ide3a
international alliance
for digital e-learning,
e-mobility and e-research
in academia

Smart City Hackathon

30th November – 2nd December

Challenge 3 **TRAFFIC-MONITORING**

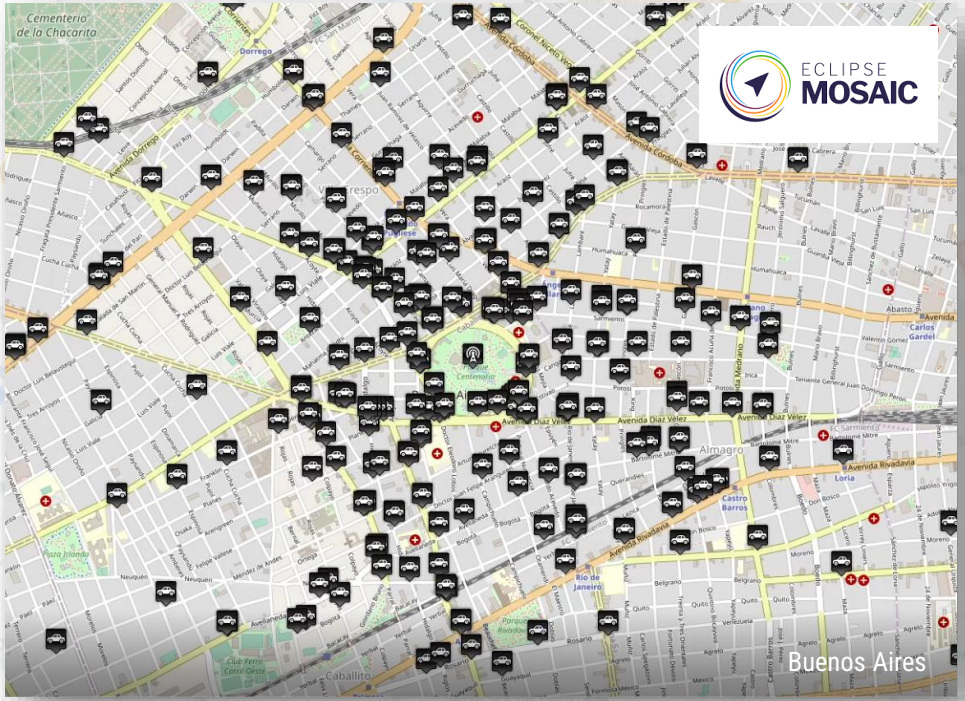
Berlin | 30.11.2022
Smart Cities School 22/23

Technische Universität Berlin · EINSTEIN CENTER Digital Future · HPI Hasso Plattner Institut Digital Engineering · Universität Potsdam · Politechnika Krakowska im. Tadeusza Kościuszki · DCU · POLITECNICO MILANO 1863 · NTNU Norwegian University of Science and Technology

Challenge Introduction Session

What's in our pockets?

Challenge 3: Traffic Monitoring



Simulated Traffic in Buenos Aires

Eclipse Mosaic

- brings the map in predefined Geolocations via Open Street Map (OSM)
- generates vehicles and their behaviors in traffic simulation
  - such as route planning from source to destination

SUMO

- simulates the continuous and realistic operation of traffic based on a physical models

Challenge 3: Traffic Monitoring

```
"rsus": [
  {
    "position": {
      "latitude": -34.6065,
      "longitude": -58.43573
    },
    "name": "MonitorWarning",
    "applications": [ "org.eclipse.mosaic.app.trafficmonitor.MonitorWarning" ]
  }
],
"vehicles": [
  {
    "startingTime": 5.0,
    "targetFlow": 3600,
    "spawningMode": "POISSON",
    "maxNumberVehicles": 3000000,
    "laneSelectionMode": "FREE",
    "departSpeedMode": "MAXIMUM",
    "deterministic": true,
    "types": [
      {
        "name": "Car",
        "weight": 1.0,
        "applications": ["org.eclipse.mosaic.app.trafficmonitor.DriverApp"]
      }
```

Simulated Traffic in Buenos Aires

- The map is configured to have 2 different prototypes:
  - RSU
  - Vehicles
- Each prototype can run applications that describe behavior in traffic.
  - …trafficmonitor.MonitorWarning
  - …trafficmonitor.DriverApp
- ZeromqAmbassador creates a ***flowbreakInteraction*** based on some rules
  - Updates the behavior of vehicles based on specific locations on the map
  - (ZeromqAmbassador controls message traffic, and makes interaction with RSU)
- RSU informs vehicles about places (represented with **roadIds**) where traffic flow is disrupted
- If you send a message with the *roadId* on the map, the query returns "True". This does not mean that every *roadId* that returns the query 'True' is the road that is interacted with.

Challenge 3: Traffic Monitoring

Simulated Traffic in Buenos Aires

Methods to interact with Zeromq server

- server.receiver_data()

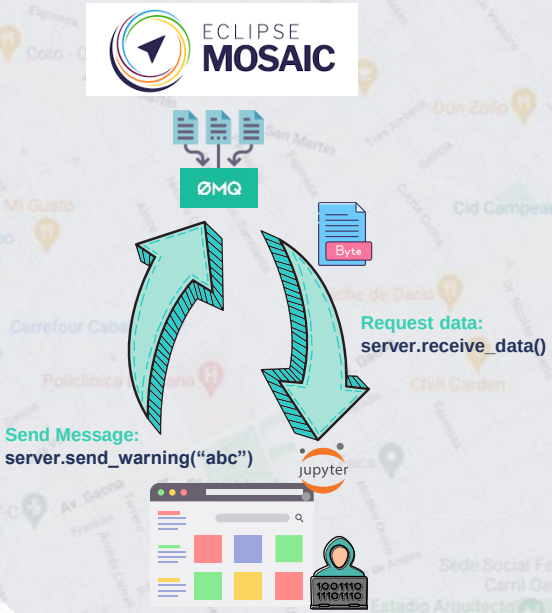
```
data = server.receive_data()
display(data)
```

- server.send_warning("estimated_roadIDs")
  - RSU get an order to publish message for the vehicle, then they can escape from the roadIds by rerouting

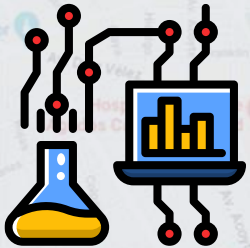
```
[2]: server.send_warning("invalid_road_id")

[2]: [b'service.warning_report', b'false']

[3]: server.send_warning("472825678_245467338_81888536")

[3]: [b'service.warning_report', b'true']
```

Challenge 3: Traffic Monitoring

1. Step: Run Simulation



2. Step: Reformat data



3. Step: Manipulate and Estimate

4. Step: Report to Jury

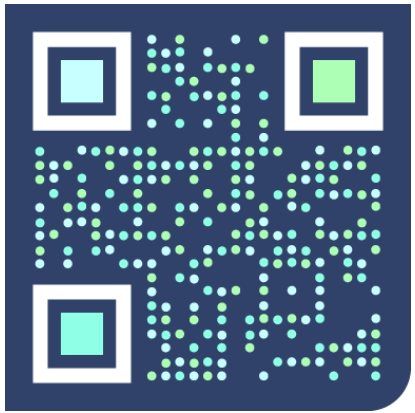
Challenge 3: Traffic Monitoring

Smart City Hackathon 2022					
Wednesday		Thursday		Friday	
30.11.22		1.12.22		2.12.22	
9.00-9.30	Check-in at ECDF Lobby	9.00-9.20	Group Photo Brandenburg Gate	9.00-12.00	Independent work and rehearsal Conference room & Seminar Rooms
9.30-10.00 10.00-10.45	Official Opening and Introduction by Andrea Keynotes by Aurel von Richthofen & Ana Chubinidze Conference room	9.30	Official Opening of the second day	13.00	**Deadline to upload presentation**
		9.45-10.15	Morning Yoga 009 and 207		
11.00-12.00	Challenge Introduction Seminar Rooms	9.30-12.00	Independent work Conference room & Seminar Rooms		
12.00-13.30	*Lunch Time*				
13.30	Official Kick off Conference room	13.30-14.30	Check-in with mentors	13.30-14.45	First round of presentations Seminar Rooms
				14.45-15.30	*Coffee Break*
13.30-19.00	Independent work Conference room & Seminar Rooms	14.30-22.00	Independent work Conference room & Seminar Rooms	15.30-16.30	Final round of presentations Conference room
				16.30-16.45	Jury Consultation
19.00	Christmas market			16.45-17.30	Announcement of winners and official closing Conference room

idea

Thank you for the attendance!

Ide3a Hackathon Team



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