

PREDICTION AND MANAGEMENT OF URBAN TRAFFIC CONGESTION USING MACHINE LEARNING

Goal of the project

The project intends to develop reliable methods of predicting urban traffic congestion in Timisoara, using machine learning methods and tools with emphasis on “random faults” in transportation networks: what happens when there is a traffic accident during rush hour and how could we mitigate the impact by using adaptive traffic signaling plans.

Short description of the project

Using historic data and traffic microsimulation we train a model for predicting the impact of traffic accidents over the transportation network of Timisoara

Implementation period

01.02.2019 – 31.07.2020

Budget

47.600 RON (10000 EUR)

Main activities

1. Technical activities consist of collection and aggregation of pertinent data regarding the state and quality of traffic on all the segments of the area under study. Each set of data is manually annotated with data regarding traffic incidents and special circumstances (road closure, flow deviation etc.).
2. Next, we use the data for training a machine learning model and use the resulting model for predicting, short time horizon, of up to 30 minutes, the flow of traffic in the adjacent area of the incident.
3. Scientific activities consist of presenting the results of our work a relevant conference (2 international conferences) and publishing in relevant journals.

Results

- At the current stage of the project we have ingested full data regarding Timisoara, over the last 215 days (12 samples/hour=61920 samples) and have annotated the sets with relevant metadata: weather, holidays, public events and traffic incident data (through the partnership with the local authorities). provide us with the means for advancing towards the final goal of the project
- The main issue we found is the scarcity of the data for a thorough training of the machine learning model, consequently we developed a framework for generating large sets of data through traffic micro-simulation, using PTV Vissim, under a large variety of circumstances. The results of this stage are going to

Applicability and transferability of the results:

The results of the project have direct applicability to the improvement of the quality of transportation in Timisoara. We already have a fruitful collaboration with the city's transportation authorities and traffic management control. Available results are going to be first used for cross-validating actions during minor traffic incidents while input from the stakeholders is used in fine-tuning the algorithm

Research team

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