

Evaluation report

Speed measurement and feedback Cycledata

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Short description

In Utrecht, there is a dangerous intersection for cyclists in the Biltstraat. It is a busy cycling path and when cyclists approach the traffic light, they do not have a clear view on the intersection mainly due to the curve in the cycle path and the surrounding buildings. Previous research has also shown that cyclists feel unsafe when approaching this intersection, especially due to the high intensity of bicycle traffic during the rush hours. By means of installing measuring equipment and different types of dynamic signs with motivational feedback for cyclists, the pilot aims to reduce speed and experienced traffic intensity and thus to improve safety feelings among cyclists. The pilot was run by the company Cycledata in cooperation with the City of Utrecht.

Type of ITS

Signum: a speed measurement device using a radar/laser combination

Dynamic signs giving motivational feedback

Timeline

In autumn 2021, the pilot started running. Between September 2021 and the end of November 2021, there were three separate measurements of speed and traffic intensity:

- (1) baseline measurement with no motivational feedback
- (2) measurement with three regular signs including positive messages such as 'relax', 'take it easy'
- (3) measurement with two digital signs including different types of messages ranging from neutral messages (e.g. 'Good travel', 'Welcome'), over messages with smileys, positive messages (see measurement with regular signs) to negative messages or warnings. Each type of measurement was tested for about 2 weeks. Five sensors continuously measured the speed and the cycling intensity of the cyclists passing by. Depending on the numbers of cyclists and their speeds, the messages were adjusted accordingly.

Hypothesis

The goal of the ITS was to detect if and which type of motivational message may have an impact on the speed of cyclists and, secondly on the feelings of unsafety caused by high speed and high cycling intensity.

Data sources

- Data on the number of cyclists and their speed
- Internal report of the city council of Utrecht (including the results of a survey administered among the cyclists in the Biltstraat)
- Report of a meeting with project managers about the evaluation of the pilot

Analysis

Report of the pilot

A Signum (a digital counting point) was installed at locations 1 and 4. It measured the number of bicycles passing by, the time, direction and speed. When coming from the direction of location 1, the cyclist saw a message on the sign at location 2 depending on the measured speed at location 1. The same is true when coming from the direction of location 4. In this case the cyclist saw a message on the sign at location 3. Signums were also installed at locations 2 and 3 in order to determine whether the message influenced the speed of the cyclists. A Signum was also set up at location 6 to measure the numbers of cyclists in order to be able to assess how many of the cyclists passing location 1 and 4 came from location 6 or vice versa.



Between September 2021 and December 2021, by means of three separate measurements, data about the impact of different types of motivational messages on speed and feelings of (un)safety caused by high speed and high cycling intensity had been collected. The internal evaluation report of this pilot has been done by the city of Utrecht. They refer to the results of a survey administered among cyclists using the Biltstraat. It concerns a representative sample but however we do not have the exact information on the sample design. The City of Utrecht indicates the following results:

Strengths of the pilot:

- Almost half of the people who completed the questionnaire appreciated that the municipality placed these signs.
- Of all signs, the digital signs were noticed the most: about 61% indicated to have noticed the digital signs while only 28% had seen the other, regular signs.

Weaknesses of the pilot:

- We do not find the hypothesis to be confirmed: the various (digital) signs do not clearly support the safety in the Biltstraat.
 - The results of the survey indicate that there is no clear impact of (digital) signs on the feelings of (un)safety caused by high speed and high cycling intensity. Up to 70% of the respondents indicated that they were still bothered by the high traffic intensity. They

- find motorised vehicles and e-bikes driving with high speed the most annoying as well as incoming traffic and overtaking manoeuvres.
- Based on the data collected by the signums (speed measurements), there is no clear impact of (digital) signs on the average speed of cyclists.
- The signs had no direct influence on the perception of intensity on this cycle path. Only 5% of the respondents mentioned that they experienced less cycling intensity due to the signs.
- The only positive note we read in the survey results: about 22% claims to have adjusted their speed due to the message observed. However, this is contradicted by the data provided by the signums as stated above.
- There were several technical problems with the five sensors which continuously measured the speed and the cycling intensity of the cyclists passing by.
- The data do not support the conclusion that this pilot reached the main BITS-objectives. The (digital) signs cannot be directly linked nor to an increase of 10% cyclists, nor to a decrease of 9% CO2 emission.

Experiences project managers

The project managers defend the initial idea of the pilot. It is very interesting to build a pilot for testing the way people react to different types of signs. However, there were some obstacles that prevented the pilot to be successful. Firstly, they should have invested more in a good communication flow with the city of Utrecht from the beginning of the pilot onwards. There have been some misunderstandings as for who was responsible for what part of the pilot. Moreover, while Cycledata focussed on the measurement of intensity, the city of Utrecht was more interested in the measurement of the speed of the cyclists. Secondly, the location to test the hypothesis on the differential impact of various signs has not been well chosen. The Bilstraat is for instance a spot where the availability of high voltage is not constant which ended up causing gaps in the measurements by the signums. Thirdly, neither the measurement by the Signums nor the survey accounted for changing weather conditions which makes it difficult to interpret the results. 54,7% of the respondents in the overall BITS-survey indicated that bad weather conditions are a barrier to cycle and 40% indicated that they are a major factor in their motivation to use the bicycle. Moreover, it is self-evident that weather conditions can equally impact speed and feelings of (un) safety. The project managers conclude that there are too many open endings for this pilot. Whether or not the message on the sign had any impact remains unclear.

Conclusions

In the light of the BITS-project goals¹, we may conclude that the main goals of this pilot are only very partially reached. While, objectively, no impact on cycling speed was measured due to the digital signs, 22% of the survey participants notwithstanding reported to have adjusted their speed and 5% experienced less cycling intensity due to the signs. Accordingly, this type of ITS, installed at a busy and complex traffic situation, may have a small but nevertheless relevant impact on the feelings of unsafety caused by high

¹ an increase in cycling use with 10% and a reduction of CO2 emission with 9% within target groups due to the implementation of ITS solutions

speed and high cycling intensity. Eventually, in the long run, increasing feelings of safety at this intersection may help to motivate more people to cycle there and thereby decrease the level of CO2.

Lessons Learned

A first lesson learned concerns the choice of the location to test this type of ITS. The busy and complex traffic situation at the Biltstraat already provides many stimuli for cyclists which was even increased due to the additional signs installed in this pilot. To comprehend the impact of the signs and the message they broadcast, it would have been better to choose a less complex traffic situation, as for instance a straight road.

A second lesson learned concerns the importance of taking into account the weather conditions. They can have been reason for not finding an impact of the signs on speed and feelings of (un)safety. Weather conditions could indeed have intervened and thereby ruled out the effect of the signs.

A third lesson refers to alternative ITS that already exist to support the safety at the cycling path. These alternatives could in the case of the Biltstraat be a better option. 3D-cameras could be used (see the 3D camera-pilot in the Antwerp) to observe whether and in what way the busy and complex traffic situation is unsafe in the sense accidents or near-accidents occur. Moreover, other ITS than signs can be used to alert or correct cyclists as for instance vibrations and lights. Vibrations for instance are increasingly used to alert car drivers. The same principles might be transposed to cyclists.