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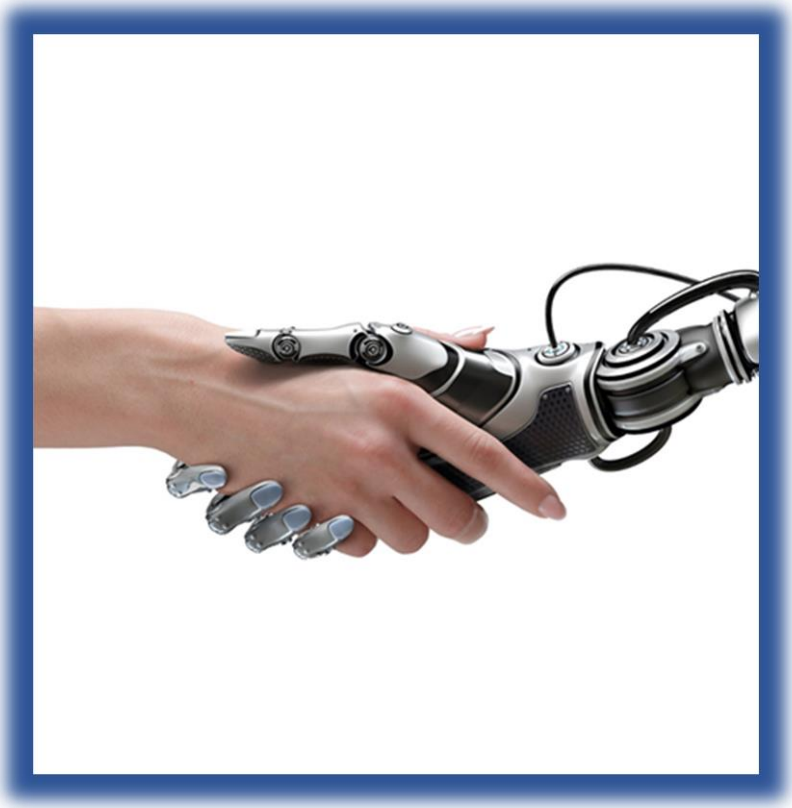

R&D&I PORTFOLIO

ENERGY/ITC SECTOR

UNIVERSIDAD DE BURGOS

Advanced Data Mining Research and Bioinformatics Learning (ADMIRABLE)

Presentation

The ADMIRABLE (Advanced Data MIning Research And Business intelligence/Big data/Bioinformatics LEarning) research group main aim is the development of new ensemble algorithms and the application of data mining, data visualization and pattern matching techniques to diverse various domains such as: fault detection (in machine tools, in wind power mills), bioinformatics, time series classification or multidimensional data analysis industrial environments. Among the main achievements of the researchers of the group is the development of several new data mining algorithms: Rotation Forest, Nonlinear Boosting Projections, Disturbing Neighbours, Democratic Instance Selection, GRASP Forest, Random Balance, Random Feature Weights, Random Oracles that have aroused the interest of the data mining community. For example, Rotation Forest is an algorithm considered as a method of reference in some books in the area. The group is recognized by regional government of Castilla y Leon as a Consolidated Research Unit.

Scientific-Technical Services

Application of pattern recognition techniques to large volumes of data, including industrial and bioinformatics databases.

Solution of prediction, classification and segmentation problems using data mining techniques. For example for predicting the risk profile of customers, discover access behaviour patterns of users accessing web sites, artificial vision and image processing.

Application of advanced visualization techniques for extracting information in large volumes of data, for optimizing industrial processes; and diffusion of the historical-artistic and archaeological heritage through the use of 3D modelling and virtual reality.

Contact

Advanced Data Mining Research and Bioinformatics Learning (ADMIRABLE)

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Industrial and Environmental Biotechnology (BIOIND)

Presentation

The research group "Industrial and Environmental Biotechnology" (BIOIND), recognized by the University of Burgos in January 2013 and as Consolidated Research Unit of Castilla y Leon (UIC 128) in July 2015, is composed by all the professors and researchers of Chemical Engineering at the University of Burgos.

This group aims to apply the foundations of Chemical Engineering to address various challenges mainly in food industry but also in energy and recycling systems. This could be very interesting for the environment, and in turn, the group has boosted studies related to food, up to the doctoral level.

The proposals of the group make special emphasis on the environmental pillar of sustainability through different strategies: use of CO2 as a resource, valorisation of industrial by-products, biogas production and use of clean technologies among others.

Scientific-Technical Services

Characterization of fats and oils.

Determination of particle size and size distribution in micron and submicron range by laser diffraction techniques and stability studies of emulsion and colloidal systems.

Wastewater treatment engineering.

Optimization of filtration conditions.

Study of industrial applications of supercritical fluid technologies.

Study of industrial applications of membrane technologies.

Study of industrial applications of chemical engineering basic operations.

Contact

Industrial and Environmental Biotechnology (BIOIND)

Coordinator: Sagrario Beltrán Calvo; Tel.: +34 947 258 810

Facultad de Ciencias, Departamento de Biotecnologia y ciencia de los alimentos. Pza. Misael Bañuelos s/n 09001 Burgos

Inclusive Personalized Design (DINPER)

Presentation

Creation of DINper Research Group in 2011 aims to provide new targets to the activity so far in the development of technical support to disability. Keeping the successful line of projects being carried out , we realize that it is possible to get more out of that line, on one hand, and that this is necessary to work in a multidisciplinary environment . The Research Group is composed of members of technical (the members of the Group of Educational Innovation) profile, belonging to the Knowledge Area Electronics Technology and new members from the Area of Didactics and School Organization with extensive experience in the disabled care. The lines of work that open following the establishment of the Group are mainly two: o Development of technological aids for the disabled. o Promotion of the employment of disabled people.

Scientific-Technical Services

Motoric disability: cerebral palsy.

Hearing impairments.

Special education.

Infant education.

Augmentative and alternative communication systems.

Human - machine interfaces.

Contact

DINper (DINPER)

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Renewable Energies And Atmospheric Pollution (ERYMAA)

Presentation

The ERYMAA research group is actually conformed by teachers and researchers from the Physics Department of the Universidad de Burgos. They work to develop solutions for a more sustainable future. The focus of their research is in the field of clean renewable energies, but so the production of electrolytic hydrogen for energetic purposes using renewable sources.

In the environment scope, the research group works in atmospheric pollution determination, its diffusion phenomena and effects, and also dry deposition.

Scientific-Technical Services

Thin film production by electron beam or steam deposition.

Thickness determination of films using AFM.

Surface optical properties determination.

Measurement of visible and infrared reflectance by spectrometry.

Measurement of infrared emission of surfaces by IR spectrometry.

Determination of atmospheric pollutants through D.O.A.S.

Contact

Energías Renovables y Medio Ambiente Atmosférico (ERYMAA)

Coordinator: Ramón Enrique Viloria Raymundo; Tel.: +34 947 258 988

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Applied Computational Intelligence (GICAP)

Presentation

This multidisciplinary research group (GICAP) at the University of Burgos is interested on research related to the field of Artificial Intelligence, and mainly in the fields of connectionist models, data mining and knowledge extraction, projection methods and dimension reduction and visualization techniques. Also, we are researching in the field of identification systems (modelling of any kind of process). These techniques have been applied to different and interesting areas as Knowledge Management, Chemistry, Physics, and Civil Engineering, Food Industry, Computer Network Security, Laser milling, identification of the optimal conditions of a pneumatic drill and so on.

Scientific-Technical Services

Design and application of artificial neural networks and machine learning algorithms to different problems: analysis, search, structure visualization and high dimensional data classification.

Customer Analysis for loanss.

Glass clasification based on chemical composition, etc.

Development of ICT tools.

Knowledge Management.

Enterprise Management Models.

Tools for data classification, clustering and visualization.

Development of scientific websites.

Contact

Applied Computational Intelligence (GICAP)

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Technology, Building, Construction and Architecture (GITECA)

Presentation

GITECA was a proposal to integrate the proactivity and the individual concerns of the researchers in the field of building. The research group is represented by three main areas of knowledge: Architectural constructions, construction engineering and graphic design in building. This multidisciplinary group is a response for the complex field of residential buildings, combining comfort and energy efficiency.

The focus of the group is to develop solutions according to the objectives of the European program for 2020, to obtain near zero emissions buildings.

Another field of interest is the reuse of elements from debuilding as bases in mortars and concretes.

The scientific approach of the group is also related with thermal process and ventilation in residential buildings.

Scientific-Technical Services

Thermography.

Tightness.

Photogrammetry.

Passivhaus homologation.

Contact

Tecnología, Edificación, Construcción y Arquitectura (GITECA)

Coordinator: José Manuel González Martín; Tel.: +34 947 258 985

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Metaheuristic (GRINUBUMET)

Presentation

An optimization problem has an infinite number of solutions and it is hard to find the best solution in a reasonable time lapse.

To find this optimal solution, GRINUBUMET develops metaheuristics methods to apply them in real problems. These solutions have been applied in several fields for example in public transport (scholar or urban) or sanity (inpatients planning), logistics (indoor or outdoor route planning) or production planning.

Scientific-Technical Services

Design of routes.

Design of production planning systems.

Public transport systems.

Health resources planning.

Financial issues solutions.

Contact

Metaheuristic (GRINUBUMET)

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Automechanics Engineering (iAM)

Presentation

The research group in Automechanics Engineering at the University of Burgos, focus its activity in Mechanics, Systems Engineering and Automatics.

Its main activity spins around machine and/or mechanical systems analysis and design, free production systems automation, robotic systems integrations, failure diagnosis and predictive maintenance programs.

The team elaborate continuously real applied research and innovation projects, with regional important companies, related with equipment goods, automobile auxiliary industry and agrofood sector.

Scientific-Technical Services

Didactic prototypes and educational innovation

Advanced control of industrial processing

Automatics and industrial robots

Failure detection and diagnostic

Behaviour and design studies of wind turbines

Design and control of solar track mechanisms

Contact

Automechanics Engineering (iAM)

Coordinator: Justo Ruiz Calvo (justorc@ubu.es); Tel.: +34 947258917

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Energy Engineering Research Group (iENERGIA)

Presentation

The research team of Energy Engineering aims the development of basic research and its application to the field of energy conversion efficiency and the renewable energy research. The scope extends to thermodynamic and transport properties of new fluids and its mixtures (such as fuels and bio-fuels, refrigerants, heat transfer fluids, phase change materials) thermal energy storage materials, energy efficiency in buildings and industry, and energy supply by renewable energies.

Scientific-Technical Services

Study on thermodynamic behaviour of liquid mixtures of industrial interest.

Energy audits in industry and buildings.

Quality controls of energy installations in buildings.

Thermo hydraulic tests on equipment for heat transmission.

Thermophysical properties of industrial fluids. The improvement of energy efficiency and the use of renewable energies are strongly influenced by the rise of new energy fluids of high technical performance and low environmental impact. Amongst them we can mention refrigerants, bio-fuels, heat transfer fluids, thermal energy storage materials, etc. The precise characterization of the thermo-physical properties of these fluids is of utmost importance for its development and application.

Contact

Energy Engineering Research Group (iENERGIA)

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Logistic and Transport Engineering (LogIT)

Presentation

Logistic and Transport Engineering research group began to work in 2006, as a result of its membership interest in the techniques of engineering and transportation infrastructures.

The main active research lines are, on one hand, the improvement in the construction of transportation infrastructures, integrating the last advances in sustainable and recycling techniques, and, on the other hand, the modelling transport system for public and private urban and inter-city transports.

The sustainable mobility aim is one of the key points of the activity of the research team, giving special attention to the use of recycled materials or for those which construction produces the minimum possible environmental impact. In addition, the promotion of the public transport and the minimization of externalities -accidents, noise, traffic jam, pollution- owed to the transport are basic strategies to improve the quality of life of the citizens.

Scientific-Technical Services

Road surfaces: Technical advising in road surfaces. Knowledge and advanced technique application in the use of bituminous recycled materials. Study on hardness/durability of materials.

Transport and logistics: Added Value on managing the specific computer programs: AIMSUN, PTV VISUM, ESTRAUS, LIMDEPNLOGIT, TRANSCAD, SATURN. Quality studies accomplishment in transport. Study on demand of trip and services. Study on mobility. Study on technical, social and financial viability. Modelling network of public and private transport: capacity of forecast alternatives in case of incidents, reorganizing urban traffic, etc... Road safety audit. Engineering and port Logistics and airport Security Engineering. Infrastructure management.

Contact

Logistic and Transport Engineering (LogIT)

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Solar and Wind Feasibility Technologies

Presentation

Our research is focused on the development of new technologies for the application in renewable energy generation, mainly wind and solar photovoltaic and thermal. Other research interest is the measurement and modelling of climatological and radiative variables, needed to design energetic facilities. We are a multidisciplinary research group formed by engineers, mathematicians and physics. We have two meteorological experimental facilities to measure solar radiation (global, direct and diffuse), temperature, ambient pressure, rainfall, humidity, wind and illumination.

Scientific-Technical Services

Solar trackers based on parallel kinematics for its integration into Smart Grids. Link

Device to measure the diffuse solar radiation in any direction at the same time: energy efficiency applications.

Contact

Solar and wind feasibility technologies (SWIFT).

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PEOPLE COUNTING SYSTEM OR OCCUPATION CONTROL SYSTEM IN ADVERSE CONDITIONS OF BRIGHTNESS.

TECHNOLOGY SUMMARY

Artificial vision system and data capture for counting people in adverse environmental conditions. The real time data is used to analyse the occupation or people flows in a reliable way, becoming a tool to improve the decision making more efficiently.

BENEFITS

CONTRIBUTES WITH REAL TIME INFORMATION OF PEOPLE FLOW AND ATTENDANCE IN COMMERCE, PUBLIC TRANSPORT, MUSEUMS, ETC.

ALLOWS ANALYSING AUTOMATICALLY DE **PEOPLE FLOW** WITH VIDEO CAMERAS.

MAKES IT EASIER TO **CONTROL DE CONCURRENCE** AND MAKING DECISIONS IN HALLS OR VEHICLES.

FUNCTIONALITY GRANTED IN ADVERSE BRIGHTNESS CONDITIONS.

CONTEXT

People counting systems with real time information, are used to make decisions in multiple sectors as commerce, public transport, museums or other public spaces.

The obtained data is useful to make a detailed analysis of people flows, spots of concentration, buying habits, marketing influence and furthermore, to optimize material and human resources.

To ensure the system is working properly in adverse brightness situations ensuring the operability and the data collection. Thus, the system becomes a reliable choice to control people in an enclosure.

APPLICATIONS

Access and concurrency control in establishments: Commerce, museums, public transport and other sites.

Analysis of effectiveness of marketing campaigns and other buyer influence factors.

Optimization of resources by clients or assistants presence.

PEOPLE COUNTING SYSTEM OR OCCUPATION CONTROL SYSTEM IN ADVERSE CONDITIONS OF BRIGHTNESS

IP RIGHTS

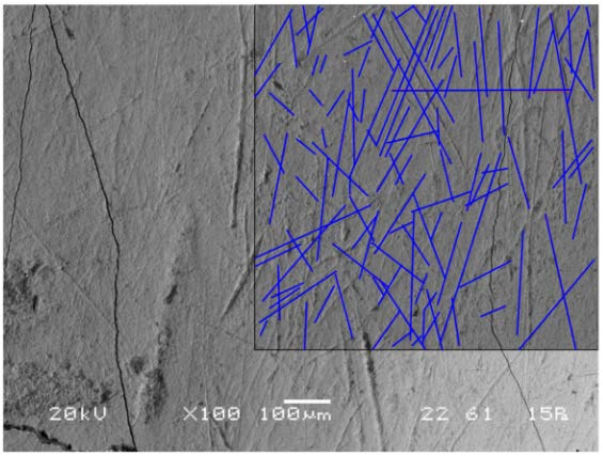
Intellectual property registered BU-43-17.

DEVELOPMENT STAGE

Proof of concept. Evaluation of results.

KEYWORDS

Capacity, Control of people, Access, Events, Museums, Public transport, Marketing, Shopping, Image capture, Video capture



DEVELOPED BY

DINPER Research Group of Universidad de Burgos.

BUSINESS OPPORTUNITY

Electronics, IT and Telecom.
Industrial manufacturing, Material and Transport Technologies.
Protecting man and environment.
Social and Economics concerns.

PARTNERSHIP

Commercial agreement, License agreement, Technical cooperation: further development, Technical Cooperation: testing new applications; Technical Cooperation: adaptation to specific needs.

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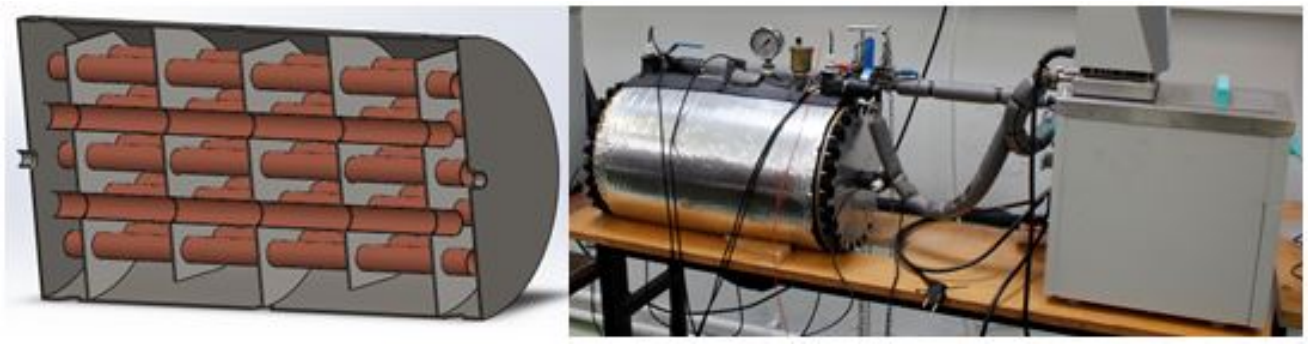
Technology #XXXXX

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

HEAT EXCHANGER WITH ENERGY STORAGE ALTERATION DETECTORS.



TECHNOLOGY SUMMARY

Heat exchange system with internal energy storage with sensors that detect performance alterations and take decisions about energy efficiency of the system, saving energy and economical loses.

BENEFITS

ENERGY STORAGE WITH ENERGY SENSORS TO KNOW THE STATUS AND PROPER WORKING OF THE HEAT EXCHANGER. THE FREQUENCY OF THE CLEANING OPERATIONS IS REDUCED AND ITS SHELF LIFE IS INCREASED AS A CONSEQUENCE OF THE DECREASE IN THE DEPOSITION OF SOLIDS OVER THE MEMBRANES SURFACE.

ALLOWS TAKING DECISIONS ABOUT ENERGY EFFICIENCY OF STORAGE SYSTEMS.

CONTEXT

Heat exchangers include mechanisms to store energy from renewal sources when those sources but demand needs to be cover (for example, solar energy during the night). There is a material (PCM) responsible of energy storage by absorbing or giving thermal energy. The PCM goes through behaviour changes not detectable currently, increasing unnecessarily the energetic consumption.

The new system detects this changes and consequently, it permits taking decisions and/or and automatized energetic system to save energy.

APPLICATIONS

Air conditioning installations including heat exchangers with energy storage systems (renewables and conventional).

HEAT EXCHANGER WITH ENERGY STORAGE ALTERATION DETECTORS.

IP RIGHTS

Protected by patent P201730420.

DEVELOPMENT STAGE

In use, test results available.

KEYWORDS

Industrial manufacturing, Material and Transport Technologies Energy Technology Agrofood Industry Other Energy Market Industrial Products exchager, heat, accumulation, enery, energetic efficiency, sensor, temperatura, savings, decisión, automation, alteration, storage, detector, climation

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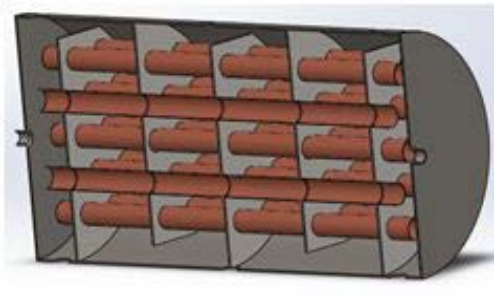
Technology #XXXXX



DEVELOPED BY

Energy Engineering Research Group (iENERGIA) of the University of Burgos.

BUSINESS OPPORTUNITY

- Agrofood Industry.
- Energy
- Other Industrial Technologies.

PARTNERSHIP

Commercial agreement, License agreement, Technical cooperation: further development, Technical Cooperation: testing new applications; Technical Cooperation: adaptation to specific needs.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

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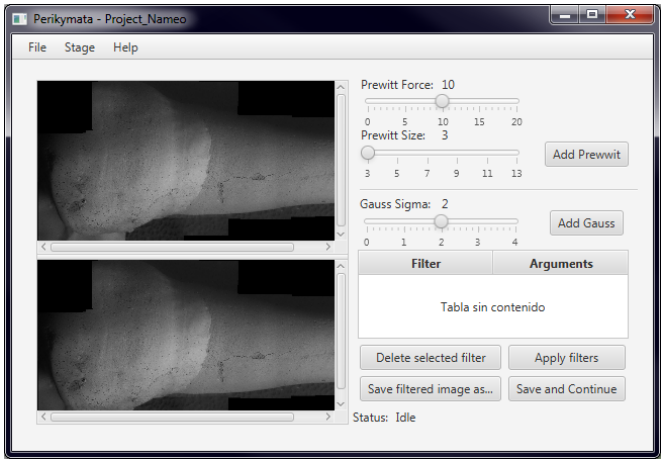
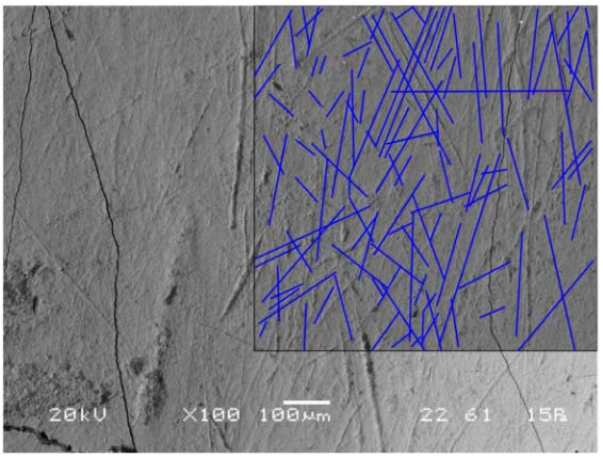
AGE, GROWTH AND FEED ANALYSIS FROM TEETH IMAGES, APPLICABLE IN PALAEONTOLOGY AND THE FORENSIC INDUSTRY.





TECHNOLOGY SUMMARY

Teeth analysis using software to obtain information from palaeontological remains by semi-automatic image processing. This way the human error due to the repetitive works are minimized. Moreover, it can be used in forensic odontology.

BENEFITS

FUSCE RHONCUS DOLOR: ac euismod eros feugiat et.

SED IMPERDIET: libero nec fringilla volutpat, sem tellus luctus neque, at gravida eros erat vitae metus.

PELLENTESQUE HABITANT MORBI TRISTIQUE: senectus et netus et malesuada fames ac turpis egestas.

QUISQUE CONSEQUAT: neque lorem, ut elementum neque facilisis vel.

INTEGER EGET: scelerisque tellus, sit amet aliquet nisi.

CONTEXT

It is possible to obtain relevant information about our predecessors' way of life through the teeth image analysis. Mainly the age, nutrition problems during its growth and the diet can be estimated. Thus, it is possible to make guesses about its life, behaviour and environment.

The new analysis method uses semi-automatic image treatment modules. This avoids the human mistakes often committed during this analysis based in a repetitive process.

For each module, marks and indicators of feed or growth problems are identified in a semi-automatic way instead of current solutions. Now an image treatment is needed with a posterior identification and analysis.

APPLICATIONS

Palaeontological teeth analysis. It could also be usable in forensic odontology. More data could be required in this second case.

AGE, GROWTH AND FEED ANALYSIS FROM TEETH IMAGES, APPLICABLE IN PALAEONTOLOGY AND THE FORENSIC INDUSTRY

IP RIGHTS

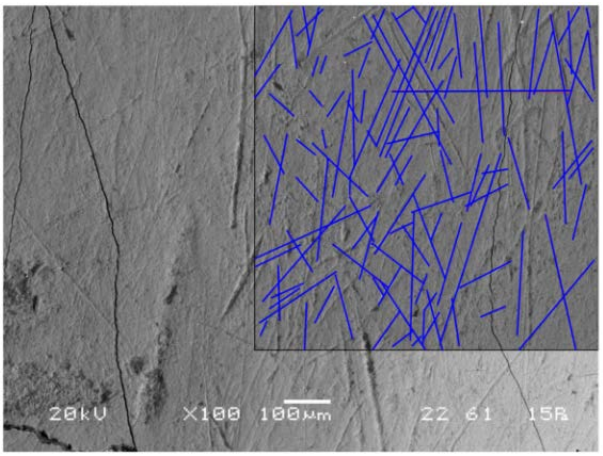
Intellectual property registered BU-75-17, BU-76-17 and BU-77-17.

DEVELOPMENT STAGE

Continuously improving software.

KEYWORDS

Paleontology, Paleontology, Forensic dentistry, Paleobiology, Paleoecology, Hominids, Homo sapiens, Neanderthals, Homo antecessor, Mandible, Analysis, Age, Diet.



DEVELOPED BY

Palaentology Area of the Departament of History, Geography and Communication of Universidad de Burgos.

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Technology #XXXXX

BUSINESS OPPORTUNITY

Electronics, IT and Telecom.
Physical and Exact Sciences.
Biological Science.

PARTNERSHIP

Commercial agreement, License agreement, Technical cooperation: further development, Technical Cooperation: testing new applications; Technical Cooperation: adaptation to specific needs.

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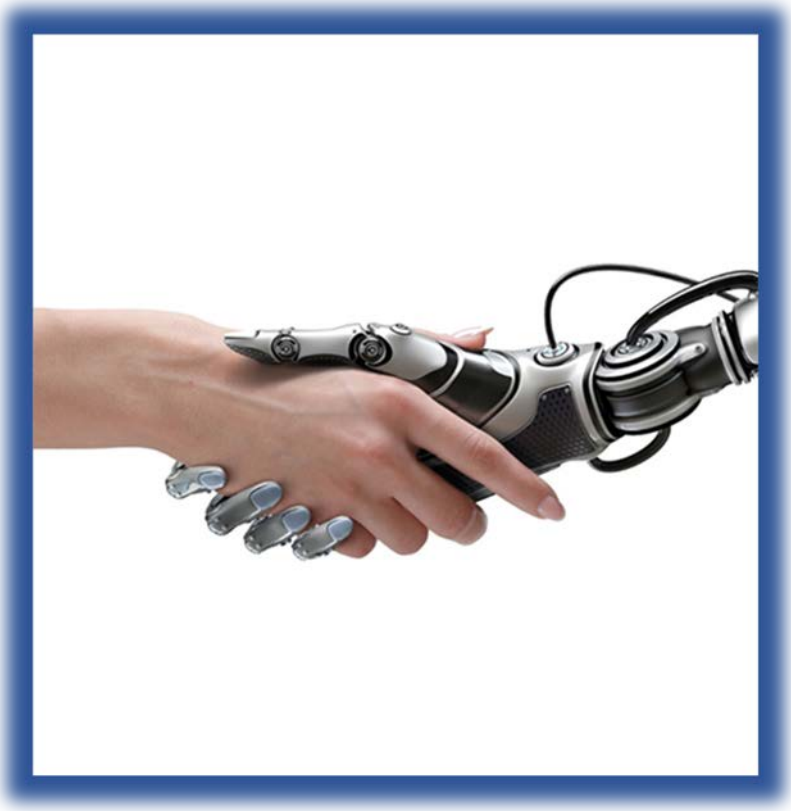

R&D&I PORTFOLIO

ENERGY AND ICT SECTOR

DANIEL GÓMEZ CÁMARA

UNIVERSIDAD DE MÁLAGA

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SCENIC

Presentation

The **SCENIC** (**Service and Component ENgineering for Internet Computing**) group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in Software interoperativity and Cloud computing.

The group has collaborated in multiple national and international projects including H2020.

The SCENIC has grown in the last years and has opened new research lines in new ICT trends like IoT-Internet of Things and other scenarios.

Scientific-Technical Services

Problem solving in App integration in Cloud

App Development:

- Problem solving in Cloud servers.
- Development in multiple plataforms.
- Possibility to change from one provider to other with minimun effort and effect.
- Independent of PAS or IASS used.

Analysis tools for services:

- Velocity analysis.
- Answer Time between App and server.
- Behavior prediction of App depending of the server provider.

IoT-Internet of Things:

- Sensor automatisation and sensor configuration to pre-process before App interaction.

Contact

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NICS

Presentation

The **NICS** (Network, Information and Computer Security Lab) group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in Cybersecurity and privacy, digital witness and Criptography.

The group has participated in several EU projects: WP7, H2020, Marie Curie Actions, etc with excellent results.

Scientific-Technical Services

Software development in Cybersecurity and privacy.

Influenced areas:

- In Smog.
- In Cloud.
- In critical infrastructure monitoring in IoT devices.
- Advanced Criptography for Blockchain.
- Digital Witness: Safeguarding Digital Evidence by using Secure Architectures in Personal Devices.
- Reliability in IoT

Application in vehicule communication for autonomus vehicule.

Contact

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ERTIS

Presentation

The **ERTIS** (Embedded Real-Time Systems) group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in Methodologies for Critical Software Development, Complex Systems Middlewares, Cyber-Physical Systems and Cloud Computing Integration.

Scientific-Technical Services

- Critical infrastructure monitoring for predictive maintenance.
- Software development for embedded devices in automotive sector for physical variables monitoring.
- Energy consumtion monitoring with smartmeters.
- IoT software developing.
- Traceability by blockchain technology.

Contact

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CAOSD

Presentation

The **CAOSD** (Component and Aspect Oriented Software) group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in component-based systems developing, aspect-oriented systems and agent-oriented systems. smart homes, home telecare, vehicular networks, etc.

The Group has collaborated in multiple EU projects in different consortiums.

Scientific-Technical Services

Software development:

- Dynamic configuration software for IoT devices network.
- Genetic algorithms for IoT systems optimisation in execution time.
- Cybersecurity: dynamic configuration keeping the security protocols.

Energy consumtion:

- Energy consumtion test.
- Software energy consumtion for Wireless systems: battery life cycle.

App development:

- Algorithm optimisation for touristic tours and disabled people.
- Algortihm multiobjective development.

Contact

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PROTEUS

Presentation

The **PROTEUS** group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in Security Systems and privacy, Security certification and, security in Cyber-Physical Systems (CPSs) and IoT. Reliable computing and cryptographic hardware.

The group has participated in multiple WP6 and WP7 projects involved in the EU funding programs.

Scientific-Technical Services

Information Security design:

- Security privacy by design.
- Security systems engineering.
- Control model by hastags or attributes:
    - ABAC (Attribute Base Access Control.
    - SAC (Semantic Access Control)
- Payment systems “car to car” and/or “car to infrastructure”

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MORSE

Presentation

The **MORSE** (**Mobile Networks and Software Reliability**) group is part of the GISUM (Software Engineering Group of the University of Málaga) and are specialised in Model based testing and model checking for Cyber Physical Systems (CPSs). Runtime verification of extra-functional properties in CPSs. Quality of Service/Quality of Experience in 4G/5G mobile networks. Experimental facilities for research in wireless communications.

Scientific-Technical Services

Mobile networks software development:

- Base stations
- Network core
- Operator Network

5G Network Core software development:

- SAN
- NFV
- MEC (Mobile Edge Computing)
- MEC (Multiaccess Edge Computing)
- LLC (Low Latency Communication)
- URLLC (Ultra Reliable Low Latency Communication)

Software reliability. Software analysis to purge and reliability analysis for:

- Common software
- Aircrafts software
- Critical infrastructures software

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NEO

Presentation

The **NEO** (**Networking and Emerging Optimization**) group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in Cloud Computing Security. Critical Infrastructures Protection, Identity Management, Internet of Things, Non-repudiation, RFID. Secure Software & Service Engineering, Trust & Reputation Management y Wireless Sensor Networks.

Scientific-Technical Services

Software testing in IoT and Fiware.

Systems and Process optimisation (e.g. industrial process, logistic plataforms design) by:

- Machine learning
- Evolutive algorithms
- AI – Artificial Intelligence
- Metaheuristics by bioinspired algorithms.

Smartcity (micro-simulation):

- Cloud computing
- Grid
- GPU – Graphical Processing Units
- FPGA
- App development of iOS and Android

Smartcity:

- Communication between vehicles.
- Traffic prediction by machine learning
- Route optimization (e.g. in waste collection, etc)

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KHAOS

Presentation

The **KHAOS** group is part of the GISUM (Software Engineering Group of the University of Malaga) and are specialised in integration management and Data Analysis: data bases, semantic web, linked open data and Big Data.

These technologies are applied to Systems Biology, translational information technology and, Cultural Heritage and Tourism.

Scientific-Technical Services

- Scalable Reasoning on Large data Volumes.
- Middleware based on Ontologies
- Discovery of semantic relationships among ontologies
- Composition of Semantic Web Services. ESB Semantic
- Recommendation of contents based on semantics
- Semantic extension of data bases
- Semantic Web for E-Science
- Multi-objective optimization
- Big Data Analysis
- Business Intelligence Models

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Systems Engineering and Automatics

Presentation

The group of **Systems Engineering and Automatics** develops its work in mobile and autonomous robots, robotic systems in hospital and surgery enviroments. Manufacturing process automatisation, intelligent control systems and image processing.

They worked for aerospace, rescue, industrial and medical sector principally.

Scientific-Technical Services

Industrial process automatisation:

- Robots applied to industry.
- Complete manufacture of mobile robots for industrial applications and services.
- Logistic systems automatisation.

Monitoring:

- Control systems design.
- Touch perception by Deep learning.
- Control systems by Deep learning.

3D modelling by laser scan.

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MAPIR

Presentation

The **MAPIR** (**Machine Perception and Intelligent Robotics**) group belongs to the Systems Engeneering and Automatics Department and are specialised in sensoring and robotics.

The group has developed the activity in aerospace, industrial and medical sectors.

They have a long experience in international projects funded by EU programs developing projects in WP6, WP7, H2020, etc.

Scientific-Technical Services

Sensor signal processing:

- Sensor signal
- Video signal (Artificial visión)

Image processing: 3D modelling of objects, buildings and infrastructures.

Laser sensor: map building.

Gas and Odor detection and recognition: electronic nose.

Data Analysis and decision making through techniques from AI and Machine Learning.

Monitoring and performance in Smart enviroments.

Robotics:

- Development of Service and assistance robots.
- Guided vehicles (autonomous navigation): robots, cars, drones, etc.

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SURFACES AND MATERIALS LABORATORY

Presentation

The Group **Surfaces and Materials Laboratory** develops the activity in 3 main areas: Energy storage by electrochemical methods, translucent and transparent materials developing and nanostructures for optic applications.

The Group has participated in European consortiums for Research and Develop projects and has multiple patents in nano and micro-structures.

Scientific-Technical Services

Energy and materials:

- Manurfacture and characterisation of nanostructures.
- Selective surfaces manufacturing.
- Nano-structured anodes and cathodes manufacturing for lithium ion batteries.
- Transparent Oxid Conductors (TOC) characterization and manufacturing.
- Nanoparticles and nanostructures generation by microprecursors irradiation.
- Commercial Solar cells efficiency optimisation

Defence and Aerospace:

- Electromagnetic shielding materials for anti-radar functions.

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Electric Engineering Malaga. Renewable Resources

Presentation

The **Electric Engineering Malaga. Renewable Resources** has more than 25 years experience in fundamental properties of engines improving. They are specialised in design of electric drivers and regulation of electric machines (e.g. turbines of wind generators).

The group works in noise and vibrations reduction in electric engines.

The group has developed research projects with multiple companies and has developed different patents in this research area.

Scientific-Technical Services

Development of active filters for harmonic elimination and harmonic compensation of reactive power.

Quality optimization of the power supply:

- Power converter design in electric engines.

Mechanic behaviour optimization of induction engines:

- Noise
- Vibrations.

Control equipment design in Engines and their applications.

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ENERGETICS

Presentation

The Group **Energetics** develops applications in solar energy through thermo-solar and photovoltaic technologies.

The Group collaborates with multiple companies in research projects to ensure sustainable development with solar energy.

Scientific-Technical Services

Characterization of thermo-solar and photovoltaic systems and components.

Thermal behaviour testing of air conditioning systems.

- Energy saving systems and energy efficiency applied to building.

New applications of solar energy in cooling systems.

Energy audits.

Residential Automation: Wireless connections applied to climate.

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PHOTOVOLTAIC SYSTEMS

Presentation

The Group **Photovoltaic Systems** analyzes these solar systems and their behavior with different environment conditions and develops new methods of electric characterization and testing methods.

The Group has multiple patents in photovoltaic testing methods and a long experience working with companies in collaborative research projects.

Scientific-Technical Services

Weather models monitoring and electric models monitoring for work temperature prediction in photovoltaic systems in real conditions.

Tools and systems design for photovoltaic systems monitoring.

Photovoltaic systems optimisation.

Integration of automatic learning models and OPC technologies to evaluate and predict the photovoltaic systems generation.

Electric properties analysis in anti-dirt surfaces modules.

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DIANA

Presentation

The **DIANA** (**Design of Advanced Interfaces**) is large research group focus on novel advanced interfaces for applications to the new information and communication technologies.

The Group has grown in the last years and has 4 different research lines:

1. Virtual Reality/Augmented Reality
2. Wireless sensor networks.
3. Innovation in Education.
4. BCI-Brain Computer Interface
5. UAV (Unmanned Aerial Vehicle)

Scientific-Technical Services

Virtual and Augmented Reality development:

- Image.
- Audio 3D.

Wireless Communication Technologies:

- Sensor Wireless networks.

Security in Wireless communications by physical layer: channel codification.

Industrial training development.

BCI (Brain Computer Interface) to apply in electronics (by brain control).

UAV- fire detection and monitoring.

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Communications Engineering

Presentation

The **Communications Engineering** group has a intensive research activity in the main areas in ICT. They divide their projects in several research lines: Optic communications (laser and optic fiber), radio communication, subaquatic communications, heterogeneous networks, geolocation systems, SON technologies, etc.

The Group has participated in WP6 projects and at the current moment is involved in a H2020, however the main activity is provided by collaborations programs with companies.

Scientific-Technical Services

Optic communications development:

- Optic fiber
- Laser

Wireless subaquatic communications.

Heterogeneous networks software development.

Geolocation systems.

Planar antenna devices development.

SON (Self Optimization Networks) development:

- Detection, diagnosis and automatic correction of incidences.
- Quality Experience testing.
- Channel modelization.

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ATIC

Presentation

The **ATIC** (Application of Information and Communication Technologies) group develops principally its research activity in audio signal processing for multiple applications.

The Group has a long experience in Audio signal analysis and has a audio laboratory equipped with all necessary instruments.

Scientific-Technical Services

Audio signal processing:

- Characterization of audio signal.

Quality control by audio monitoring:

- The piece wear (e.g. tire, other friction pieces, etc)

RFID – Radio Frequency Identification

Cryptography and Security in Communications

Vehicular Networks

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ISIS

Presentation

The **ISIS** (**Engineering of Integrated Systems**) group has more than 25 years experience in research and development in cognitive systems and AI (Artificial Intelligence) which is applied in robotics, computer vision and ambient intelligence.

The group has experience in multiple international projects by EU funding and has a valuable portfolio of patents in object recognition based in different technologies.

Scientific-Technical Services

Robotics: learning by imitation.

Augmented Reality (AR).

Computer vision:

- Biometric navigation.
- Human-machine vision interfaces.

Microelectronic systems (VLSI-ASICs) hardware design.

Soft computing

- ANN-Artificial Neural Networks.
- Fuzzy systems.
- Genetic algorithms.

Image analysis: Industrial Application (quality control) and mapping (satellite/air/dron image).

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Computer Intelligence and Image Analysis

Presentation

The Computer Intelligence and Image Analysis group has more than 30 years of research activity in neurocomputation, computational learning and image analysis.

The main application is the video surveillance in different enviroments. The group has multiple patents in this sense.

Scientific-Technical Services

Development of intelligent systems to help in business decisions.

Video surveillance:

- Recognition and identification of patterns.
- digital images Analysis: abnormalities detection.
- Computational learning.

Design and manufacture of digital mobile video sensors (e.g. systems for inspection tasks and surveillance).

Marketing monitoring:

- Social networks monitoring
- online reputation analysis

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CLINIMETRICS IN PHYSIOTHERAPY

Presentation

The **Clinimetrics** group works in validation of tools for diagnosis integrating biomechanics, physiology, psychometrics and clinical signs.

The group works in automotive safety sector since a long time developing new methods to prevent accidents.

Scientific-Technical Services

Fatigue in drivers diagnosis:

- Image analysis: Face recognition technics.
- Infrastructure: Drive simulator.

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ELECTRONICS FOR INSTRUMENTATION AND SYSTEMS

Presentation

The **Electronics for Instrumentation and Systems** is a group specialised in study and design of tactile sensors.

The group has focused the application in multiple sectors including surgery, telepresence and industrial robotics.

Scientific-Technical Services

Sensors design (analogical and digital):

- Sensoring of presure distribution.
- Application of tactile sensors in industrial robotics and experience in other fields like:
  - Industrial robotics.
  - Telemedicine.
  - Domotics.
  - Assistance for senior citizens.

Intelligent sensors

Sensor network

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MINFO

Presentation

The **MINFO** (COMPUTER MICROELECTRONICS) research group aims to improve the efficiency of the production in industrial enviroments.

The group is specialised in electronic design and automatic supervision systems in industrial processes. They worked for international companies in multiple industrial sectors and have developed some patents.

Scientific-Technical Services

Electronic design:

- Circuits design (analogical and digital)
- Electronic cards

Neuronal networks to optimise resources and execution times in production processes.

Automatic supervisión applied to quality control e.g.

- by laser measurment.
- By artificial vision for spots/defects detection

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ACE_TI

Presentation

The **ACE_TI** (Green Buildings & Energy Supply, Sustainable Urban Mobility) belongs to a big group placed in University of Sevilla. However, part of the research is elaborated in University of Malaga by Javier Duran and his group, which is specialised in electric engines and power converters with 12 or more phases. These technologies could be applied to wind energy, electric vehicles or Aerospace sector.

They have developed a patent in 2014 of power controllers monitoring and management.

Scientific-Technical Services

12 (or more) phases electric engines:

- Power converters.
- Power controllers.

Electric engines with phase fault tolerant.

Urban electric vehicles:

- Demonstration development.

Energy managment:

- Intelligent systems development.

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HOME AUTOMATION, INDUSTRIAL MODELS, TECHNOLOGIES…

Presentation

The group "**Home Automation, Industrial Models, Technologies and organization**", has a large qualified personnel, numerous patents, domotic laboratories, and all necessary equipment to carry out the multiple research lines that they develop.

In addition, this group owes the creation recently of the Domotics and Energetic Efficiency Institute (IDEE), which is located in the Industrial Engineering School.

Scientific-Technical Services

The group develops different research lines in multiple environments:

- Sensor design and manufacture for industrial and service applications.
- Domotics.
- Energy efficiency in buildings.
- Design and manufacture of embedded control systems.
- Home automation applications for health.
- Ilumination.

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GEOGRAPHYCAL ANALYSIS

Presentation

The group **Geographycal analysis** focuses the research lines on studies and applications for sustainable social and territorial development. The areas that we have done works are local development, carrying capacity and uses of rural areas, the development of urban or tourist areas and Geographic Information Technologies

The group has collaboration agreements with several companies in the agriculture sector and mapping.

Scientific-Technical Services

- Technical assistance in land-use planning. Studies of environmental impact, landscape and natural hazards. Territorial and urban planning.
- Socioeconomic studies for the territorial diagnosis of the urban environment and the rural environment.
- Design of geographic databases, cartographic production with GIS and Remote sensing and geographic data management for optimal geolocation and capacity of reception or load.
- Landscape studies and analysis of optimal implementation of facilities and infrastructures.
- Potential evaluation of soils and agricultural crops. Ecological agriculture. Livestock management.

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PROCAT (TECNOLOGIA PROCESOS CATALITICOS)

Presentation

The Group of the Catalytic Processes Technology (PROCAT) belongs to Chemical Engineering Department. The research activity of the PROCAT Group is focused on Applied Catalysis for environmental protection, energy conversion and sustainable chemicals production.

The group worked with multiple national energy companies to develop projects of Catalyst not only for fuel and biofuel production, also for fuel and biofuel consumption.

Scientific-Technical Services

- Testing and characterization of materials
- Monitoring of chemical reactions in situ FTIR-MS
- Thermogravimetric Analysis
- Studies of the use of biomass, biosolids and biogas
- Counseling in courses, seminars and congresses organization
- Laboratory development of Catalyst for fuel and biofuel production and consumption.

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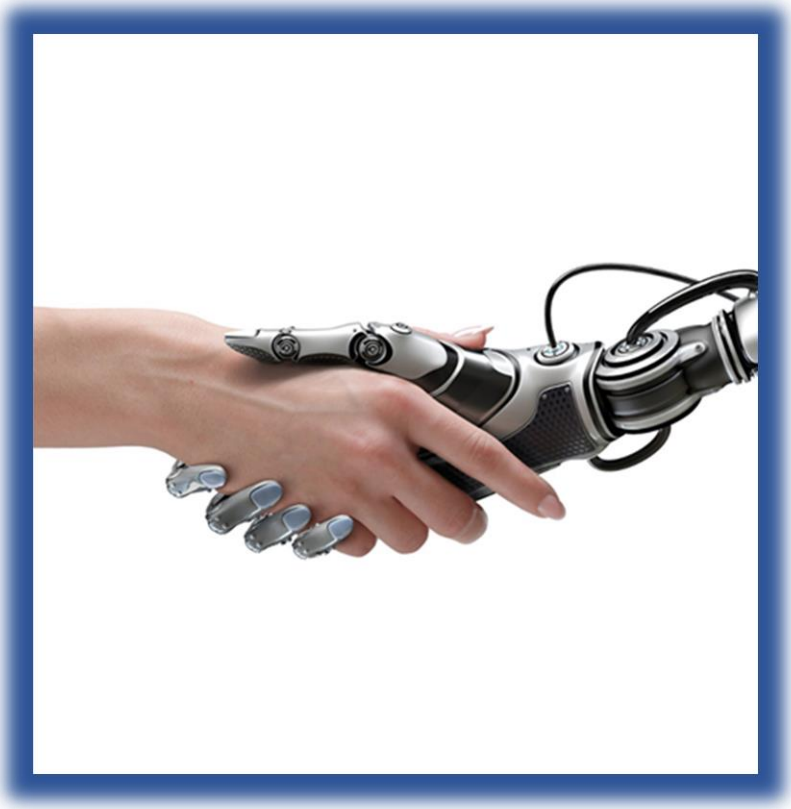

R&D&I PORTFOLIO

ENERGY AND ICT SECTOR

DANIEL GÓMEZ CÁMARA

Ion-Lithium secondary transparent battery

TECHNOLOGY SUMMARY

The Ion-Lithium secondary transparent battery can be integrated with a thin-film cell, and the connection can be connected to an external lighting system such as LED or OLED. Those lighting systems can be alternatively integrated into the thin layer form on the tandem photovoltaic battery-cell.

In addition, its transparency to sunlight and visible, and the fact that it can be directly manufactured on transparent supports (glass or polymer) allows its integration into glass surfaces of buildings, and the combination with solar cells can be used in systems of cost saving and energy sufficiency in buildings, including lighting.

.

BENEFITS

BIG SURFACES: the secondary battery can be obtained in big surfaces.

TRANSPARENT SUPPORTS: Can be manufactured directly in transparent supports.

COST SAVING AND ENERGY EFFICIENCY: can be used such as cost-saving system or energy efficiency system, including lighting system such as an external source for LED system.

LOW THERMAL EMISSION.

CONTEXT

The Ion-Lithium batteries are one of the more used battery types in electronic of consumption. These batteries have not memory effect, which facilitates the efficiency in the charging process. They have a better cyclability process in the charging process also and develop high values of energy. In the current market, there is an intensive search to improve the energy/weight rate and, of course, the security.

The present invention offers a new kind of Ion-Lithium secondary thin layer transparent battery made of solid polymer, which can be integrated into glass or other polymers. It is useful for energy sustainability in buildings and, other places to deploy.

APPLICATIONS

This technology is focused on the Energy sector in order to improve the energy efficiency systems and cost saving advantages.

BATTERY ION-LITHIUM
LED LIGHTING SYSTEM
OLED LIGHTING SYSTEM
ENERGY SUSTAINABILITY

Ion-Lithium secondary transparent battery

IP RIGHTS

This Technology is currently protected by a granted patent in Spain (priority date May 2009).

DEVELOPMENT STAGE

The technology has been developed and validated in laboratory.

KEYWORDS

ION LITHIUM BATTERY
TRANSPARENT BATTERY
SOLID POLYMER
ELECTRONIC DEVICE
ENERGY

DEVELOPED BY

Inventors: Francisco De P. Martin Jimenez, Elena Navarrete Astorga, Luis Sanchez Granados, Luis Sanchez Granados, Jose Ramon Ramos Barrado.

BUSINESS OPPORTUNITY

Technology transfer by licensing agreement, and collaborative development for new applications.

PARTNERSHIP

Looking for company for a licensing agreement or a collaborative project in order to develop a specific prototype model for a specific application (specific device or particular battery).

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Technology:

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

MOBILE DEVICE FOR VEHICLE IDENTIFYING AND PARKING MANAGEMENT.

TECHNOLOGY SUMMARY

The invention is a new mobile device, which allows automatic car plate recognition with an identification software integrated with other common software such as GPS in order to make an integral management of all necessary operations that usually are necessary for fine imposing or another pricing process in car parking, statistics, etc.

The new device is able to gather all the information (plate number, GPS position, date, time, gather other information of the vehicle from databases) and print automatically the fine.

.

BENEFITS

MOBILE: the new device is portable.

INTEGRATED WITH COMMON SOFTWARE: integrated with other functions: GPS, database check, etc.

CAR-PLATE AUTOMATIC IDENTIFICATION: through a specific software is able to recognize the number and check the database to look for additional information.

WIRELESS CONEXION: using public infrastructure (GPRS, UMTS, etc.).

CONTEXT

At the current moment, there are several jobs where the personnel needs to process the pricing or fine imposing. The portable commercial devices need to introduce the data manually. The new device integrates all necessities to develop this jobs in a mobile device with the advantages of wireless connection to databases in order to check the information about the vehicle, driver, etc. And the developed software for car-plate identification reduces the size and weight of the current devices, which are fixed or transported by car in a simple PDA or similar devices.

APPLICATIONS

This technology is focused on parking management services.

PARKING MANAGEMENT.
FINE IMPOSING.
CAR-PLATE IDENTIFICATION.

MOBILE DEVICE FOR VEHICLE IDENTIFYING AND PARKING MANAGEMENT

IP RIGHTS

This Technology is currently protected by a granted patent in Spain (priority date May 2007).

DEVELOPMENT STAGE

The technology is able to be deployed.

KEYWORDS

PARKING MANAGEMENT
FINE IMPOSING
CAR-PLATE IDENTIFICATION
FINE IMPOSING AUTOMATIC PROCESS

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Technology:

DEVELOPED BY

Inventors: Antonio Javier Gonzalez Jimenez, Juan Miguel López Fernández, Cipriano Galindo Andrades, Vicente M. Arévalo Espejo, Jose Luís Blanco Claraco, Juan Antonio Fernandez Madrigal, Gregorio Ambrosio Cestero.

BUSINESS OPPORTUNITY

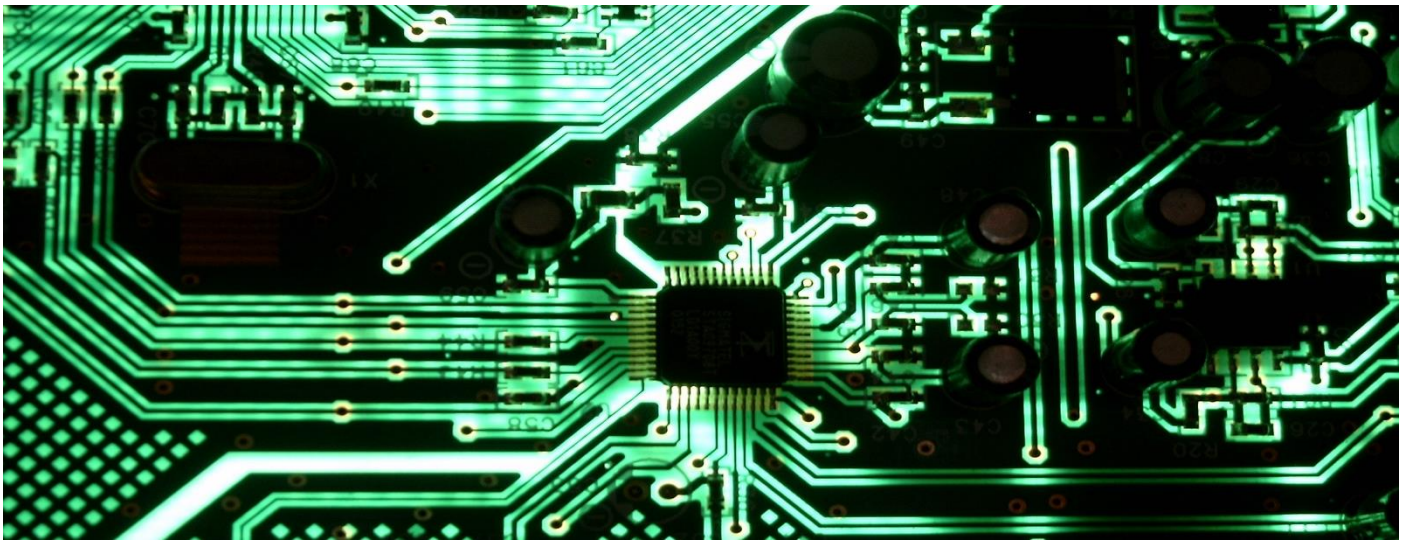
Technology transfer by licensing agreement, and collaborative development for new applications.

PARTNERSHIP

Looking for parking management companies interested in deploying this technology in private or public parking.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

INTEGRATED POLARIZATION SPLITTER



TECHNOLOGY SUMMARY

The new device is a integrated polarization splitter, which through a polarization splitter based in an multimode interference accoplator (SWG) is able to separate one polarized orthogonal signal in two [Electric Transversal (ET) and Magnetic Transversal (MT)], and it does not supose a difficulty to manufacturate and can be integrated with other kind of combinations of devices in a photonic chip. The device provides a compact polarization splitter with low loss and high bandwidth, which is manufacturably in an only litography step. The device can also work reciprocaly, in order to combine two polarized orthogonal signals in only one.

BENEFITS

HIGH EFFICIENCY: in the multimode waveguide region.

SMALLER SIZE: smaller than the MMI (Multimode Interference Coupler).

LOWER LOSS AND HIGHER BANDWIDTH.

NO MORE MANUFACTURE COMPLEXITY: no more litography steps necessary.

RECIPROCAL WORK: can divide one signal in two, and combine two in one.

CONTEXT

One of the main problems in the integrated optics field today is the dependency on the polarization. The current designed devices are exclusively for ET or MT. Multiple materials or optical structures were proposed in order to implement both. Nevertheless, all of them present serious problems to be manufactured and the differences between the spreading constants are low and high difficult to control, therefore these solutions offer devices with a low efficiency, which needs high propagation distances and requiring big sized devices. The market needs new devices with low loss, higher bandwidth and easy manufacture processes. In this state of art is where the new device can tackle all these problems in order to offer a reduced size and easy manufacture process device.

APPLICATIONS

There are multiple uses for the integrated polarized splitter. The se are some of priority applications:

PHOTONIC CHIPS
OPTICS
OPTIC COMMUNICATIONS

INTEGRATED POLARIZATION SPLITTER

IP RIGHTS

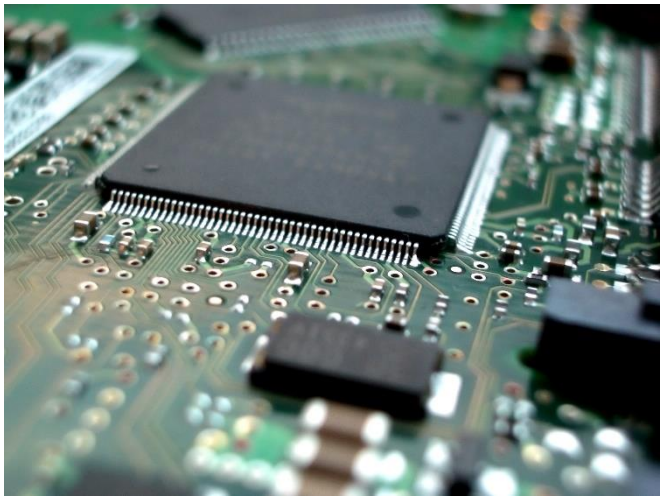
This Technology is protected by pending patent in Spain (priority date february 2018).

DEVELOPMENT STAGE.

The technology is already checked and ready to deploy in photonic chips.

KEYWORDS

INTEGRATED OPTICS
MMI (MULTIMODE INTERFERENCE COUPLER)
POLARIZATION SPLITTER



DEVELOPED BY

Inventors: the device was developed by CSIC (50%) and UMA(50%). The inventors are: Ignacio Pons(UMA), Ivan Gonzalo Wanguernert (UMA), Alejandro Ortega (UMA), Roberto Halir (UMA), Aitor Villafranca (CSIC), Alaine Herrero (CSIC) and Pedro Corredera (CSIC).

BUSINESS OPPORTUNITY

Looking for technology commercials in order to expand the client portfolio by license agreement and other technology collaboration forms.

PARTNERSHIP

Looking for users in order to license the patent and carry on the development for new devices or applications.

CONTACT

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Technology #XXXXX

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

INTEGRATED REALITY GLASES

TECHNOLOGY SUMMARY

The new device is a glasses with 2 front high resolution cameras and other 2 lateral cameras (1 each side) to get a 350º vision around. The device includes 2 side microphones to capture the enviroment sound, and 2 down more to receive the voice orders from the user. The devices is equiped also with infra-red cameras to follow the saccadic eyes movement. The image is projected in a high resolution screen with a central core and others dedicated to interpret in real time the enviroment.

The glasses have GPS, high velocity Wireless connexion and electronic gyroscope and compass.

BENEFITS

REAL-TIME SOUND PROCESSING: sound can be modified to optimise.

LATERAL VISION PRE-PROCESSING: the side cameras processe the image before the user turns, giving an inmediated answer.

OUTSIDE VISION FIELD ALERT SYSTEM: the user is alerted in case an event ocurred out of his field of view.

VOICE RECOGNITION SYSTEM: makes easier and faster the glasses usability.

CONTEXT

Originally was the virtual reality, after the augmented reality, but the last technology is the Integrated Reality which is able to interpret the captured reality and add or delete elements from this (visual and audio) to integrate in the generated reality by Computer and give as a result the integrated reality which can be experimented by the user.

The current technologies integrated in smartphones can be used like interface and can help to the processing capacity of the device in case is necessary.

APPLICATIONS

There are unlimited uses for the integrated reality glasses. These are some of priority sectors:

REMOTE ASSISTANCE IN INDUSTRY 4.0
TURISM
VIDEOGAMES
EDUCATION
ARCHITECTURE

INTEGRATED REALITY GLASES

IP RIGHTS

This Technology is protected by pending patent in Spain (priority date march 2017).

DEVELOPMENT STAGE.

The technology is in phase to build a prototype.

KEYWORDS

INTEGRATED REALITY
AUGMENTED AND VIRTUAL REALITY
GLASSES

DEVELOPED BY

Inventor: Gonzalo Pascual Ramos Jimenez.

BUSINESS OPPORTUNITY

A collaborative development: we are looking for a company to build a prototype.

PARTNERSHIP

Looking for a company in the virtual reality sector which can affront the investment of the prototype in order to get the priority in the patent licensing agreement.

CONTACT

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Technology #XXXXX

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

ARTIFICIAL VISION SYSTEM FOR PEDESTRIAN OR ANIMAL DETECTION IN HIGHWAYS

TECHNOLOGY SUMMARY

The invention is an artificial vision system for pedestrian or animals detection and presence warning of unusual elements (pedestrians, animals or inert objects) in roads and highways. With this technology the drivers could be notified faced with the risk by traffic authorities.

The model stimates the positions and velocities of the registered objects in the scene, and deleting them when they disappear, and adding new ones when they appear in a dynamic tracking model, which solve the problem of localize and identify unusual objects in a non-controled enviroment.

CONTEXT

At the current moment, the surveillance systems in Highways and roads are deploying massively due to the lower cost of the hardware. These products are being applied to economic fines for the offenders, however can be applied to detect, although unfrequently, very risky situations which can put the life of drivers and pedestrians in danger.

Between these situations are animals or pedestrians highway crossing, which is in fact forbidden, and can cause a serious accident.

This technology could provide a direct alert system to drivers by smartphones or other communications tools in order to save lifes in public roads.

BENEFITS

ARTIFICIAL VISION: real-time image Processing.

DYNAMIC MODEL FOR ANIMAL AND PEDESTRIANS RECOGNITION. and other unusual inert objects.

AUTOMATIC ALERT SYSTEM: to alert drivers of risky situations.

ROAD SAFETY: Highways and public roads more safe.

APPLICATIONS

The application is focused to public roads and highway control.

ARTIFICIAL VISION
ROAD SAFETY
HIGHWAYS AND ROADS
RECOGNITION AND DETECTION SYSTEM
PEDESTRIAN AND ANIMAL RECOGNITION

ARTIFICIAL VISION SYSTEM FOR PEDESTRIAN OR ANIMAL DETECTION IN HIGHWAYS

IP RIGHTS

This Technology in protected by a granted patent in Spain (priority date december 2014).

DEVELOPMENT STAGE.

The technology is available in a prototype.

KEYWORDS

ARTIFICIAL VISION
ANOMALIES DETECTION SYSTEM
ROAD SAFETY

CONTACT

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Technology #XXXXX

DEVELOPED BY

Inventors: Ezequiel Lopez Rubio, Rafael Marcos Luque Baena, Esteban José Palomo Ferrer.

BUSINESS OPPORTUNITY

Licensing and possible collaborative development to adapt in a different application.

PARTNERSHIP

Looking for a company for a license agreement interested in use this technology to adapt in a new sector of surveillance or others where the artificial vision could be applied for other necessities.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

StreetQR: INFORMATION ASSISTANT DEVICE FOR STREET PLATES AND PLACES OF INTEREST.

TECHNOLOGY SUMMARY

The new invention is a device for capturing and offering information and multimedia content through QR codes. The device can be installed in facades or poles, that can incorporate in street plates for citizens assistance and to help the control centres to gather information about the places, where those devices are distributed. The device will have, at least, one information captor (sensor) such as a camera, in order to capture in real time information in the street. This information can be pre-processed or send directly to the remote central. Also, the device can incorporate lights or loudspeakers to inform in the area where the device is about a particular situation. The device has a battery and solar panels, which allow working without electricital connection.

BENEFITS

BIDIRECTIONAL INFORMATION: giving useful information in the street to the citizens.

INFORMATION PROCESSING: the captured information can be pre-processed or send directly to the remote central.

UNIQUE QR CODE: can be assigned a unique QR code to each device.

EASY AND CHEAP MANUFACTURING: and also easy to deploy and install.

CONTEXT

The current cities are deploying complex systems to make easier the life of their citizens. In this environment of SmartCities are necessary new tools to gather information and to inform to the people after the information process has been done. Nevertheless, most of the times, those devices actually, which work for this process are different. StreetQR is an information assistant device very easy to deploy that allows in a bidirectional way to gather information and to inform simultaneously. This kind of technologies will be implemented in the SmartCities in the next years in order to build an information network for supporting the local government remote centrals to help the citizens in all kind of situations: traffic, crowds, events, emergency situations, etc.

APPLICATIONS

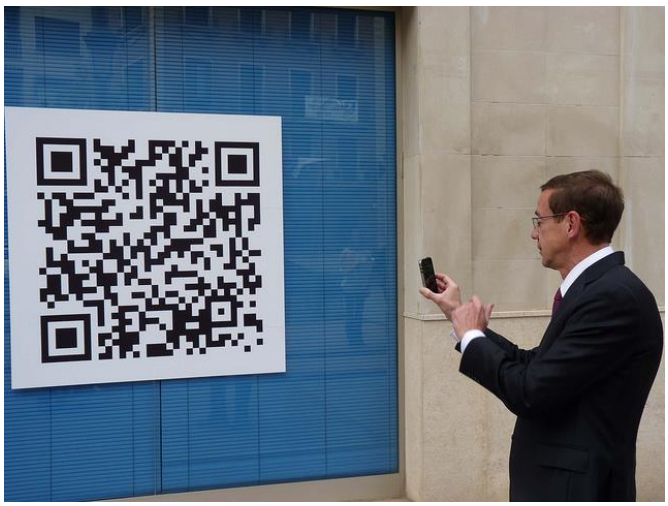
This technology is focused on SmartCity environment and solutions where is necessary to gather information and bidirectionally to inform the citizens in situ.

CITIZENS INFORMATION DEVICE
SMARTCITY
FLOW CONTROL: TRAFFIC AND PEOPLE.
EMERGENCY SITUATIONS INFORMATION.

StreetQR: INFORMATION ASSISTANT DEVICE FOR STREET PLATES AND PLACES OF INTEREST.

IP RIGHTS

This Technology is protected by a pending patent in Spain (priority date Mar 2017).



DEVELOPMENT STAGE

The invention describes the technology, which is already tested in the laboratory and pending to develop in a real situation.

KEYWORDS

INFORMATIVE ASSISTANT DEVICE
INFORMATION PANEL
QR CODE
SMARTCITY
CITIZENS INFORMATION

DEVELOPED BY

Inventors: Gonzalo Pascual Ramos Jimenez.

CONTACT

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Technology:

BUSINESS OPPORTUNITY

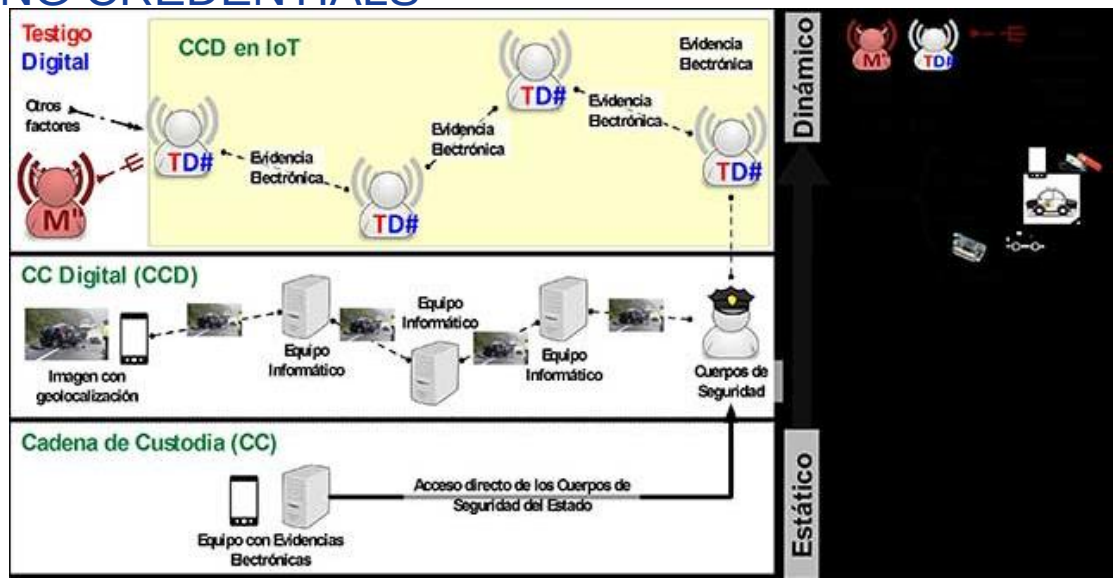
Technology transfer by licensing agreement, and collaborative development for different applications.

PARTNERSHIP

Looking for a company for a licensing agreement or a collaborative project in order to improve the technology and adapt to a specific and commercial device for a SmartCity or other environments.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

DIGITAL WITNESS: METHODS AND DEVICES FOR THE SECURE MANAGEMENT OF ELECTRONIC EVIDENCE WITH BINDING CREDENTIALS



TECHNOLOGY SUMMARY

Procedures and devices for secure managment of electronic evidence with binding credentials (digital witness). The identity of the user or object delegate their identity in a binding and indissoluble by binding credentials characterised which have a operations agent between user/object and device, cryptographic mechanisms accepted in a secure element, secure storage means with access-control (reliable core), electronic evidence agent for objects and optionally a contractual agent.

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BENEFITS

BINDING IDENTITY: binding identity between devices and users.

IoT EVIDENCE MANAGMENT: electronic evidence in IoT- digital chain of custody.

ATTACK DETECTION: attack detection in origin in order to establish responsabilities.

MOBILE NON-REPUDIATE: able to implement in mobile devices and other devices with restricted resources.

ARCHITECTURAL REQUIREMENTS CLARIFY: in security features in IoT and mobiles.

CONTEXT

At the current moment the aim of these architectures is to protect the user data or make easier the electronic payment. The last technologies let the signature through the mobile devices using the last version of DNIe (electronic ID card) which have NFC. However these architectures could offer much more. The developed technology defines the concept and archirecture of digital witness, that let personal devices and other devices with security embedded architectures could collaborate between themselves to alert about malicious activities and leave proof of those. This architecture makes possible to implement a digital chain of custody in IoT.

APPLICATIONS

This technology is focused in Security of Information. The most direct application is the early attack detection and use the digital witness as a proof.

IoT DEVICES

STATE SECURITY FORCES

CYBERNETIC ATTACKS: DETECTION AND PROOF.

ANTI-TAMPERING

SECURE ARCHITECTURE

DIGITAL WITNESS: METHODS AND DEVICES FOR THE SECURE MANAGEMENT OF ELECTRONIC EVIDENCE WITH BINDING CREDENTIALS

IP RIGHTS

This Technology is protected by by a granted patent in Spain (priority date Oct 2015) and pending PCT worldwide.

DEVELOPMENT STAGE

The technology is already tested in laboratory.

KEYWORDS

DIGITAL WITNESS
IOT
INDISSOLUBLE IDENTITY
DIGITAL CHAIN OF CUSTODY

CONTACT

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Technology:

DEVELOPED BY

Inventors: Ana Nieto Jiménez, Rodrigo Román Castro, Francisco Javier López Muñoz.

BUSINESS OPPORTUNITY

Technology transfer by licensing agreement, and collaborative development for different applications.

PARTNERSHIP

Looking for a provider of the state security forces for a licensing agreement or a collaborative project in order to improve the technology and adapt to his specific client.

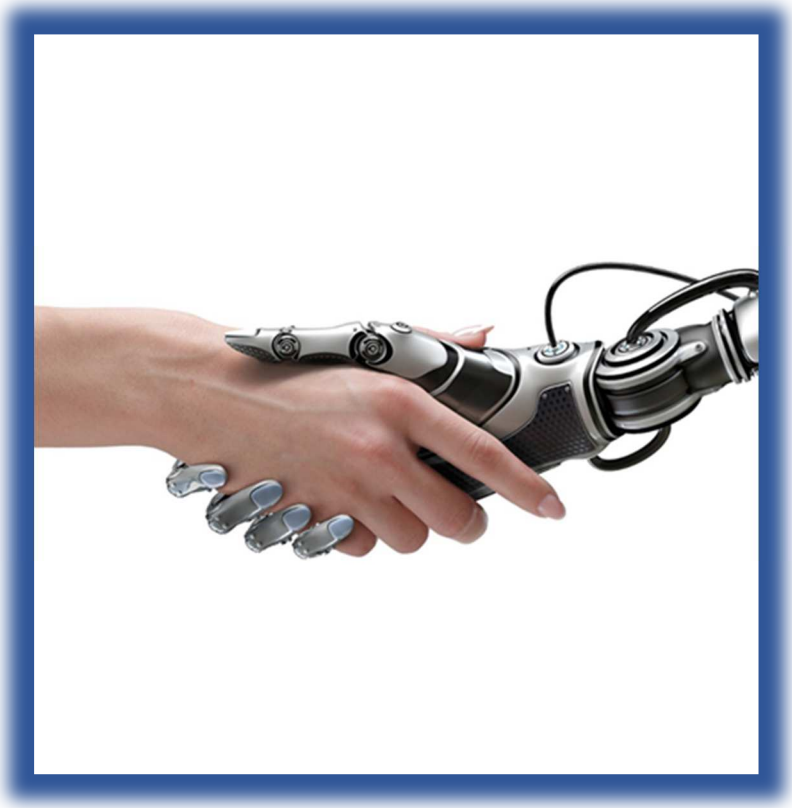
TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

universidade de aveiro

Interreg Sudoe

TuRBO Sudoe

European Regional Development Fund



R&D&I PORTFOLIO

ENERGY/ICT SECTOR

PAULO CARDOSO

Title

Centre for Mechanical Technology and Automation (TEMA)

Presentation

The scope of the Unit's research and development (R&D) activities includes multidisciplinary core competencies that are already being applied to the technological needs of the manufacturing and process sector.

R&DU's misión may envision that over the years, it will lead to an expansion of the Unit's R&D activities and it will enable to extend its contributions to non-manufacturing and non-process applications. Extensive collaborations with different industries have been established and others are being sought. These industries are indeed the users of the Unit's "products": highly trained personnel and new knowledge.

Scientific-Technical Services

- Simulation and experimentation in biomechanics; development of medical devices; development of implants and its fixation in the bones;

- Development of processes for industrialization of products; test of sensors for car and oil industry; development / experimentation of industrial equipment; analysis XPS, UPS and AES

- Equipment failure analysis; implementation and testing of welded constructions and adhesive joints; topological analysis and optimization of mechanical structures; experimental stress-strain analysis; characterization of fluids; impact tests; testing internal combustion engines

- Micromechanics analysis and modeling of composites laminates; homogenization properties of composite materials; trials, mechanical tests and numerical modeling; characterization of materials by inverse analysis; plastic anisotropy and constitutive modeling;

- Evaluation and monitoring of emissions / energy consumption / use of alternative energies;

- Analysis of performance and life cycles; building models and prototypes;

- Experimentation in home automation / smart buildings; hydrogen production.

Contact

TEMA, Mechanical Engineering Department

Universidade de Aveiro - Campus Universitário de Santiago

3810-193 Aveiro, Portugal

Title

Instituto de Telecomunicações (IT)

Presentation

IT mission is to create and disseminate scientific knowledge in the field of telecommunications. IT is actively involved in fundamental and applied research both at national and international levels. Simultaneously it is committed to foster higher education and training, by hosting and tutoring graduate and postgraduate students. it also plays its role towards public society with public awareness initiatives, knowledge transfer to industry, and by providing consulting services on a non-competing basis.

IT is organized around three sites and 4 branches: Aveiro, Coimbra, Lisbon (2), Porto, Covilhã and Leiria.

Scientific-Technical Services

Scientific expertise in IT, from which follow its main research and education activities, spans the following areas:

- Wireless Communications
- Optical Communications
- Networks and Multimedia
- Basic Sciences and Enabling Technologies

IT expertise spans all areas of telecommunications and supporting basic sciences, including wireless communications, optical communications, networks and multimedia. The work is developed in the framework of national and international projects, with ample cooperation with national and international partners including Universities, Telecom Operators, Manufacturers and SMEs.

Contact

IT – Aveiro, Instituto de Telecomunicações, Campus Universitário de Santiago

3810-193 AVEIRO, PORTUGAL

Title

Institute of Electronics and Informatics Engineering of Aveiro (IEETA)

Presentation

The Institute of Electronics and Informatics Engineering of Aveiro (IEETA) is one of the Research Units of the University of Aveiro.

It is organized in three Groups, two of them more application oriented (Biomedical Informatics and Technologies, and Intelligent Robotics and Systems), the other one of a more fundamental nature (Information Systems and Processing), mapping the major scientific areas of activity of its researchers. Empowered by its internal diversity and strong collaborative environment, IEETA has been able to provide important contributions in problems that require a high level of multidisciplinarity.

Scientific-Technical Services

IEETA has a vast experience in joint projects with the industry, some of them resulting in the creation of spin-offs and start-ups, patents and trademarks, both national and international, and a number of products that have been licensed and are in use by the industry.

The mission of the Biomedical Informatics and Technologies group (BIT) is to contribute to the scientific advances in ICT for translational health, through the study of algorithmic questions and computational solutions inspired by and related to biological and biomedical problems. We are in a privileged position to explore future healthcare scenarios working in R&D towards personalized medicine, where treatments are shaped for each individual considering its multiple dimensions, from molecular profiling to better clinical tools for diagnostic and treatments.

The mission of Intelligent Robotics and Systems group is to gather the wide range of scientific knowledge and competences embraced by the IEETA researchers in several areas of Electronics, Communications and Informatics and apply it in R&D efforts in the wide and ever growing area of robotics. This group also fosters the knowledge in target areas as intelligent mobile robotics, with a particular focus in subjects such as Robot/Robot interaction and cooperation, Robot/Human interaction, Artificial Intelligence, Control and Self-learning, Robotics in Education, just to mention a few.

Contact

Instituto de Engenharia Electrónica e Informática de Aveiro, Campus Universitário de Santiago

3810–193 Aveiro, Portugal

Title

Digital Media and Interaction research centre (DigiMedia)

Presentation

DigiMedia – Digital Media and Interaction is an interdisciplinary research centre of the University of Aveiro focusing on innovation in the design of new interaction approaches for human-centered digital media applications.

Mission: DigiMedia is fully committed to foster the power of Digital Media, including web, mobile and interactive TV technologies, towards an inclusive digital society.

Scientific-Technical Services

DigiMedia joins 27 senior researchers from the fields of Communication Sciences and Technologies, Sociology, Philosophy and Computer Science, acting in transversal teams that develop fundamental and applied research in the fields of Cyberculture and Media Convergence, New Media and Digital Entertainment and Knowledge Media in Connected Communities.

DigiMedia has 6 R&D groups:

- Cyberculture
- Social TV
- Advanced technologies
- E-health and wellbeing
- Social media and learning
- Games and transmedia

Contact

DeCA – Department of Comunication and Art, Campus Universitário de Santiago

3810-193 Aveiro, Portugal

Title

Institute of Nanostructures, Nanomodelling and Nanofabrication/ Physics of Semiconductors, Optoelectronics and Disordered Systems (I3N/FSCOSD)

Presentation

I3N is a partnership between three leading research units in fundamental and applied science: IPC (Institute for Polymers and Composites, hosted by University of Minho), CENIMAT (Materials Research Center, hosted by the New University of Lisbon) and FSCOSD (Physics of Semiconductors, Optoelectronics and disordered Systems, hosted by the University of Aveiro).

I3N has multidisciplinary fundamental and applied research projects in four broad domains:

- multi-scale modeling of materials behaviour; nanofabrication, micro and nano technologies; polymer systems with nano and microcontrolled structures; physical characterization of nanostructures.

Scientific-Technical Services

The mission of I3N is to promote excellence in nanoscience, nanomaterials and nanotecnologies for socio-economical ends. Disseminate and promote among the general public the importance of nanoscience and and the potential applications of nanotechnologies in benefit of society.

I3N has multidisciplinary fundamental and applied research projects in four broad domains:

- multi-scale modeling of materials behaviour
- nanofabrication, micro and nano technologies
- polymer systems with nano and microcontrolled structures
- physical characterization of nanostructures

Contact

Departamento de Física, Universidade de Aveiro

3810-193 Aveiro, Portugal

Title

Aveiro Institute of Materials (CICECO)

Presentation

The associate laboratory CICECO – Aveiro Institute of Materials, formerly CICECO-Centre for Research in Ceramics and Composite Materials, was created in March 2002 at the University of Aveiro, Portugal, with the mission of developing the scientific and technological knowledge necessary for the innovative production and transformation of ceramics and organic-inorganic hybrids and materials for a sustainable development.

CICECO is the largest Portuguese institute in the field of materials science and engineering, with over 370 people comprising 46 academic staff, 37 full-time researchers and, in December 2016, 89 post-doctoral associates, 108 PhD students and 81 other students. Activities are supported by 12 technicians and administrative personnel.

Scientific-Technical Services

In CICECO, the Centre for Imaging and Structure of Materials (CISM) manages, in an integrated way, medium and large-scale equipment, granting free access to all members. Service to external users is also provided. CISM houses a wide range of advanced equipment:

TEM, SEM and AFM, including a Piezoelectric Force Microscope) and house top liquid- (300 and 500 MHz) and solid-state (400 and 500 MHz) nuclear magnetic resonance facilities (including LC-NMR). X-ray diffraction (single crystal, powders and films). FTIR, Raman, FTRaman, UV-vis, TGA, DSC, DTA, dilatometry, GC, GC-MS, photoluminescence spectrometers (10-300 K), particle size analyser, glove box, vacuum line, dedicated gas lines for Ar, N2, CO2, H2+N2 mixtures, methane, etc. Equipment for magnetism studies: 1.9-700 K, magnetic fields up to 10 T; magnetization (VSM) and magnetic susceptibility (AC technique, up to 10 kHz). Impedance bridges (1 Hz-2 GHz, 11-800 K); ferroelectric histeresis analyser; photonic sensor for evaluating electromechanical properties; Berlincourt apparatus for measuring piezoelectric coefficients; equipment for films preparation (dip coater, spin coater, dc and rf sputtering). Computing clusters Flamingo (fully dedicated) and Argus (shared machine), and to numerous computer codes, among others.

Contact

CICECO - Complexo de Laboratórios Tecnológicos, Campus Universitário de Santiago

3810-193 Aveiro, Portugal

Title

Aveiro Research Centre of Risks and Sustainability in Construction (RISCO)

Presentation

RISCO is a new research unit that aims at gathering researchers whose scientific and technological work is focused on subjects related to the study and evaluation of risks and sustainability in construction including built heritage conservation and restoration.

Scientific-Technical Services

Centred in the Civil Engineering domain it can also comprise researchers from frontier areas such as mechanical, materials or environmental engineering as well as architecture. In fact, RISCO aims at bringing together different areas of knowledge in order to ensure the interdisciplinary interaction to achieve excellence of scientific production and technology transfer in those currently very important domains. For this latter purpose to be achieved, this research unit aims to aggregate around it industry and companies interested and involved in the scientific output coming from its R&D work. The small dimension of RISCO makes its organization and management simple.

RISCO's mission is to develop applied and fundamental research in three main thematic lines:

i) Risks in the Built Environment;

ii) Construction Sustainability;

iii) Built Heritage Conservation and Restoration.

Contact

Departamento de Engenharia Civil, Universidade de Aveiro, Campus Universitário de Santiago

3810-193 Aveiro, Portugal

MOLTEN ALLOY ELECTROCHEMICAL CELLS FOR THE RECYCLING OF PLASTIC WASTE

TECHNOLOGY SUMMARY

The technology is an electrochemical device that can convert waste plastics into fuels. Plastic waste is pyrolysed and partially oxidised to CO + H_2 (syngas) by input of renewable electricity. The formation of syngas allows the production of higher value synthetic fuels such as DME, methanol, methane, etc..

CONTEXT

Most plastics are organic polymers based on chains of carbon and hydrogen atoms that can also contain oxy-gen, sulphur, or nitrogen as well as other trace elements. Plastics are durable and, as such, degrade very slowly. Since the 1950s, one billion tons of plastic have been discarded and, without intervention, these plastics will persist for hundreds or even thousands of years without decomposition. The current project aims to address this situation by providing sustainable synthetic fuels and chemicals from plastic waste recycling.

BENEFITS

ELECTROCHEMICAL RECYCLING PROCESS OF PLASTIC WASTE:

- Better than the mechanical recycling process, be-cause it breaks the chemical structure of the plastic.

- Plastic materials are recycled back to their precursors, forming CO and H_2.

- At high H/C ratio, this process produces fuels and/or further chemical products.

APPLICATIONS

RENEWABLE FUELS

RENEWABLE ELECTRICITY STORAGE

WASTE RECYCLING

MOLTEN ALLOY ELECTROCHEMICAL CELLS FOR THE RECYCLING OF PLASTIC WASTE

IP RIGHTS

Trade secret

DEVELOPMENT STAGE

TRL 2: The success of this technology rests on the development of anode materials that can function at the high temperatures of operation needed to pyrolyse the waste plastic. It is in this area that work is being per-formed

KEYWORDS

MOLTEN ELECTRODES

RENEWABLE FUELS

RENEWABLE ELECTRICITY STORAGE

WASTE RECYCLING

PYROLYSIS

SYNGAS

CONTACT

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Technology #CI18017

DEVELOPED BY

Researchers from TEMA, the Centre for Mechanical Technology and Automation from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement

Joint development

PARTNERSHIP

Fuel, Renewable Energy and Waste Treatment Industries.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

PRODUCTION OF PURE HYDROGEN BY REFORMING OF BIOGAS AND ELECTROCHEMICAL SEPARATION

TECHNOLOGY SUMMARY

Syngas ($CO+H_2$) of high calorific value is formed from a biogas feed stock by a joint reforming and co-electrolysis procedure performed across a protonic ceramic membrane using input of renewable electricity. The formed syngas is the rootstock for the formation of synthetic fuels, such as methanol, alkanes, dimethyl ether (DME) and synthetic petroleum, which may be used directly in the existing energy and transportation infrastructure.

BENEFITS

CONVERSION OF BIOGAS INTO SYNGAS (CO + H2):

- Better than the mechanical recycling process, be-cause it breaks the chemical structure of the plastic.

- Plastic materials are recycled back to their precursors, forming CO and H_2.

- At high H/C ratio, this process produces fuels and/or further chemical products.

CONTEXT

Standard biogas (CO2/CH4) reforming suffers a very high propensity for carbon formation as a result of a low H/C ratio. Typical biogas compositions exist within the car-bon deposition region at temperatures below 1200K and this factor is compounded by reductions in temperature and/or increases in the CH4 content of the biogas. Avoidance of carbon deposition is classically achieved by the addition of excess oxidant or by kinetic limitation. The former solution is undesirable as it lowers the calorific value of the syngas product by increasing the CO2 fraction, while the latter option puts heavy demands on catalyst design that are aggravated by the composition-al fluctuation of biogas with source and over time. Thus, in a novel progression, the current procedure plans to circumvent this problem by the electrochemical alteration of gas composition.

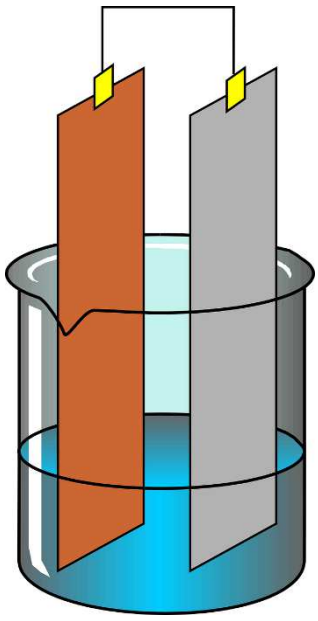
APPLICATIONS

RENEWABLE FUELS
RENEWABLE ELECTRICITY STORAGE
WASTE RECYCLING

PRODUCTION OF PURE HYDROGEN BY REFORMING OF BIOGAS AND ELECTROCHEMICAL SEPARATION

IP RIGHTS

Trade secret



DEVELOPMENT STAGE

TRL 2: The success of this technology rests on the development of anode materials that can function in bio-gas producing the desired high selectivity to syngas. It is in this area that work is being performed.

KEYWORDS

RENEWABLE FUELS

RENEWABLE ELECTRICITY STORAGE

WASTE RECYCLING

SYNGAS

DEVELOPED BY

Researchers from TEMA, the Centre for Mechanical Technology and Automation from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement

Joint development.

PARTNERSHIP

Fuel, Renewable Energy and Waste Treatment Indus-tries.

CONTACT

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Technology #CI18018

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html

DIRECT CONVERSION OF CARBON DIOXIDE TO METHANE

TECHNOLOGY SUMMARY

The technology is a unique electrochemical devices that bridges low and high temperature solutions currently offered for CO_2 electro-valorisation, to positively combine their distinct operational advantages to directly convert CO_2 and H_2O to synthetic methane, using renewable electricity. The device is specifically designed to be utilised at temperatures in the intermediate range, 400-600 ^{0}C, where fast kinetics are obtained, while methane formation at ambient pressures and good cell longevity can also be retained.

CONTEXT

Intermittency is a major challenge for the widespread use of renewable energies, as the electricity generated is highly variable at different timescales: from hour to hour, daily and seasonally. In this respect, synthetic methane is receiving great attention as a potential energy carrier due to its easy storage and distribution in the existing natural gas grid, coupled with its improved volumetric energy density with respect to hydrogen.

BENEFITS

- Directly convert CO_2 and H_2O to synthetic methane, by input of renewable electricity.

- Method to store renewable electricity and to avoid intermittency by its conversion into portable chemical fuels.

- CO_2 valorization to provide CH_4 production with higher electrical efficiency than can be obtained by lower temperature devices.

- Use of intermediate temperature (400-600 ^{0}C) pro-duce CH_4 with higher electrical efficiency than by using lower temperature devices.

APPLICATIONS

Carbon capture

Production of added-value chemicals

Storage renewable electricity

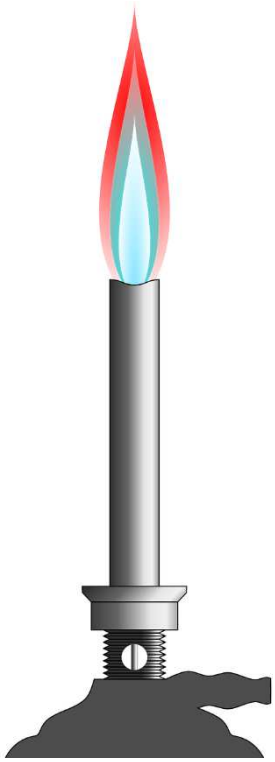
DIRECT CONVERSION OF CARBON DIOXIDE TO METHANE

IP RIGHTS

Trade secret

DEVELOPMENT STAGE

TRL 2: The success of this technology rests on the development of anode materials that can function in bio-gas producing the desired high selectivity to syngas. It is in this area that work is being performed.



KEYWORDS

RENEWABLE FUELS

RENEWABLE ELECTRICITY STORAGE

WASTE RECYCLING

SYNGAS

REFORMING

SYNTHETIC METHANE

DEVELOPED BY

Researchers from TEMA, the Centre for Mechanical Technology and Automation from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement

Joint development.

PARTNERSHIP

Fuel, Renewable Energy, Waste Treatment Industries and Storage Players.

CONTACT

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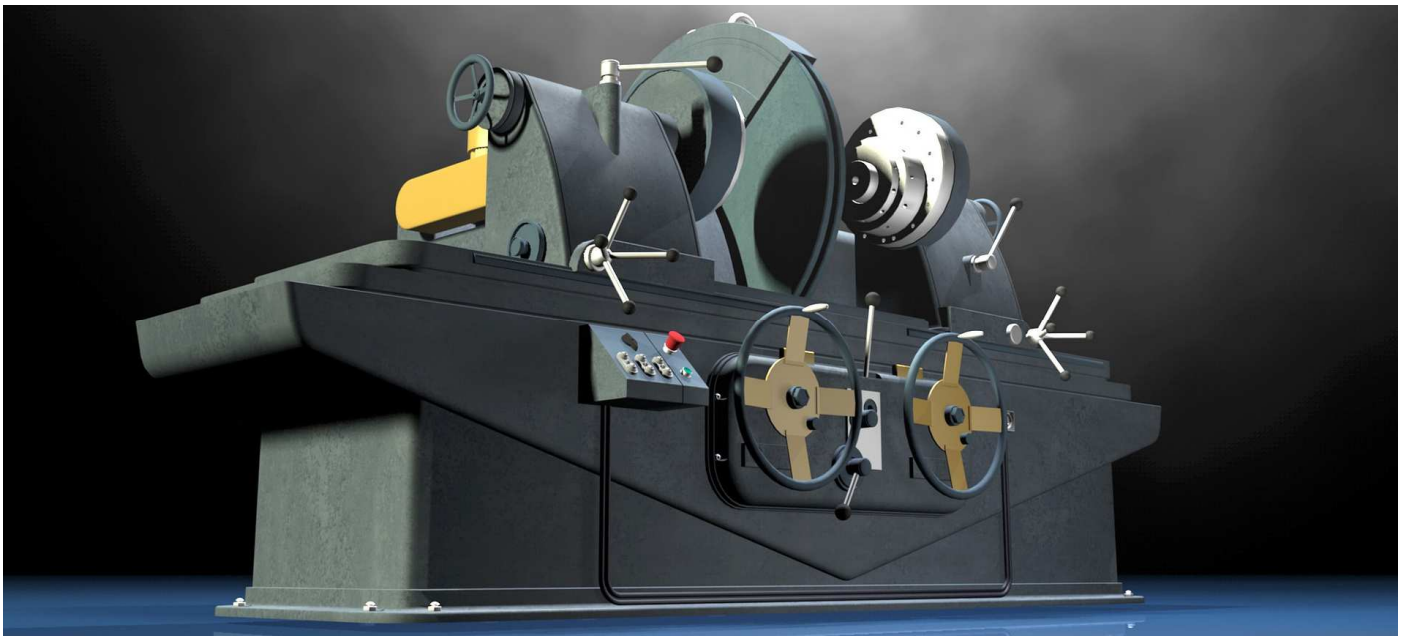
LOW COST MINIMUM QUANTITY OF LUBRICANT SYSTEM



TECHNOLOGY SUMMARY

A group of researchers from a Portuguese university has developed a system of "Minimal Quantity of Lubricants" fully functional and automated.

This system is an alternative to most lubrication systems used in machining operations, with both economically and ecological level advantages, contributing to sustainable manufacturing. Stands out for its optimal functioning, automation, low cost and good portability. It allows a good lubrication and a good cooling of the machined piece, dry chips, a cleaner desktop, thus ensuring a higher yield and environmental improvement.

BENEFITS

LOW COST MQL SYSTEM: currently, there are numerous MQL systems on the market, but their high cost contributes to their little use in machining.

REDUCTION OF SYSTEM SIZE AND NUMBER OF COMPONENTS USED: this invention avoids the use of the large reservoirs found in other solutions, thus reducing the system size and avoiding the use of various components.

USE OF PERISTALTIC PUMP FOR FLOW CONTROL: this innovative system uses a peristaltic pump for flow control, making the overall system much cheaper.

CONTEXT

The term MQL, "Minimal Quantity of Lubricant", refers to the use of a low lubricant flow (10 to 100 mL/hr) through a high-pressure fluid (compressed air).

The low cost MQL system is fully functional and automated, uses a pressure regulator valve, a solenoid valve and implements an innovative stepper motor system coupled to a peristaltic pump head for controlling the lubricant flow that is supplied from the container. Thus, the system allows a highly focused spray cloud preventing dispersion of small droplets of lubricant using a needle to introduce lubricant to the compressed air.

APPLICATIONS

LUBRICATING/COOLING DURING MACHINING OPERATIONS FOR:

TURNING

DRILLING

GRINDING

OTHERS

LOW COST MINIMUM QUANTITY OF LUBRICANT SYSTEM

IP RIGHTS

Portuguese patent No. 108233, submitted in 2015

DEVELOPMENT STAGE

TRL 4: Functional laboratorial prototype

KEYWORDS

MINIMUM QUANTITY LUBRICATION

GREEN MANUFACTURING

LUBRICANTS

MACHINING PROCESSES

DEVELOPED BY

Technology developed by the Advanced Mechanical Engineering and Fracture Mechanics Group (GAME), from the Centre for Mechanical Technology and Automation (TEMA), a research center from the University of Aveiro..

BUSINESS OPPORTUNITY

Industrial equipment manufacturers in the field of lubrication.

Manufacturers of industrial cooling systems.

Manufacturers of machine tool accessories..

PARTNERSHIP

Industrial equipment manufacturers in the field of lubrication and industrial cooling and machine tool accessories..

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Technology #CI14019

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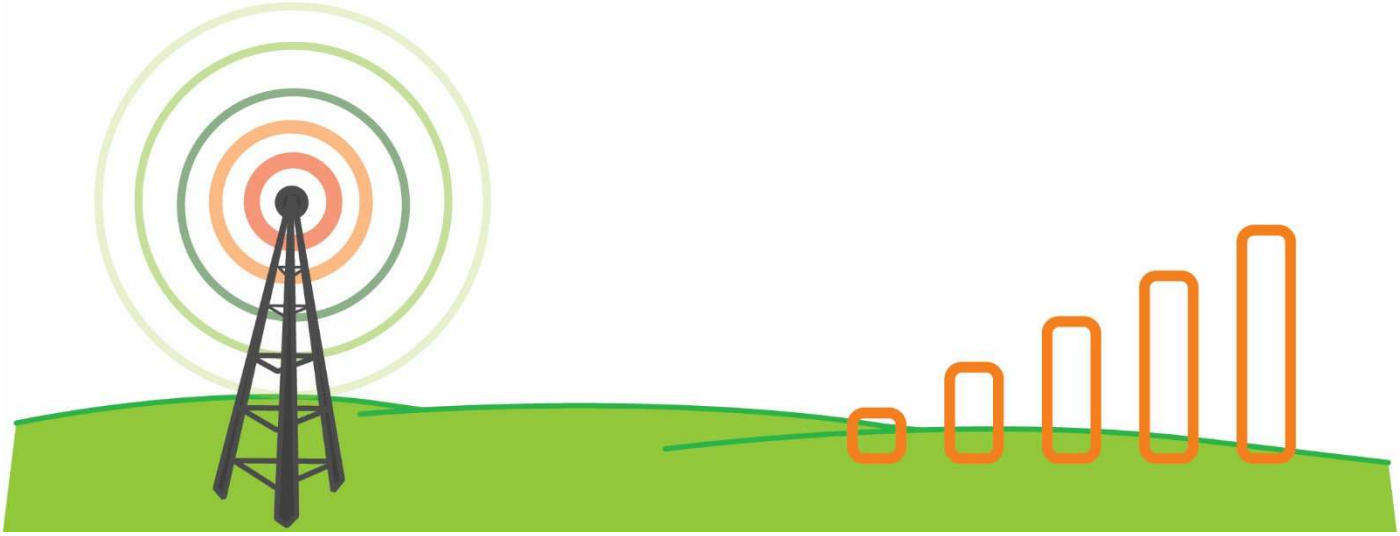
PASSIVE SENSOR SYSTEM POWERED BY WIRELESS POWER TRANSMISSION



TECHNOLOGY SUMMARY

Network of wireless and passive sensors (without batteries), using a set of unique sensors which use a frequency for the data transfer (obtained by sensors) and another frequency for the reception of energy that is emitted by transmitters that power the sensors. For this, only a central data reception and wireless transmission structure is required which communicates with each of the sensors independently. These sensors have lower power consumption and higher data rates (up to 960 Mb/s).

BENEFITS

Compared to traditional sensors:

LOWER COST: these sensors do not use any kind of batteries.

INCREASED CONVENIENCE: these sensors do not require battery charge or change as well as wiring.

Compared to other passive sensors:

LOWER POWER CONSUMPTION

HIGHER DATA TRANSMISSION RATES: up to 960Mb/s

CONTEXT

Wireless sensors, which transmit the collected information without the need of wiring, have gained increasing commercial importance. These sensors can be used in a wide range of situations, from environmental monitoring to farm and industrial control. However, most sensors still need to use batteries, which increases maintenance and environmental costs.

The presented sensors are an alternative since they do not require any type of battery and receive energy through a specific frequency emitted by an energy transmitter. These passive sensors gain even more relevance if sensor networks are formed, in which several nearby sensors detect and transmit environmental data.

APPLICATIONS

This passive sensor system can be used in a wide range of applications, such as:

COLLECTION OF ENVIRONMENTAL DATA (e. g. farm fields, inside buildings)
ACCESSES CONTROL (e. g. parking lots, buildings)
APPLICATIONS THAT REQUIRE HIGH TRANSMISSION RATES (e. g. audio or video sensors)

PASSIVE SENSOR SYSTEM POWERED BY WIRELESS POWER TRANSMISSION

IP RIGHTS

Internacional patent pending (*Patent Cooperation Treaty*).

DEVELOPMENT STAGE

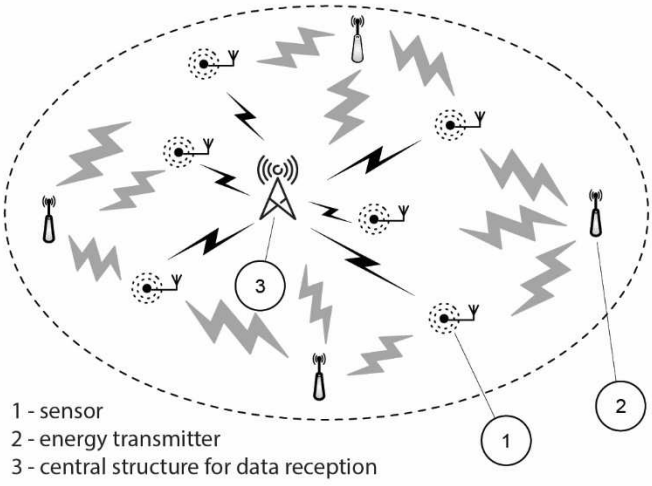
TRL 4: Field tests performed with prototypes.

KEYWORDS

BACKSCATTER

WIRELESS POWER TRANSMISSION

PASSIVE SENSORS



DEVELOPED BY

Researchers from the Telecommunications Institute (IT) from the University of Aveiro.

CONTACT

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Technology #CI116018

BUSINESS OPPORTUNITY

License agreement.

Joint development.

Adaptation to specific needs.

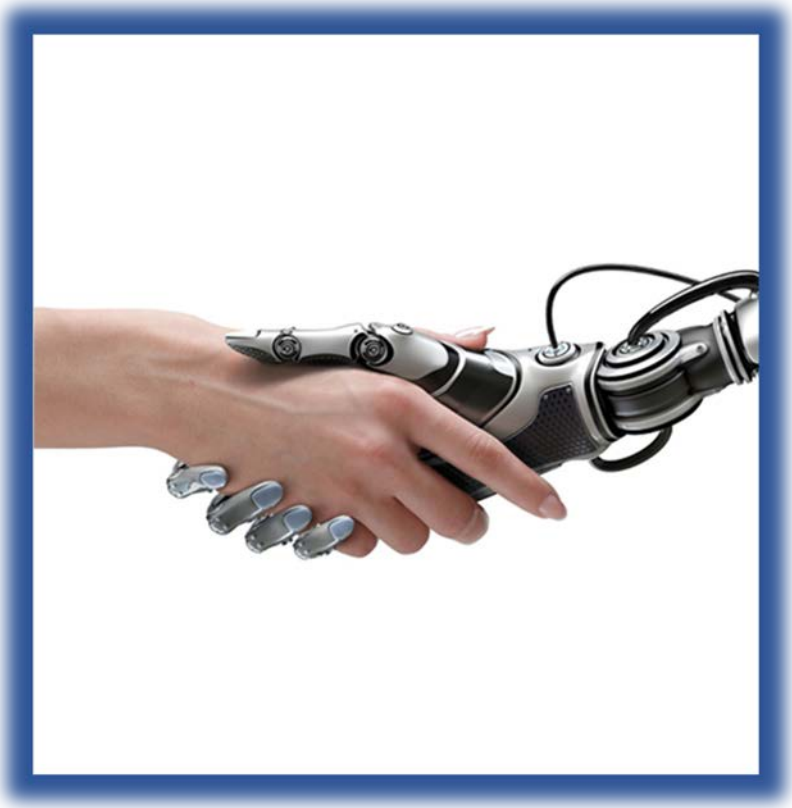
Testing of new applications.

Industrialization.

PARTNERSHIP

The University of Aveiro seeks partners with the area of sensor development and manufacturing.

TRL: Technology Readiness Level – more information in https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-2890.html



R&D&I PORTFOLIO

ENERGY/ICT SECTOR

OLIVER FREIRE PASTORIZA

Industry Area

Presentation

It works in the energy efficiency optimisation mainly on industry, with the possibility to apply the knowledge to any other field or activity.

Scientific-Technical Services

Feasibility studies for innovative energy saving technology solutions and services.

Energy efficiency of products, production processes and technologies.

Advanced manufacturing (industry 4.0) efficiency improvement.

Improvement of manufacturing processes, energy recovery, energy audits and energy management systems.

Development and market uptake of innovative highly efficient energy-related solutions.

Contact

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AUDIT OF COMPRESSED AIR NETWORKS

TECHNOLOGY SUMMARY

Analysis and optimization of energy consumption in compressed air networks through the initial study of the facility. “In situ” measurements and the subsequent analysis of the measured data. Contrasting with the historical data of energy consumption.

All of this will allow us to analyse how efficient the compressed air installation is and what are the most improvable aspects.

In this type of studies you can detect problems such as leaks in the network or the incorrect sizing of the pipes.

BENEFITS

AIR COMPRESSED NETWORK OPTIMIZATION

KNOWLEDGE OF THE OPERATION OF THE COMPRESSED AIR NETWORK

ENERGY SAVINGS: lower energy losses.

ECONOMICAL SAVINGS

POLLUTANT EMISSIONS REDUCTION

CONTEXT

It is essential the implementation of energy efficiency because of the progressive rise of energy costs in order to obtain the maximum energy and economic savings.

This aspect is accentuated in the case of compressed air, as it is a technology with very low performance. Moreover, losses by leakage are present in this type of installations. As a result, it is necessary to control these facilities regularly.

APPLICATIONS

INDUSTRIES WITH COMPRESSED AIR CONSUMPTION:

PLASTIC INDUSTRY

METAL – MECHANIC INDUSTRY

CANNING INDUSTRY

AUTOMOTIVE INDUSTRY

IN GENERAL, ANY PRODUCTION PLANT WITH COMPRESSED AIR NETWORK.

…

AUDIT OF COMPRESSED AIR NETWORKS

AREA CAPABILITIES

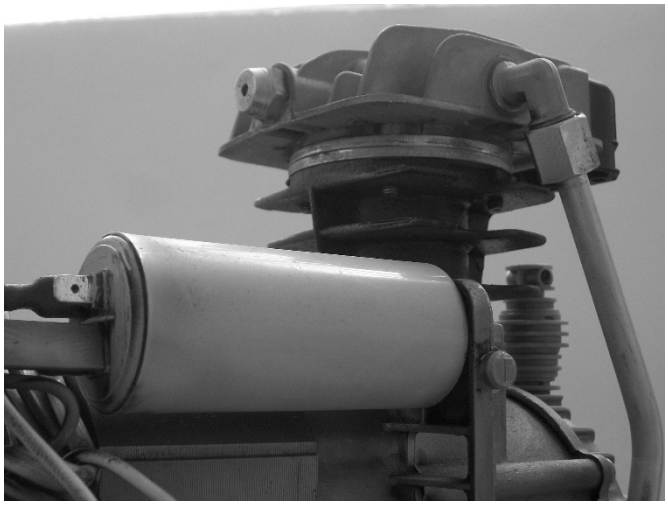
Energy monitoring systems: industrial and tertiary sectors.

- Definition of the necessary equipment and communications.
- Energy consumption measurement.
- Influential parameters: temperature, humidity, loads, etc.
- Energy saving measure and report.

Technical support for the implementation of Energy Management Systems according to ISO 50001.

Energy audits and detailed energy studies.

Saving measurement and verification plans. IPMVP Protocol promoted by EVO (Efficiency Valuation Organization).



KEYWORDS

COMPRESSED AIR

COMPRESSOR

AUDITING

ENERGY EFFICIENCY

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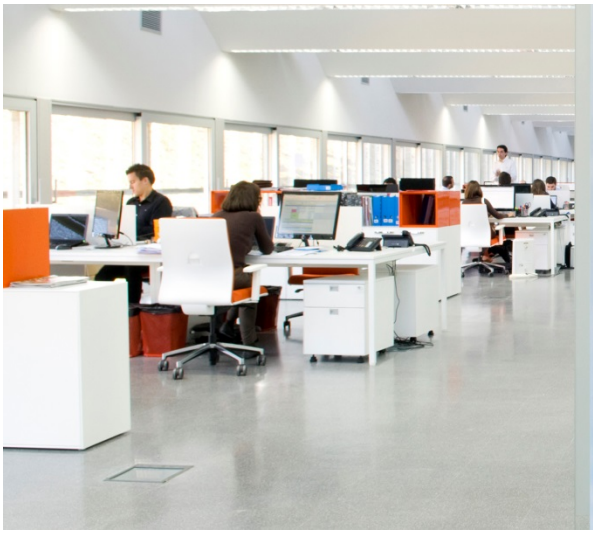
CIRCULAR ECONOMY AND LIFE CYCLE ANALYSIS (LCA)



TECHNOLOGY SUMMARY

Life Cycle Analysis is an objective process that allows evaluating the environmental burdens associated with a product, process or activity, identifying and quantifying both the use of matter and energy and emissions to the environment, to determine the impact of that use of resources and those emissions and to evaluate and implement environmental improvement strategies.

To carry out this service, EnergyLab has the software Simapro which is a very powerful and internationally recognized tool of Life Cycle Analysis..

BENEFITS

KNOWLEDGE ABOUT THE COMPLETE CYCLE OF A PRODUCT

KNOWLEDGE ABOUT THE MOST POLLUTING STAGES: and therefore the most energy consuming.

OBTAINING ENVIRONMENTAL CERTIFICATIONS: LCA calculation allows companies to obtan eco labels or environmental certifications that can boost product sales..

CONTEXT

Climate change is causing the change the European policies towards a more efficient and sustainable economy.

This leads to incentive the efficiency actions in companies. In the other hand, the companies and countries most contaminating are being penalized by the EU.

As a result, the interest in the LCA of products and the Eco labelling is strongly increasing.

APPLICATIONS

The Life Cycle Analysis is oriented to the analysis of the complete cycle of a product and therefore is applicable to any product consumed / used in any company:

AUTOMOTIVE INDUSTRY
FARMING INDUSTRY
ENERGETIC INDUSTRY
AEROSPATIALE INDUSTRY
BUILDINGS

CIRCULAR ECONOMY AND LIFE CYCLE ANALYSIS (LCA)

AREA CAPABILITIES

Energy monitoring systems: industrial and tertiary sectors.

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- Energy saving measure and report.

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Energy audits and detailed energy studies.

Saving measurement and verification plans. IPMVP Protocol promoted by EVO (Efficiency Valuation Organization).

KEYWORDS

LIFE CYCLE ANALYSIS

CARBON FOOTPRINT

WATER FOOTPRINT

SIMAPRO

SUSTAINABLE ECONOMY

CIRCULAR ECONOMY

ECOLABELLING

ENVIRONMENTAL IMPACT

CONTACT

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RESIDUAL HEAT RECOVERY

TECHNOLOGY SUMMARY

It consists in the study of the use of residual heat coming from a productive process and that is currently being wasted.

The methods for the use of this heat can be diverse: production of electricity, heat or cold.

This use depends on the available energy resource: type of fluid, flow rate, flow temperature,…and on the energy need in each factory: heating and sanitary hot water, recirculation to the process, cold production, electricity production.

EnergyLab performs personalized studies in order to optimize the solution both from a technical and economic point of view..

BENEFITS

BETTER USE OF RESOURCES

ENERGY SAVING: lower fuel consumption.

ECONOMIC SAVING

REDUCTION OF POLLUTING EMISSIONES

CONTEXT

It is essential the implementation of energy efficiency because of the progressive rise of energy costs in order to obtain the maximum energy and economic savings.

The current technology allows recovery systems being much more competitive and to obtain very interests returns of the investment.

APPLICATIONS

INDUSTRY SECTOR, ESPECIALLY PLANT WITH BIG HEAT CONSUMPTIONS:

- PLASTIC INDUSTRY
- METAL-MECHANIC INDUSTRY
- CANNING INDUSTRY
- AUTOMOTIVE INDUSTRY
- …

RESIDUAL HEAT RECOVERY

AREA CAPABILITIES

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KEYWORDS

RESIDUAL HEAT

ENERGY EFFICIENCY

TRIGENERATION

HEAT EXCHANGER

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CFD PROCESS SIMULATIONS

TECHNOLOGY SUMMARY

The application of CFD (Computational Fluid Dynamics), allows recreating the operating conditions of a certain process, by characterizing its thermo – fluid dynamic properties and applying the appropriate modifications to simulate the measures to be implemented.

As a result of this, it is possible to determine the sensitivity of the variables involved, making an assessment of energy consumption and the returns obtained based on the capital invested.

CONTEXT

In the industrial field, it is common to identify factories with energy-intensive processes. This has a high impact on the fixed costs of the products or services generated.

Moreover, the development of the markets implies the need to evaluate design decisions, which involve either an important investment or the critical parameters modification of a process.

In these situations, the development of mathematical models that simulate the transformation of these processes and reduce uncertainty is essential.

BENEFITS

KNOWLEDGE ABOUT BOILER / FURNACE OPERATION.

OPERATION AND PERFORMANCE OPTIMIZATION.

LESS ENERGY CONSUMPTION.

APPLICATIONS

Applicable to any industry which has an energy intensive process. Especially focused on elements such as boilers or furnaces in which heat transmission acquires a vital importance.

AUTOMOTIVE INDUSTRY
FARMING INDUSTRY
ENERGY INDUSTRY
AEROSPATIALE INDUSTRY
…

CFD PROCESS SIMULATIONS

AREA CAPABILITIES

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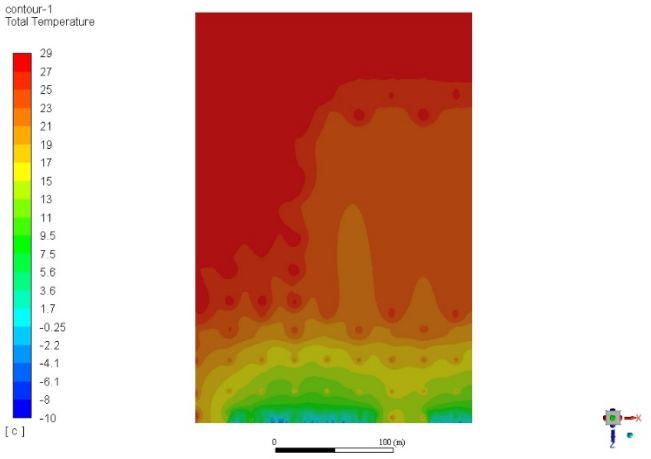

KEYWORDS

CFD SIMULATION

FLUENT

ANSYS

ENERGY EFFICIENCY

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RENEWABLE ENERGY STUDIES

TECHONOLOGY SUMMARY

The renewable energies study consists of the client installation analysis and the demand profile study in order to perform the pre-design of a renewable energy installation (thermal solar, FV solar, wind, geothermal).

This service includes a technical – economic viability study of the different possibilities, as well as advice on the option that best suits the specific needs of each plant.

EnergyLab also provides technical assistance service with preparation of the specification document and the assessment of the different offers raised by suppliers.

BENEFITS

EXTERNAL ENERGY DEPENDENCE REDUCTION

LOWER POWER SUPPLY CUTS AFFECTION

FOSSIL FUEL CONSUMPTION REDUCTION

ENERGY COSTS REDUCTION

CO_2 EMISSIONS REDUCTION

CONTEXT

The increase in energy costs, as well as a greater awareness of the organizations for the care of the environment, has caused a greater interest of companies to reduce their energy consumption and dependence on energy sources from fossil fuels.

In this way, the renewable energies installation in the industrial field has been increasing last years.

This increase is promoted by the reduction in cost of installation of this type of facilities. Self-consumption becomes increasingly viable in order to reduce both the energy cost and the supply dependence.

APPLICATIONS

Companies that consume energy:

ELECTRIC ENERGY PRODUCTION THROUGH FV SOLAR PANELS OR WIND ENERGY

HEAT PRODUCTION FOR DOMESTIC HOT WATER (DHW) OR HEATING THROUGH GEOTHERMAL

HEAT PRODUCTION FOR DHW OR HEATING THROUGH THERMAL SOLAR PANELS

RENEWABLE ENERGY STUDIES

AREA CAPABILITIES

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Technical support for the implementation of Energy Management Systems according to ISO 50001.

Energy audits and detailed energy studies.

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KEYWORDS

RENEWABLE ENERGIES

SOLAR ENERGY

WIND ENERGY

GEOTHERMAL ENERGY

FEASIBILITY STUDIES

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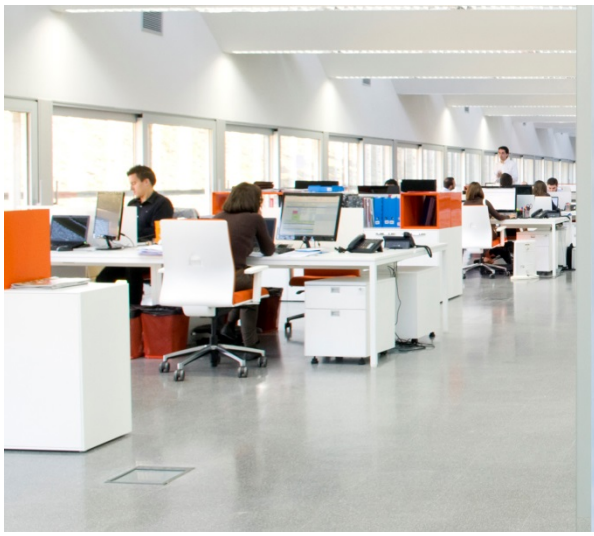
TECHNICAL ASSISTANCE FOR THE IMPLEMENTATION OF ISO 50001



TECHNOLOGY SUMMARY

It consists of the definition and documentation of an energy management system (EMS) through an analysis of the use and consumption of integrated systems in the client's facilities, serving as a basis for the certification of the entity in the ISO 50001 standard.

EnergyLab also provides technical support to overcome the ISO 50001 certification with the Certification Company.

CONTEXT

The fossil fuels and electricity prizes have been increasing in recent years so therefore energy efficiency becomes essential in order to obtain the maximum energy and economic savings.

The ISO 50001 standard implementation allows knowing the consumption of an installation and establishing goals that enable to obtain both energy and economic savings.

BENEFITS

CERTIFICATION ACCORDING TO ISO STANDARD

KNOWLEDGE OF OWN CONSUMPTION

OBTAINING ENERGY SAVINGS

ESTABLISHMENT OF PROCEDURES

APPLICATIONS

ALL COMPANIES FROM INDUSTRIAL SECTOR.

TECHNICAL ASSISTANCE FOR THE IMPLEMENTATION OF ISO 50001

AREA CAPABILITIES

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- Definition of the necessary equipment and communications.
- Energy consumption measurement.
- Influential parameters: temperature, humidity, loads, etc.
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KEYWORDS

ISO CERTIFICATION

ENERGY EFFICIENCY

ENERGY MANAGEMENT

INDICATORS OF PERFORMANCE

ENERGY MONITORING SYSTEM

TECHNOLOGY SUMMARY

Energy monitoring consists of the measurement of the consumptions of the different sources of energy used in a facility. This allows us obtaining information about which are the main energy consuming points, operating anomalies detection and therefore knowing where it is necessary to focus energy efficiency actions.

Energy monitoring also provides information about the habits of the employees in the facilities.

CONTEXT

It is essential the implementation of energy efficiency because of the progressive rise of energy costs in order to obtain the maximum energy and economic savings.

Energy monitoring systems allow measuring, analysing and recording different parameters of the electricity grid, such as active power, reactive power factor, the existence of harmonics and the different energy consumption for specific periods of time. All of this makes possible the optimization of the consumptions and the facilities of the plants monitored.

BENEFITS

GREATER KNOWLEDGE ABOUT CONSUMER ENERGY FACILITIES

MEASUREMENT AND VERIFICATION OF ENERGY SAVINGS

ECONOMIC SAVINGS

APPLICATIONS

Energy monitoring may be used in any industry. It is especially interesting in industries with big energy consumption since they normally have wider margin of savings.

AUTOMOTIVE INDUSTRY
FARMING INDUSTRY
AEROSPATIALE INDUSTRY
BUILDINGS

ENERGY MONITORING SYSTEM

AREA CAPABILITIES

Energy monitoring systems: industrial and tertiary sectors.

- Definition of the necessary equipment and communications.
- Energy consumption measurement.
- Influential parameters: temperature, humidity, loads, etc.
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KEYWORDS

ENERGY MONITORING

ENERGY EFFICIENCY

CIRCUTOR

ENERGY SAVINGS

CONTACT

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Sustainable Building Area

Presentation

The building area is focused on efficient technologies for heating, cooling and lighting in buildings to deliver Energy Efficient and nearly Zero Energy Buildings (EEB & nZEB)

Scientific-Technical Services

Energy efficiency simulation for different novel materials and innovative solutions under different climatic conditions.

Local interior environmental quality for high efficiency buildings.

Techno-economic assessment of novel EEB solutions.

Standard and quality fulfilment of innovative EEB developments.

Remote inspection technologies for energy efficiency evaluation of buildings.

Thermal energy storage systems, including phase change materials.

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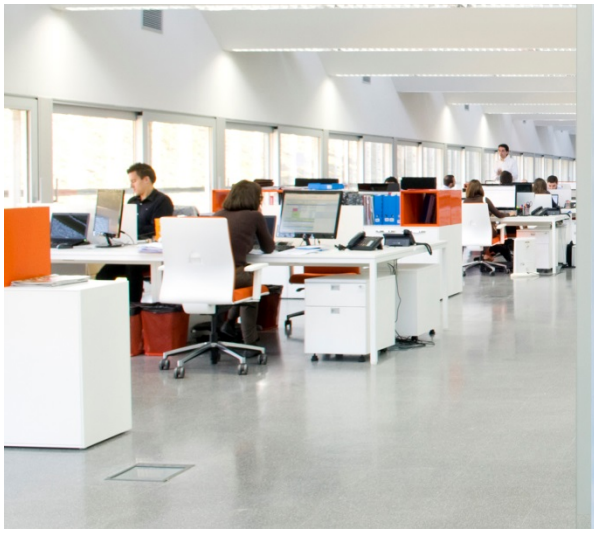
SIMULATION CFD OF AIR FLOWS AND TEMPERATURE DISTRIBUTIONS



TECHNOLOGY SUMMARY

It consists in the realization of simulations of tertiary buildings / industrial warehouses with CFD software in order to obtain temperature distributions and directions of airflows. This is the intention to optimize the distribution of air conditioning equipment in a building.

All this is useful to redistribute the climate equipment of an existing installation or to design a new installation.

To carry out this service, EnergyLab uses the fluent software from ANSYS and specially trained personnel are available to carry out this activity.

BENEFITS

KNOWLEDGE OF THE OPERATION OF THE BUILDING.

BETTER DESIGN OF THE AIR CONDITIONING FACILITY: it allows to study different options and chose the most suitable one, with which process is optimized.

LOWER ENERGY CONSUMPTION AND GREATER CONFORTABILITY IN THE WORKPLACE.

CONTEXT

With the increase in the cost of energy produced in recent years, along with the greater interest in the comfort of employees, this type of simulations become essential, allowing on the one hand reducing the energy consumption of a building / building and on the other hand improving the habitability of them.

APPLICATIONS

CFD simulation of air flows is focus on the thermal behaviour of buildings and therefore it is applicable to any building of different sectors, especially the third sector.

SIMULATION CFD OF AIR FLOWS AND TEMPERATURE DISTRIBUTIONS

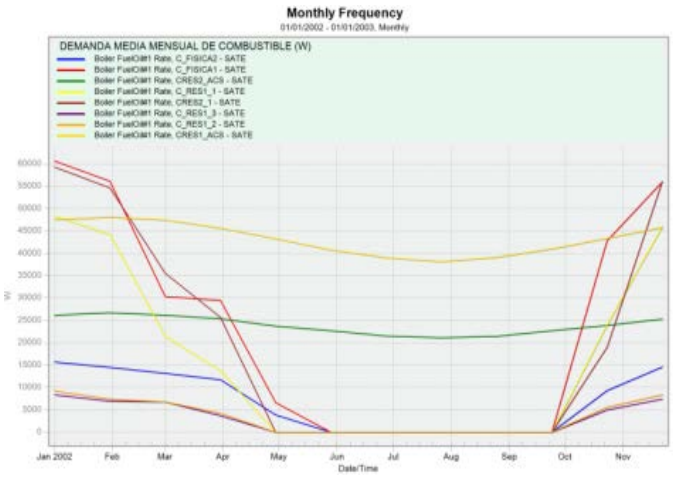
AREA CAPABILITIES

EnergyPlus: calculation engine used by the International Scientific Community that allows energy simulation to characterize the impact of unique constructive solutions on the behaviour of the building.

TRNSYS 17: graphically based software environment used to simulate the behaviour of transient systems.

Simapro: tool for quantification of environmental impacts of the whole life cycle, to determine CAPEX and OPEX and perform sensitivity analysis.

ANSYS Fluent: CFD analysis for temperature distribution, inside airflows, natural ventilation, HVAC in buildings and subsystems.



KEYWORDS

Simulation CFD

FLUENT

ANSYS

CONFORT

ENERGY EFFICIENCY

CONTACT

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DEVELOPMENT OF INTEGRAL STRATEGIES FOR THE ACHIEVEMENT OF nZEB BUILDINGS

TECHNOLOGY SUMMARY

It consists of the advice in the process of design and construction of the building with the purpose of obtaining a near Zero Energy Building (nZEB) which is a building whose consumption is almost zero.

For this purpose, it is necessary to develop a building with a very high efficiency and whose energy demand is satisfied, for the most part, through renewable energies.

Some technologies studied in these types of buildings such as the use of novel insulators, hybridization of renewable systems, energy storage or district heating/cooling systems for groups of buildings.

To perform this type of simulations EnergyLab uses **Design Builder** and **TRNSYS** softwares.

BENEFITS

MINIMIZATION OF THE BUILDING'S ENERGY CONSUMPTION

ENERGY WASTE REDUCTION

CO_2 EMISSIONS REDUCTION

CONTEXT

With the progressive increase in the price of fossil fuels and electricity, energy efficiency becomes essential in order to obtain maximum energy and economic savings.

Furthermore, nZEB buildings are increasingly common, especially in large blocks of buildings in order to reduce their consumption and environmental impact.

APPLICATIONS

New construction buildings.

Buildings to be rehabilitated with large energy consumption.

DEVELOPMENT OF INTEGRAL STRATEGIES FOR THE ACHIEVEMENT OF nZEB BUILDINGS

AREA CAPABILITIES

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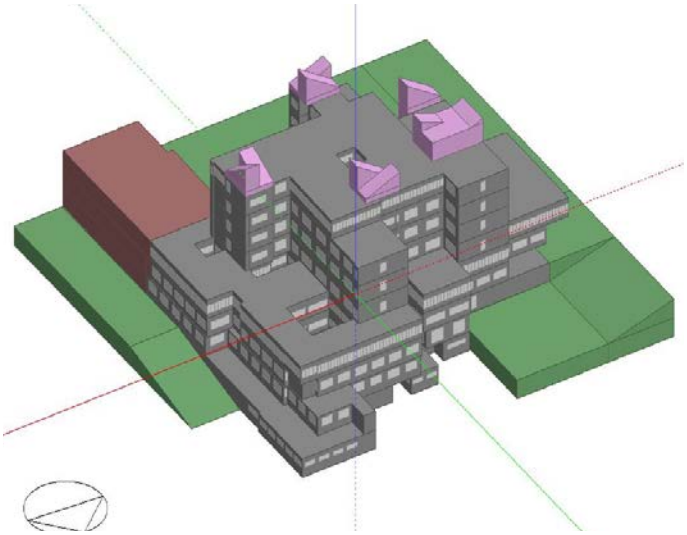

KEYWORDS

SIMULATION

ENERGY EFFICIENCY

DESIGN BUILDER

TRNSYS

ENERGYPLUS

NZEB

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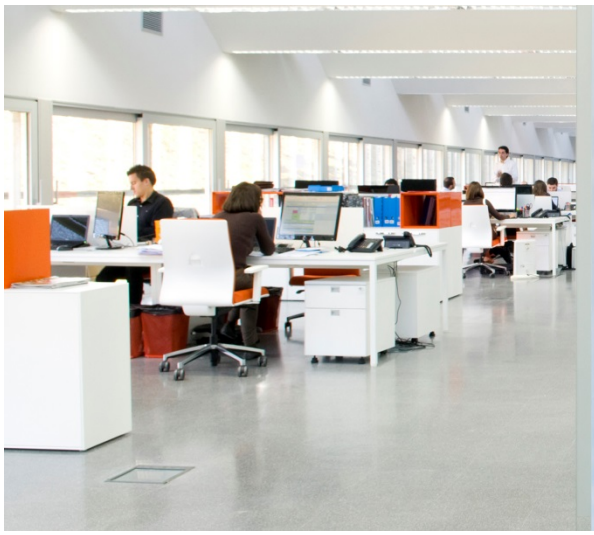
STUDY OF COOLING SYSTEMS



TECHNOLOGY SUMMARY

It consists of the study and analysis of different cooling systems in order to obtain the optimal for each case.

In this sense, EnergyLab is specialized in the use and optimization of heat pump cooling systems.

Linked to these systems, it is studied the use of renewable energies such as geotermal aerothermal energy.

BENEFITS

REDUCTION IN COOLING CONSUMPTION

REDUCTION IN ENERGY COST

REDUCTION IN CO_2 EMISSIONS

CONTEXT

With the progressive increase in the price of fossil fuels and electricity, energy efficiency becomes essential in order to obtain maximum energy and economic savings.

Refrigeration is a very important consumption in many industries and therefore it is essential to optimize its performance with latest technologies in the market.

APPLICATIONS

Companies which have a large cooling consumption:

REFRIGERATION COMPANIES

METAL SECTOR

STUDY OF COOLING SYSTEMS

AREA CAPABILITIES

EnergyPlus: calculation engine used by the International Scientific Community that allows energy simulation to characterize the impact of unique constructive solutions on the behaviour of the building.

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Simapro: tool for quantification of environmental impacts of the whole life cycle, to determine CAPEX and OPEX and perform sensitivity analysis.

ANSYS Fluent: CFD analysis for temperature distribution, inside airflows, natural ventilation, HVAC in buildings and subsystems.

KEYWORDS

REFRIGERATION

ENERGY EFFICIENCY

GEOTHERMAL

HEAT PUMP

CONTACT

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ENERGY SIMULATION OF BUILDINGS

TECHNOLOGY SUMMARY

The energy simulation of buildings consists of modelling certain geometry and obtaining thermal behaviour results of the building.

Enclosures composition, building orientation, type of window and historical climate data are parameter which are analysed in this type of simulations.

EnergyLab has the Design Builder software license, which is a software that uses EnergyPlus like calculation engine.

BENEFITS

KNOWLEDGE OF THE THERMAL BEHAVIOUR OF THE BUILDINGS: temperature distributions, estimated energy consumptions…

ESTIMATION OF THE IMPACT OF ACTIONS ON THE THERMAL ENCLOSURE

ESTIMATION OF THE IMPACT OF CHANGE OF THE BUILDING USE

ENERGETIC CERTIFICATION

CONTEXT

It is essential the implementation of energy efficiency because of the progressive rise of energy costs in order to obtain the maximum energy and economic savings.

The use of energy simulation is increasing especially in the tertiary sector.

APPLICATIONS

Buildings of all types that have significant air conditioning consumption.

Tertiary sector.

Existent and new buildings.

ENERGY SIMULATION OF BUILDINGS

AREA CAPABILITIES

EnergyPlus: calculation engine used by the International Scientific Community that allows energy simulation to characterize the impact of unique constructive solutions on the behaviour of the building.

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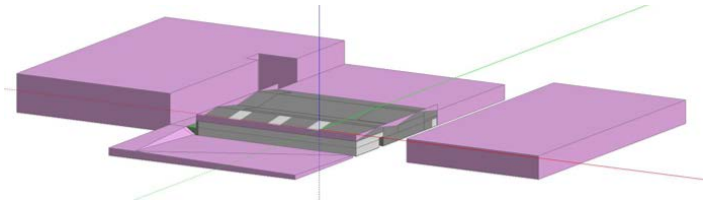

KEYWORDS

SIMULATION

ENERGY EFFICIENCY

DESIGN BUILDER

ENERGYPLUS

CONTACT

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Sustainable Mobility Area

Presentation

The area Works in the development of new systems for providing sustainable mobility solutions, mainly through electric and natural gas vehicles.

Scientific-Technical Services

Use of alternative fuels and fuel mixtures in internal combustion engines.

Hybrid engines development and testing.

Electric vehicles batteries.

Natural gas feeding and handling for transport.

Fleet management.

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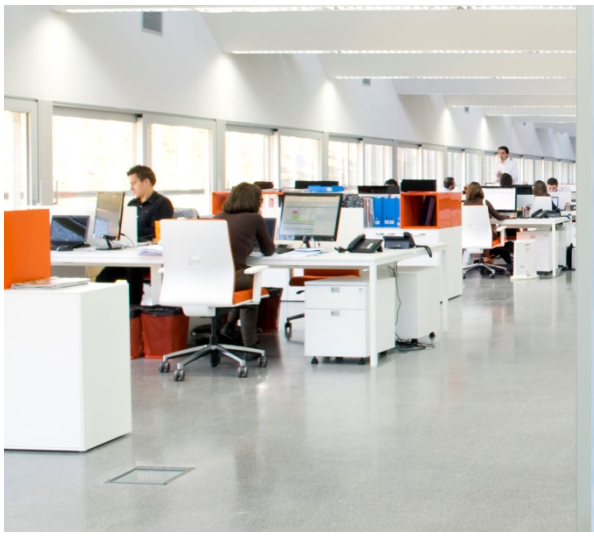
BEHAVIOUR EVALUATION LOADING / UNLOADING FOR BATTERIES



TECHNOLOGY SUMMARY

It consists of the analysis and obtaining of information about the battery loading / unloading cycle.

To develop this task, EnergyLab has in its laboratory a load / unload programmable source which emulates generation sources curves. Moreover, there are battery stacks from different capacity ranges in order to perform the tests.

BENEFITS

KNOWLEDGE OF BATTERIES OPERATION

OBTAINING GREATER BATTERIES PERFORMANCE

INCREASING OF BATTERY LIFE

CONTEXT

The hybrid and electric vehicles sector has been increasing in recent years therefore it is necessary the optimization of the performance of the batteries.

The assessment of the behaviour of these batteries is essential in order to increase their capacity and useful life.

APPLICATIONS

CONVENTIONAL BATTERIES

HYBRID VEHICLES BATTERIES

100% ELECTRIC VEHICLES BATTERIES

BEHAVIOUR EVALUATION LOADING / UNLOADING FOR BATTERIES

AREA CAPABILITIES

AVL software for new fuel performance simulation in internal combustion engines.

CFD software, Ansys and OpenFOAM for computational fluid dynamics and thermal simulation.

On-board monitoring system.

Bench test engine for new fuels, equipped with a regenerative braking system and two combustion engines (diesel and gasoline).

Gas mixer. Ability to synthesize compositions of up to 5 gases.

Programmable source / load (emulation generation curves and discharge).

KEYWORDS

BATTERY

CYCLE LOADING / UNLOADING

BATTERY LIFE

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EFFICIENT FLEET MANAGEMENT

TECHNOLOGY SUMMARY

The efficient management of vehicles fleets consists of the measurement of vehicle data for further analysis and processing in order to optimize parameters such as routes, driving habits, refuelling and auxiliary systems.

To perform this task, EnergyLab has 2 non-invasive units for monitoring and recording data via the OBDII port. Moreover, EnergyLab also has a high-speed processing workstation and the Simulink and Matlab software for the simulation of operation.

BENEFITS

MORE EFFICIENT DRIVING

DWELL TIME REDUCTION

KILOMETRES TRAVELLED REDUCTION: because of routes optimization

TOTAL COSTS REDUCTION

CONTEXT

The Price of fossil fuels such gasoline and diesel has been increasing in recent years therefore it is necessary to make a greater control of vehicle fleets.

Fleet management is a service which has been increasing because it allows obtaining large savings with small investments.

APPLICATIONS

Fleet of all type of vehicles: light-duty vehicles, heavy-duty vehicles…

This service is focused on large fleets since the savings margin is higher because of its flexibility.

In shorter fleets that not allow an important optimization, it is possible to obtain savings through good driving habits.

EFFICIENT FLEET MANAGEMENT

AREA CAPABILITIES

AVL software for new fuel performance simulation in internal combustion engines.

CFD software, Ansys and OpenFOAM for computational fluid dynamics and thermal simulation.

On-board monitoring system.

Bench test engine for new fuels, equipped with a regenerative braking system and two combustion engines (diesel and gasoline).

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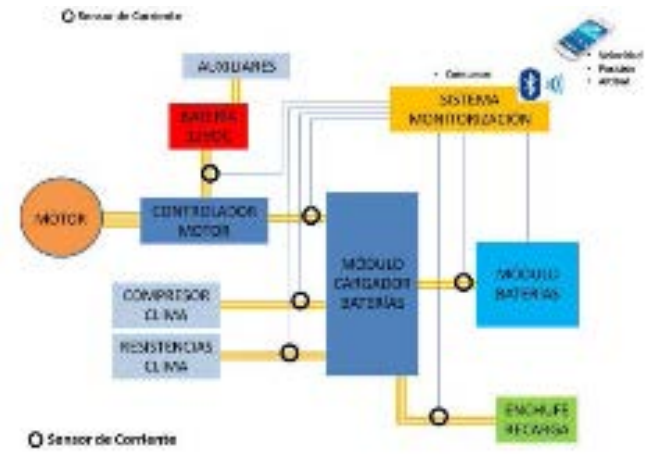

KEYWORDS

FLEET MANAGEMENT

MATLAB

SIMULINK

LOGISTICS

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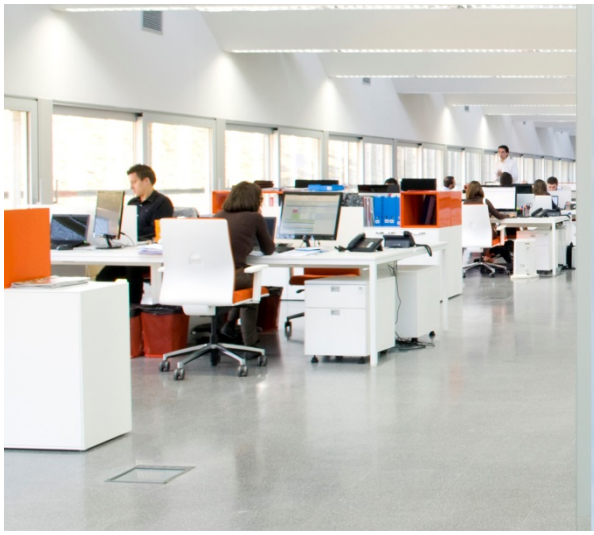
USE OF NEW FUELS (NATURAL GAS / BIOGAS) IN COMBUSTION ENGINES



TECHNOLOGY SUMMARY

The use of new fuels in combustion engines consists of the study, both in the laboratory and in the office, of the behaviour of the engine when using different fuels.

EnergyLab has a bench engine located in the laboratory in order to test combustion engines. Moreover, there are two engines (the gasoline one, and the diesel one) transformed to gas.

EnergyLab also has some software to perform simulations of engines such as AVL, Fluent and OpenFoam.

BENEFITS

ECONOMIC SAVINGS: lower cost fuels

ANTICIPATION BEFORE FUTURE LEGISLATIVE CHANGES

EMISSIONS SAVINGS

CONTEXT

The Price of fossil fuels such gasoline and diesel has been increasing in recent years therefore it is necessary to reduce the fuel consumption.

Natural gas is a fossil fuel though its cost and environmental impact are lower.

Nowadays, some large cities which are quite polluted are restricting the circulation of gasoline and diesel vehicles through the city.

APPLICATIONS

This service may be applicable to any diesel or gasoline engine.

It is especially interesting for companies which have large vehicles fleets in order to reduce the fuel costs and the emissions to the environment.

USE OF NEW FUELS (NATURAL GAS / BIOGAS) IN COMBUSTION ENGINES

AREA CAPABILITIES

AVL software for new fuel performance simulation in internal combustion engines.

CFD software, Ansys and OpenFOAM for computational fluid dynamics and thermal simulation.

On-board monitoring system.

Bench test engine for new fuels, equipped with a regenerative braking system and two combustion engines (diesel and gasoline).

Gas mixer. Ability to synthesize compositions of up to 5 gases.

Programmable source / load (emulation generation curves and discharge).

KEYWORDS

ALTERNATIVE INTERNAL COMBUSTION ENGINE

SOFTWARE AVL

FLUENT

BENCH ENGINE

NATURAL GAS / BIOGAS

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Bioenergy Area

Presentation

It is focused on technological development of low carbon energy, including renewable sources such as biogas, biomass, geothermal, marine energy, etc, with the aim of a secure, efficient amd sustainable energy supply.

Scientific-Technical Services

Low cost biogas and syngas upgrading systems.

Novel residual biomass gasification for syngas production.

Micro-algae biogas upgrading and added value by products generation.

Additives for new biomass fuels production and novel technologies for biomass energy valorisation.

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CHARACTERIZATION OF BIOMASSIC FUELS, ADDITION OF ADDITIVES AND ENERGY VALORIZATION OF BIOMAS

TECHNOLOGY SUMMARY

It consists of carrying out tests under UNE regulations for the characterization of biomass, the addition of additives for the optimization of the thermochemical valorisation of low quality biomass and the performance of combustion tests in a boiler of solid biomass of low power.

The EnergyLab equipment allows, therefore, to carry out the immediate analysis of different types of biomass, which translates into the determination of moisture content, ash, volatile material and fixed carbon. In addition, thanks to an isoperibolic calorimeter pump, the energy potential of different biofuels, both solid and liquid, can be obtaining by determining the calorific value.

On the other hand, combustion tests allow analysing the behaviour of new solid fuels, in order to optimize the process and increase its performance. These tests will allow, at the same time, to know the emissions derived from the combustion of the biomass, including the emissions of particulate material to the atmosphere.

CONTEXT

The need to increase competitiveness in companies leads to an increase in a continuous search for cost reduction.

With the exponential increase in cost of fossil fuels, it is necessary to search for alternatives with which to cover the needs at a lower cost.

Biomass is a viable option and currently applicable to small and large scale. In particular, biomass from waste (such as tree pruning) is a potentially available and freely available resource that is currently not being used.

BENEFITS

ECONOMIC SAVINGS: lower cost fuels

ANTICIPATION BEFORE FUTURE LEGISLATIVE CHANGES

EMISSIONS SAVINGS

CHARACTERIZATION OF BIOMASSIC FUELS, ADDITION OF ADDITIVES AND ENERGY VALORIZATION OF BIOMAS

APPLICATIONS

Industries generating biomass waste:

WINE SECTOR, FRUIT SECTOR, ETC.

Industries with fossil fuel consumption to produce heat.

AREA CAPABILITIES

EnergyLab has personal with a technical and research profile that has extensive experience in the laboratory, in biomass characterization processes, valorisation and analysis of emissions.

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KEYWORDS

BIOMASS

ISOPERIBOLIC CALORIMETRIC PUMP

THERMOCHEMICAL VALORIZATION

ENERGY POTENTIAL

ENERGY VALORIZATION

CHARACTERIZATION OF ORGANIC WASTE AND DETERMINATION OF ENERGY POTENTIAL

TECHNOLOGY SUMMARY

The characterization of waste and determination of the energy potential includes both the physical - chemical characterization of the waste and the determination of the composition of biogas and biomethane.

EnergyLab services also include the obtaining of methanogen potential and percentage biodegradability in discontinuous / continuous regime and in mesophilic / thermophile conditions, both of a residue and of a mixture (co-digestion); as well as the determination of the toxicity / inhibition potential of a compound and up to the evaluation of the effect of pre-treatments.

On the other hand, it is also possible to carry out the study and evaluation of biogas cleaning and purification systems, determine the quality of digestate and perform composting tests.

BENEFITS

NO NEED TO CONTRACT WASTE MANAGEMENT COMPANY

OBTAINING INCOME (IF GAS IS INJECTED IN NETWORK) OR SAVING (IF GENERATED BIOGAS IS SELECTED)

CIRCULAR ECONOMY

CONTEXT

The waste of organic origin has a high energy potential that until now was not being fully exploited.

The increase in the price of fossil fuels and the development of technologies for the use of these wastes make feasible the implementation of this type of systems in companies that generate organic waste that can be recycled or in companies that manage other waste.

APPLICATIONS

Industries that generates organic waste:

LIVESTOCK INDUSTRY

MEAT INDUSTRY

AGRIFOOD INDUSTRY

CANNING INDUSTRY

DAIRY INDUSTRY

WINE INDUSTRY

WATER TREATMENT PLANTS

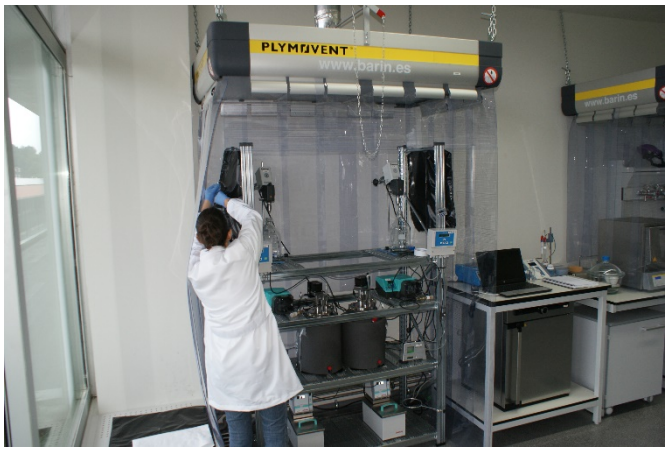
CHARACTERIZATION OF ORGANIC WASTE AND DETERMINATION OF ENERGY POTENTIAL

AREA CAPABILITIES

EnergyLab has personnel with a technical and research profile who has extensive experience in the physical-chemical, biological, process engineering and analytical processes detailed in the previous sections.

EnergyLab has a complete laboratory that allows the realization of multiple analytics such as the total and soluble chemical oxygen demand (COD), the biological demand of oxygen at 5 days (BOD5), PH, conductivity and redox potential, Total Nitrogen and Ammonium (NH_4+), humidity, total solids (ST), volatile solids (VS), total suspended solids (TSS), volatile suspended solids (SSV), Alkalinity ratio, fat, short chain fatty acids (VFA), anions (nitrite, nitrate, sulfate, phosphate), etc. and the determination of the composition of biogas by gas chromatography.

At the same time, EnergyLab has pilots, both anaerobic digesters of complete mix as well as biogas purification systems, microalgae growth, etc.



KEYWORDS

BIOGAS

BIOMETHANE

BIODEGRADABILITY

DIGESTATE

CO-DIGESTION

ENERGIC POTENTIAL

ENERGETIC VALORIZATION

ORGANIC WASTES

CONTACT

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CFD SIMULATION

TECHNOLOGY SUMMARY

The fluid - dynamic simulation (CFD - Computational Fluid Dynamics) allows to know the behavior of a system. Allowing, therefore, the identification of problems that may arise and the study of different ways of solving them. Currently, EnergyLab is carrying out simulations of the following processes:

Anaerobic Digestion: The following results can be obtain from these simulations: volume of biogas generated; degree of mixing inside the digester; composition of the digestate inside the digester; composition of the effluent, etc.

Biomass Gasification: being able to Obtain the composition of the syngas produced for different bed temperatures; different biomass compositions, etc.

Biomass Combustion: being able to obtain boiler emissions (% CO2 y % CO); temperature of the combustion gas; useful heat, etc.

BENEFITS

KNOWING FLUID BEHAVIORS WITHOUT THE NEED FOR REAL EQUIPMENT

REDUCTION OF UNCERTAINTY OF THE BEHAVIOR OF A TEAM / PROCESS BEFORE A CHANGE

CONTEXT

The processes change continuously and new possibilities of exploitation arise.

The simulation of processes allows knowing their behavior before changes produced in the operating conditions. This allows reducing the times of obtaining results and with it the reduction of the uncertainty before the realization of a large investment.

APPLICATIONS

Industries that generate organic waste with energy value.

LIVESTOCK INDUSTRY

MEAT INDUSTRY

AGRO-FOOD INDUSTRY

CONSERVER INDUSTRY

DAIRY INDUSTRY

WINE INDUSTRY

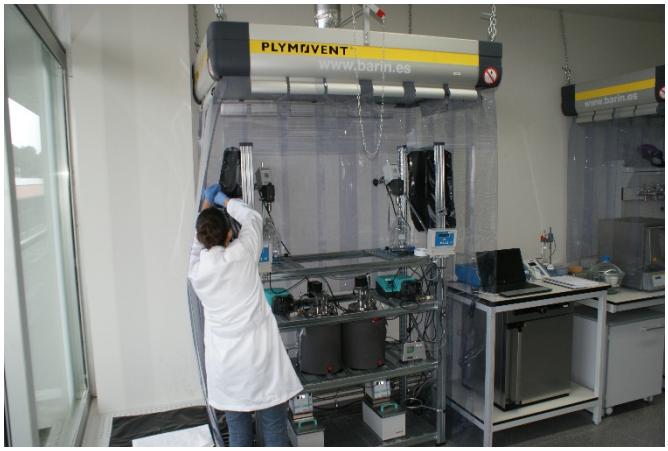
WATER TREATMENTS

CFD SIMULATION

AREA CAPABILITIES

EnergyLab has personnel with a technical and research profile who has experience in the simulation of biological and physical-chemical processes. As well as in the simulation of the combustion / gasification of different biomass fuels.

In addition, the Center also has a commercial software license ANSYS Fluent v. 18.1, which contains the broad physical modeling characteristics needed to model flows, turbulences, heat transfers, and industrial reactions ranging from the airflow over the wing of an aircraft to the combustion of a furnace.



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KEYWORDS

BIOGAS

BIOMASS

GASIFICATION

COMBUSTION

WASTE

COMPUTATIONAL FLUID DYNAMICS

ENERGY VALORIZATION

FLUENT (ANSYS)

ENGINEERING ADVANCES IN PROCESSES OF ANAEROBIC DIGESTION AND BIOMETHANE PRODUCTION

TECHNOLOGY SUMMARY

This service focuses on specialized advice on issues related to the recovery of waste, generation of biogas, obtaining biomethane, pretreatments, post-treatments and uses of digestate among others, in order to have an analysis that allows the generation industry of the waste, analyze which will be the best method for the implementation of a biogas plant or optimization of an existing process. The tasks of:

Study and analysis of the biogas production process

- Development of technological support to define the most appropriate technologies according to the waste to be digesting.
- Definition of the potential depending on the different technological solutions.
- Analysis of energy uses.
- Optimization of the system to increase the production of biogas.
- Determination of the best digestate valorization method.

Study and analysis of the biomethane production process:

- Creation of technological support for the definition of more appropriate technologies.
- Definition of the potential depending on the different technological solutions.
- Analysis of uses (injection and mobility).

CONTEXT

The waste of organic origin has a high-energy potential, which if valued, could generate both economic and environmental benefits, contributing in turn to the circular economy.

The increase in the price of fossil fuels and the development of technologies for the use of these wastes make feasible the implementation of this type of systems in companies that generate organic waste that can be recycled or in companies that manage other waste.

APPLICATIONS

Industries that generate organic waste with energy value.

LIVESTOCK INDUSTRY

MEAT INDUSTRY

AGRO-FOOD INDUSTRY

CONSERVER INDUSTRY

DAIRY INDUSTRY

WINE INDUSTRY

WATER TREATMENTS

ENGINEERING ADVANCES IN PROCESSES OF ANAEROBIC DIGESTION AND BIOMETHANE PRODUCTION

BENEFITS

NO NEED TO CONTRACT WASTE MANAGEMENT COMPANY

OBTAINING INCOME (IF GAS IS INJECTED IN NETWORK) OR SAVING (IF GENERATED BIOGAS IS SELECTED)

CIRCULAR ECONOMY

AREA CAPACITIES

EnergyLab has personal with a technical and research profile who has extensive experience in the laboratory, in biomass characterization processes, valorization and analysis of emissions.

KEYWORDS

ORGANIC WASTE

BIOGÁS

BIOMETANO

DIGESTATE

PRE-TREATMENTS

POST-TREATMENTS

ENERGY VALORIZATION

CONTACT

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PROPERTY ENGINEERING

TECHNOLOGY SUMMARY

This service focuses on specialized advice in detail projects related to biogas, biomethane, biomass combustion, gasification, waste, etc. where EnergyLab would be in charge of the following phases:

• Technical sheet writing.

• Preparation of the basic and execution project.

• Evaluation and selection of suppliers for the execution of the works described in it.

• Follow-up, verification in the process of implementation and start-up.

BENEFITS

GREATER SECURITY IN THE AWARD OF AN OFFER

OBTAINING THE BEST OPTION FOR EACH CONCRETE CASE

REVIEW OF THE CORRECT CONSTRUCTION AND START-UP OF THE PLANT

CONTEXT

Waste of organic origin has a high-energy potential that until now is not being fully exploited.

The increase in the price of fossil fuels and the development of technologies for the use of these wastes make feasible the implementation of biogas / biomethane plants both in companies that generate recyclable organic waste and in companies that manage other waste

APPLICATIONS

Industries that generate organic waste with energy value.

LIVESTOCK INDUSTRY

MEAT INDUSTRY

AGRO-FOOD INDUSTRY

CONSERVER INDUSTRY

DAIRY INDUSTRY

WINE INDUSTRY

WATER TREATMENTS

PROPERTY ENGINEERING

AREA CAPACITIES

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KEYWORDS

ORGANIC WASTE

BIOGAS

BIOMETANO

DIGESTATE

DIGESTORS INDUSTRIAL SCALE

PRETREATMENTS

POST-TREATMENTS

ENERGY VALORIZATION

THERMAL VALORIZATION

SUSTAINABLE MOBILITY

INJECTION TO NETWORK