



CITYTHON 2021

16 - 21 JULY



Challenge 3

NAME: Help Barcelona citizens to move in a safer, more sustainable and healthier way.

Short description:

Barcelona SUMP 2024 puts citizens in the centre of city mobility. Thus, it aims to boost a modal change that make possible that more than 80% of trips inside the city are made by sustainable modes (walking, cycling and public transport) in 2024.

Citizens' health is another of Barcelona main concerns and so SUMP 2024 goals for active mobility are highly ambitious. Walking current modal share is around 34% and the objective is to increase it by 7.5% in 2024. Even more ambitious is the objective for cycling whose modal share is 2.3% and the objective is to achieve 5% in 2024, representing an increase of 129%.

But above all we are aware that we must make trips safer, especially for the most vulnerable (pedestrians and cyclists).

With this objective, Barcelona is a partner of the Autonomous Ready project, which provides a driver support system that helps to prevent collisions with pedestrians and cyclists. The goal is to cut the number of accidents and identify black spots in the city so that action can be taken to improve their safety.

As part of the project, Advanced Driver Assistance Systems (ADAS) were fitted in delivery and transport vehicles. The system predicts 80% of possible driver errors and uses cameras with smart sensors to:

- Gather information from surroundings.
- Detect and geolocate pedestrians and cyclists.
- Map susceptible areas to implement safety measures.
- Give out an accident warning in cases of risk.

Autonomous Ready is headed by the Directorate General for Traffic (DGT) and Barcelona City Council. Various entities and businesses are also collaborating and have fitted ADAS devices on their vehicles. You can find



further information about the Autonomous Ready project in the following link: <http://www.autonomousready.org>.

For all above, we ask you to help us to identify the riskiest areas for vulnerable and propose actions to make their trips safer

1. Detailed description of the problem

Barcelona aims to encourage citizens to move in a more sustainable and healthy way but the main challenge is ensuring that they make it in the safest way.

This year Barcelona's challenge is divided into two sub-challenges that can be tackled by participants individually (choosing only one of them) or globally (merging both sub-challenges).

The challenge

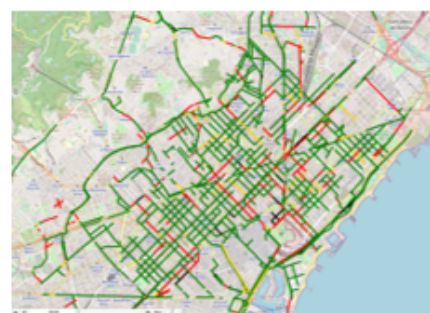
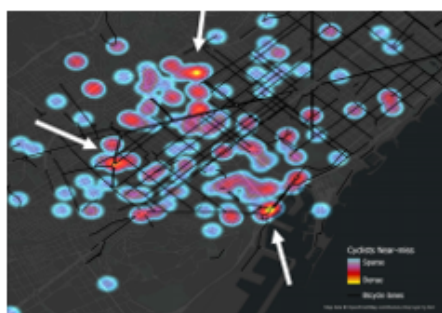
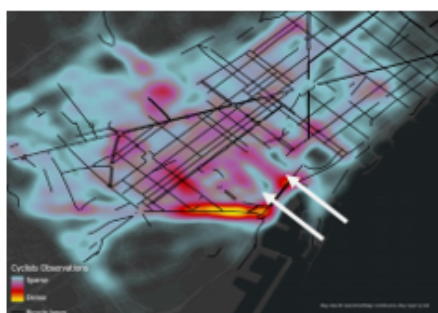
a) **Sub-challenge 1:** This sub-challenge is focused on pedestrians and we would like you to identify risky areas around main city equipments where a high number of pedestrians gather everyday. We would be pleased if you also could provide us with some advices on how to improve the safety in these areas.

b) **Sub-challenge 2:** This sub-challenge is focused on cyclists and we would like you to identify risky areas for cyclists all around the city. We would be pleased if you also could provide us with some advices on where we should construct around 50km of new bike lanes for the next few years. Proposals for these new bike lanes must aim to provide bike infra where does not exist now and safety issues have been identified.

2. What do we expect as the outcome of the solution?

We expect the following outcome for each sub-challenge (participants can choose only one sub-challenge or both):

Some examples...



a) **Sub-challenge 1:** A viewer with a map/list with the algorithm that generates the solution for decision making on future actions to be implemented by municipality in order to improve pedestrians safety and wellbeing in the risky areas around main city equipments. The viewer must show clearly which are the riskiest areas for pedestrians around city equipments and has to allow classifying risks by categories or intensity.

Citython participants will provide as well a justified list of actions that they propose to be implemented in the 5 riskiest areas.



b) **Sub-challenge 2:** A viewer with a map/list with the algorithm that generates the solution for decision making on future actions to be implemented by municipality in order to improve safety of cyclists. The viewer must show clearly which are the riskiest areas for cyclists and has to allow classifying risks by categories or intensity.

Citython participants will provide as well a properly justified proposal of where they advice municipality to construct the next 20 km of new bike lanes.

Please note that any proposed solution must comply with current Barcelona regulations.

3. What is the scope for changes to the current systems? (software, hardware, etc.)

Teams are free to utilize any technologies of their choice.

Your imagination is your power, so you can do everything that at the end you have a complete web deployable project that can show the results.

4. What data are participants allowed to use for the development of their solution?

Teams are free to get any data from any legal source they consider useful.

Moreover, we will provide participants with the following data in the due time:

a) Sub-challenge 1:

- Pedestrians' accident rate data for last years.
- A multiple geojson data set from Autonomous Ready project for the last 3 months. Every file is a day and data are hourly aggregated. Some variables contained in dataset are:
 - Number of PCW pedestrian (pedestrian collision warning) alerts during the hour.
 - Average number of pedestrians detected in the road segment (number of pedestrians detected / number of drives).
- Open data Barcelona information

b) Sub-challenge 2:

- Barcelona bike lanes map 2020
- Barcelona bike lanes map 2024 (planned)
- Barcelona bike lanes design Manual.
- Cyclists' accident rate data for last years.
- A multiple geojson data set from Autonomous Ready project for the last 3 months. Every file is a day and data are hourly aggregated. Some variables contained in dataset are:
 - Number of PCW bicycle (bicycle collision warning) alerts during the hour.
 - Average number of cyclists detected in the road segment (number of cyclists detected / number of drives).
- Open data Barcelona information

5. Evaluation process of the final solution

Teams will be evaluated based on a final presentation on the 2/3 following outputs:

- Quality of the viewer (easy to use, easy to understand the information provided, risks classifications, etc.).
- Quality of the proposals to improve riskiest pedestrian areas around city equipments (markets, schools, nurseries, hospitals, health primary facilities, residences for the elderly, etc.).



Aspects that will be considered in the evaluation are justification of selected risky areas, technical and cost viability of the proposed actions as well as their sustainability.

- Quality of the proposals to implement 20 km of new bike lanes.

Aspects that will be considered in the evaluation are justification of selected bike lanes, technical and cost viability, sustainability and accomplishment of Barcelona bike lanes design Manual specifications.

