(Literally) Paving the Way Towards Safer Cities

Challenge Provider: CycleAI

Perception of risk impedes people from cycling. We aim to build an AI model to estimate a score of perceived road safety based on the objects in an image. Using Google Street View, a map of safety will be affordably created for entire cities, enhancing urban planning and policies.

Context

Nowadays, mobility is a priority theme for the European Union in the context of urban development - the EU even announced that funding for sustainable infrastructure, including for new or better bike lanes, will be doubled to €20 billion. At the same time, hundreds of people, including cyclists and pedestrians, lose their lives on our roads. We hesitate in commuting by bicycle simply because it is perceived as dangerous!

As frequently referred in literature, pavement quality is a crucial factor to consider when evaluating safety. [1] [2] [3] Pavement quality refers to the quality of the road when there is no cycle lane, or to the cycle lane itself, when it is present. Along with the presence of water drainers and trails, these are one the most important risk factors.

Goals

This challenge addresses the 11th United Nations Goal: *Make cities and human settlements inclusive, safe, resilient, and sustainable*. It directly targets goal 11.2 by improving road safety and contributing to an increase in cycling rates. One of the most affordable and healthy ways of transport. Thus, empowering those economically vulnerable with no means to afford a car.

Outcome

A high-resolution map of Lisbon with an embedded layer of pavement quality.

Available Resources

As a reminder, all the data resources can be found here: https://bit.ly/wdl-data. You can also use any open, free, and legally available data.

Lisbon Road Image:
10 000 pictures that were extracted from Google Streetview API.
Possibility of extracting a limited number of additional images from:
https://developers.google.com/maps/documentation/streetview/overview

Submissions

Deadline: 15 - 05 - 2021 @ 14h00 GMT + 1

Don't forget that you will need to deliver the report **using the template provided** (see below) and a 1-minute summary.

Submission template: http://bit.ly/wdl-template

Tips

You can use this pre-labelled dataset trained in YOLOv5 to detect potholes in the provided images. To further increase the accuracy of the previous model:
- Download HyperLabel for data labelling.
- Use Roboflow along with YOLOv5 architecture for model training.

To geographically visualize the distribution of pavement defects, use Heatmap from Maps JavaScript API

Other tips:
- Try to fill in the template from start to finish with a straightforward dummy solution first and iterate afterwards;
- You can use other data sources, such as weather, which can be very useful;
- We don't define which period of the day for you to predict on purpose. We want to tell us which is the most useful in this case;
- If possible, don't forget to explain the predictions of your model.

References

[1] "Bicycle Facilities," iRAP, [Online].

Available: http://toolkit.irap.org/default.asp?page=treatment&id=1. [Accessed 1st March 2021].

[2] "Road Safety Commission," Government of Western Australia, [Online].

Available: https://www.rsc.wa.gov.au/RSC/media/Documents/Resources/Cyclists-INFO-SHEET.pdf. [Accessed 1st March 2021].

[3] "Bicycle Safety," National Highway Traffic Safety Administration, [Online].

Available: https://www.nhtsa.gov/road-safety/bicycle-safety. [Accessed 1st March 2021].