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Urban mobility analysis and prediction for non-routine scenarios using digital footprints

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Cofinanciado por:



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Urban mobility analysis and prediction for non-routine scenarios using digital footprints

▶ Agenda

- ▶ Project summary
- ▶ Team
- ▶ Tasks
- ▶ Current status

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▶ Project overall objective

- ▶ To study individual's mobility for mining non-routine (leisure, social, etc.) mobility patterns from multiple data sources.

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▶ The problem

- ▶ Around 80% of the European citizens live in urban areas, which is where 85% of European GDP is generated
 - ▶ These areas currently face crucial challenges, such as growing car ownership levels, increasing vehicle travel distances, and high energy consumption
- ▶ (sustainable) mobility - mode and frequency with which people move to satisfy their several needs, which range from "mandatory" to **optional/non-routine (leisure, social, etc.)** trips
 - ▶ Non-routine trips are increasingly more frequent
 - ▶ providing quality public transportation services may be extremely expensive when demand is low, variable and unpredictable (non-routine)

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▶ The problem

- ▶ Understanding personal travel patterns is essential to plan sustainable urban transportation systems that fulfil citizens' mobility needs
 - ▶ traditional demand modelling methods (such as surveys) are:
 - ▶ very expensive
 - ▶ time consuming
 - ▶ give planners only a picture of what has happened

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▶ The solution

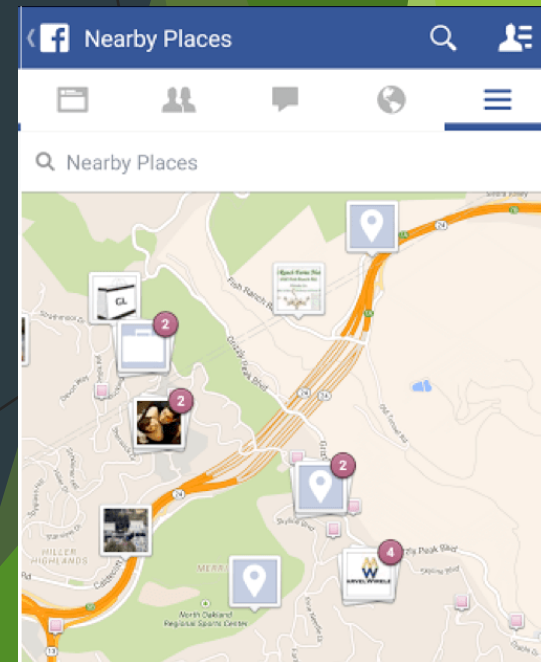
- ▶ A **dynamic** way to profile the movement of people and vehicles
 - ▶ sensing the dynamics of the city
 - ▶ points of interest
 - ▶ location-based activities (for destination choice modelling)
 - ▶ modes of transport
 - ▶ trajectory patterns

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► How?

- The wide deployment of **pervasive computing** (smartphones, GPS devices, etc) and **transport system records** provide unprecedented **digital footprints**, telling where and when people are
- The composition of **social networks** can be used for understanding for travel patterns
- Objective: To study individual's mobility for mining non-routine (leisure, social, etc.) mobility patterns from multiple data sources.



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► Project Bio

- **Funded by:** COMPETE 2020, Portugal 2020 (POCI), European Union's ERDF, and the Portuguese Foundation for Science and Technology (FCT).
- **Partners:** FCTUC, FEUP
- **Total budget:** 176 000,00 €
- **Keywords:** Digital footprints, Points of interest, Demand modelling, Destination choice modelling, non-routine mobility
- **Start Date:** 2016-06-01
- **End Date:** 2018-05-31

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► Project team



FCTUC

- Ana Alves
- Carlos Bento
- Francisco Antunes
- Frederico Neto
- Merkebe Demissie
- Rui Gomes



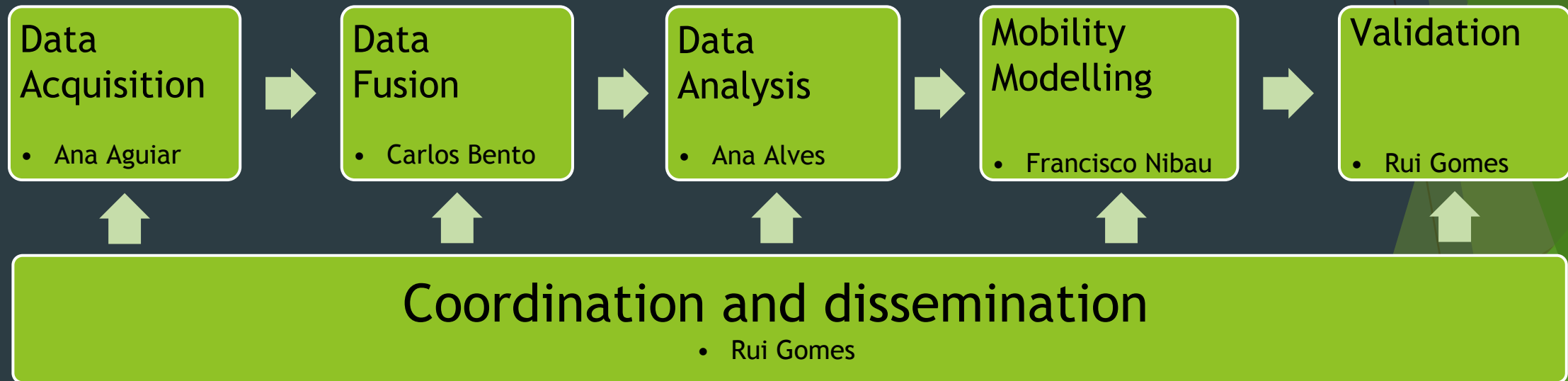
FEUP

- Ana Aguiar
- Daniel Moura

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► Tasks



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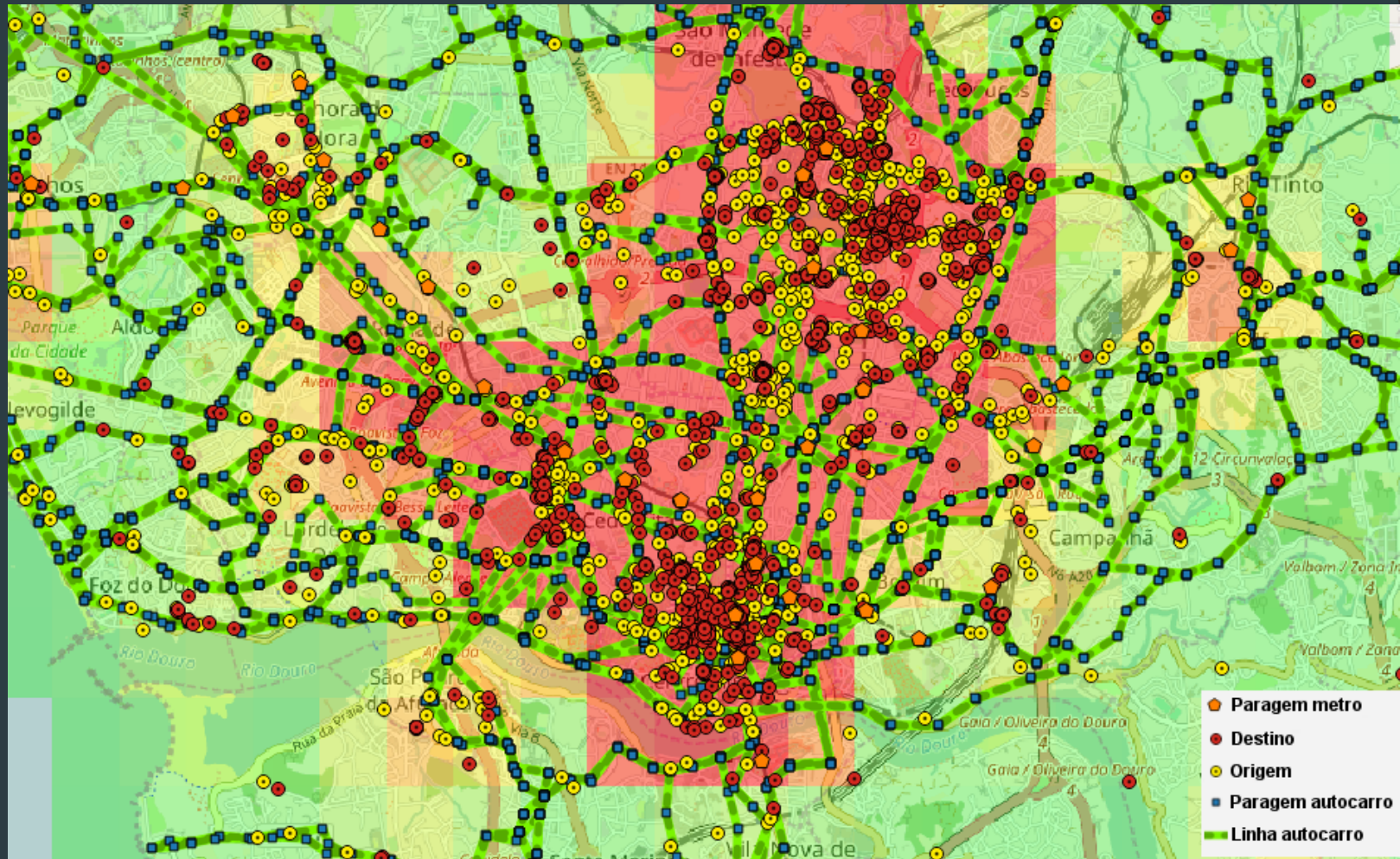
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► Status

- Definition of the area (with sufficiently large number of POIs, scale social network activity, data availability) - Porto
- Available data
 - GPS traces from a mobility app - April, 2016
 - Facebook, Foursquare, Instagram, InfoPorto, Factual
 - Census + INE
 - CityMotion (MIT-Portugal) data
 - Traditional data (surveys)
- Data acquisition
 - Social network analysis (places, popularity, events)
 - GPS traces - cleaning, clustering
 - Weather data
 - Static data (transport network stops, lines, schedules)
- Data fusion

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Thank you!!