

# Intellisys - Project Report

20th June 2021

## Progresses

- Worked further on intersection made with text editor
  - Get more into the structure and configurations of sumo and are now able to modify and play with hyperparameters like waiting time at the traffic lights. New options for the cars to drive the routes
  - Limited amount of cars at once at intersection (5 to 10)
  - Flow of cars. The car drive one route and disappear afterwards. New car come up (see GIFs at [Gitlab folder](#))
- Code wise, the following have been drafted:
  - Pipeline for sumo data extraction, from xml (time-step,vehID,X,Y,yaw,type,speed,pos,lane,slope) and with traci in script (time-step, vehID, vehAcc, vehAngle, Position3D, RoadID, LaneID, Route, LanePosition, BestLanes, Tau, Width, WaitingTime, NextTrafficLight, Slope)
  - Pipeline for building the graphs: one graph per time-step with edges built and maintained according to two radii parameters
  - Pipeline to get the Network tensors inputs: data features, data position, edges indexes and targets.

## Next Steps

- Align script pipeline for data extraction with .xml : some variables could be excluded (eg slope), others added (eg width), anyway what it is now in the xml should be transported to the more easily readable and maintainable .py script.
- Increase variability in the Data: change the probabilities and the possible routes of the vehicles.
- discuss the type of problem (Classification or Regression) and take a "final" decision on the target that we aim to predict (in the example above the target is given by X,Y and speed at timestep +5).
- Build and test different GCN architectures.
- Right now there is a bit of misalignment between the shared server folder, our local files, and the shared GitLab repo. This is due to the unavailability of the machines during last week. We will re-align all of them.

## Questions

- Parameters tuning: which radii to use to create and maintain edges (trial and error?)
- Is it a problem to have non connected graphs? see GIFs at [Gitlab folder](#): with different radii parameters sometimes the graphs are not connected.
- Is it possible to organize the time we invest in the project ourselves? Since during 05.7 - 19.07 we have very little time because of exams. In return, we have afterwards more time to work on the project.
- 14.07 - 18.07 Arianna has a flight to Italy to visit family, while there, time (and wifi) might not be abundant to do much work.

## Ref material

- [Definition of vehicles, vehicle types and routes in Sumo](#)
- [repo with rotational equivariant CNN](#) and started reading their [paper](#)