

URBAN CO-CREATION DATA LAB

#3 Parking



Co-financed by the Connecting Europe Facility of the European Union

Problem

- Illegal parking leads to traffic congestion and that consequently increase air pollution
- It also decreases pedestrian, biking, and driving safety, making cities less clean, secure, and attractive to citizens and tourists



Business understanding

- Municipal Police have interest to **optimize the dispatch of police officers** for patrolling illegal parking
- Nowadays this dispatch is made based on their **daily acquired knowledge**
- There's the need to **dispatch** police officers **more efficiently**

Service

Development of a service to **identify the risk of illegal parking occurrences for a specific road segment and period of the day**



Data understanding



Parking illegalities (2017 – 2020)
89126 illegalities



Road



Weather



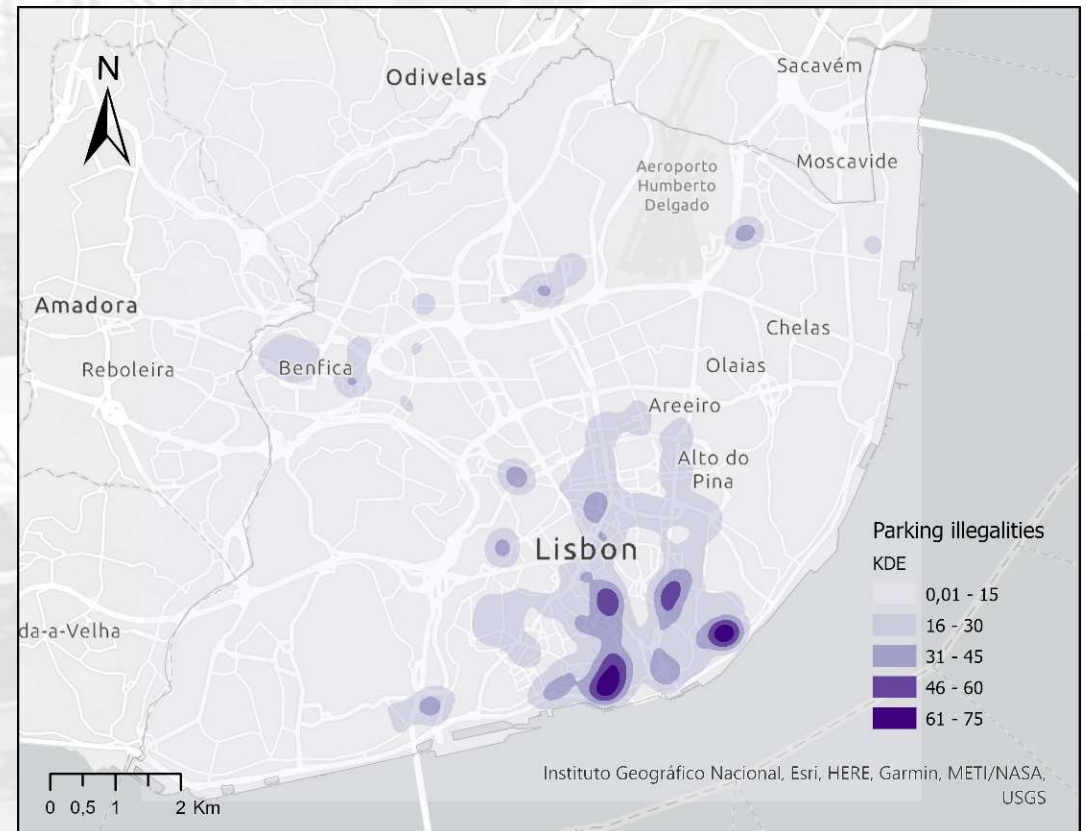
Day period



Weekends
and holidays



POIs (education, transportation)



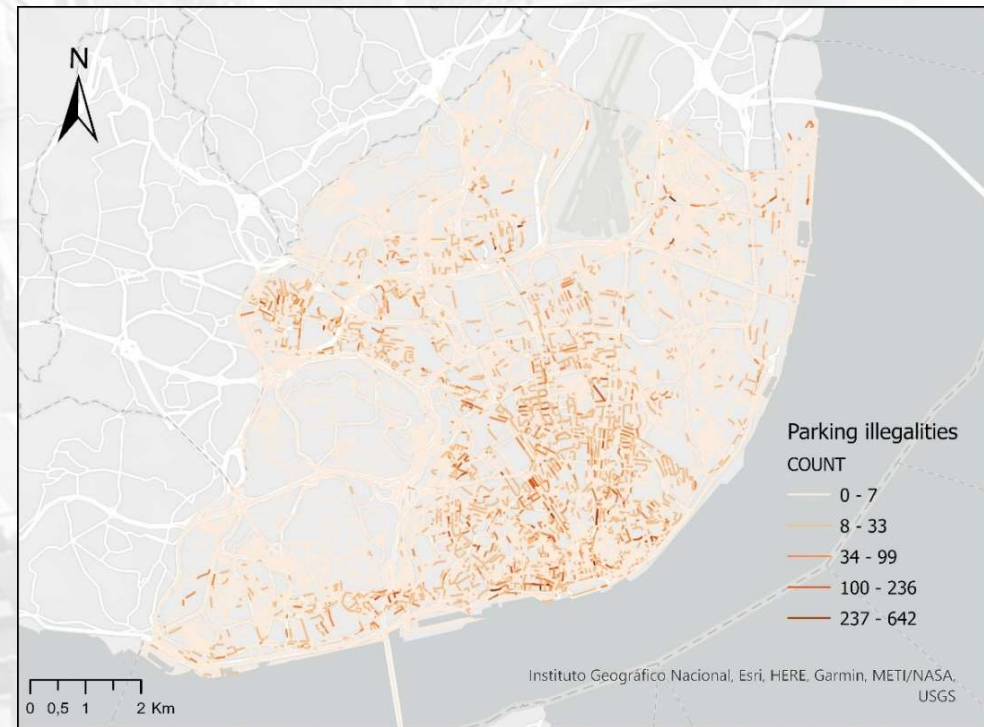
Data understanding

- Parking illegalities **increased 21%** from 2017 (23303) to 2019 (28101)
- **Substantial decrease** in 2020 (9271)
- **More illegalities** in **February, March and October** and on **Saturdays**
- **More illegalities** **between 10H and 13H** (conditioned by the number of patrols)



Data preparation

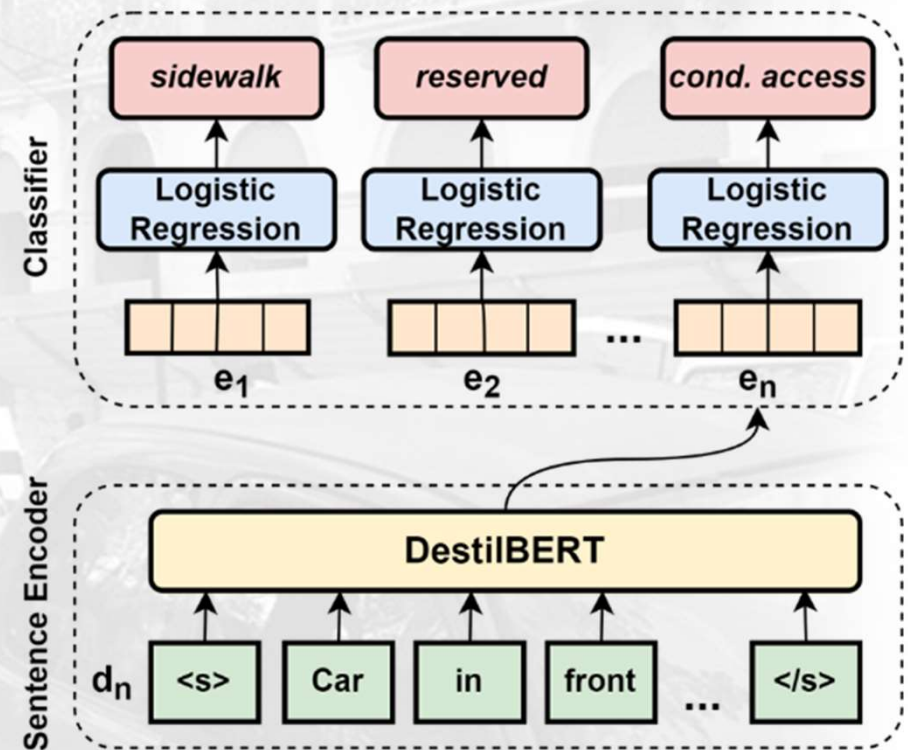
- Parking illegalities and contextual features were aggregated to the nearest road segment
- Features with temporal component were aggregated in periods of 3 hours



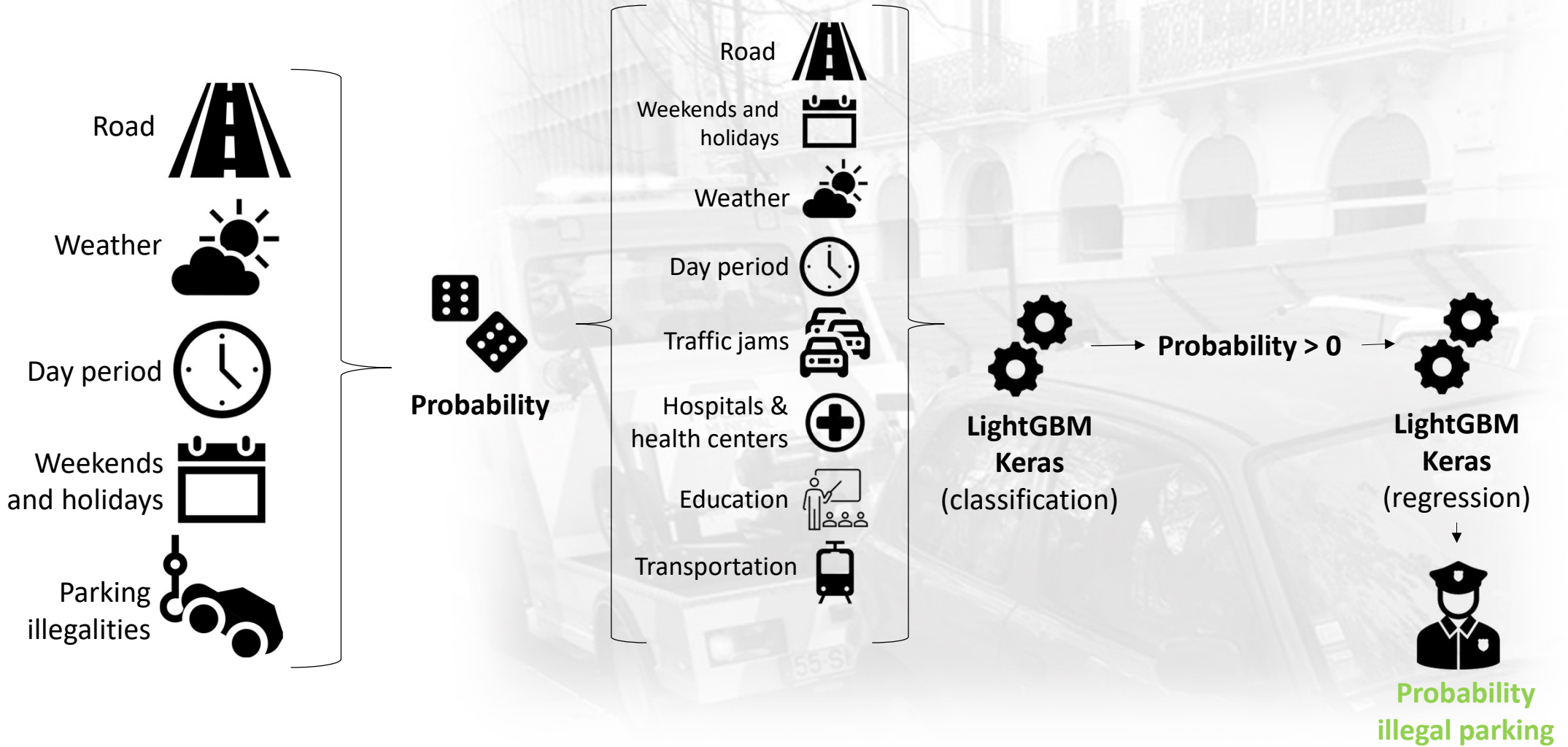
Data preparation

As the description of illegalities was **inserted as unstructured text** was created a model to **classify illegalities accordingly with 5 classes** (articles 48-52, 70 71 of traffic regulations)

- Conditions access
- Crosswalk
- Sidewalk
- Disabled
- Reserved
- Others
- Unknown



Modelling



Modelling

Model	Classification (AUC)	Regression (MAPE)
Keras	0,83	32%
LightGBM	0,88	53%

The LightGBM model was chosen for evaluation

Evaluation



Analysing and predicting **parking** **illegalities** in Lisbon roads



Overview



Time Analysis



Real-Time



Risk Simulator



Illegality Classes

Beneficiaries:



Co-financed by the Connecting Europe
Facility of the European Union



Barcelona
Supercomputing
Center
Centro Nacional de Supercomputación

Thank you

<http://urbandatalab.pt/>



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