Traffic Junction

Different Approaches for a Multi-Agent System

Motivation

Self-Driving Cars

New car arrivals

Car exiting

3 possible routes

Visual range
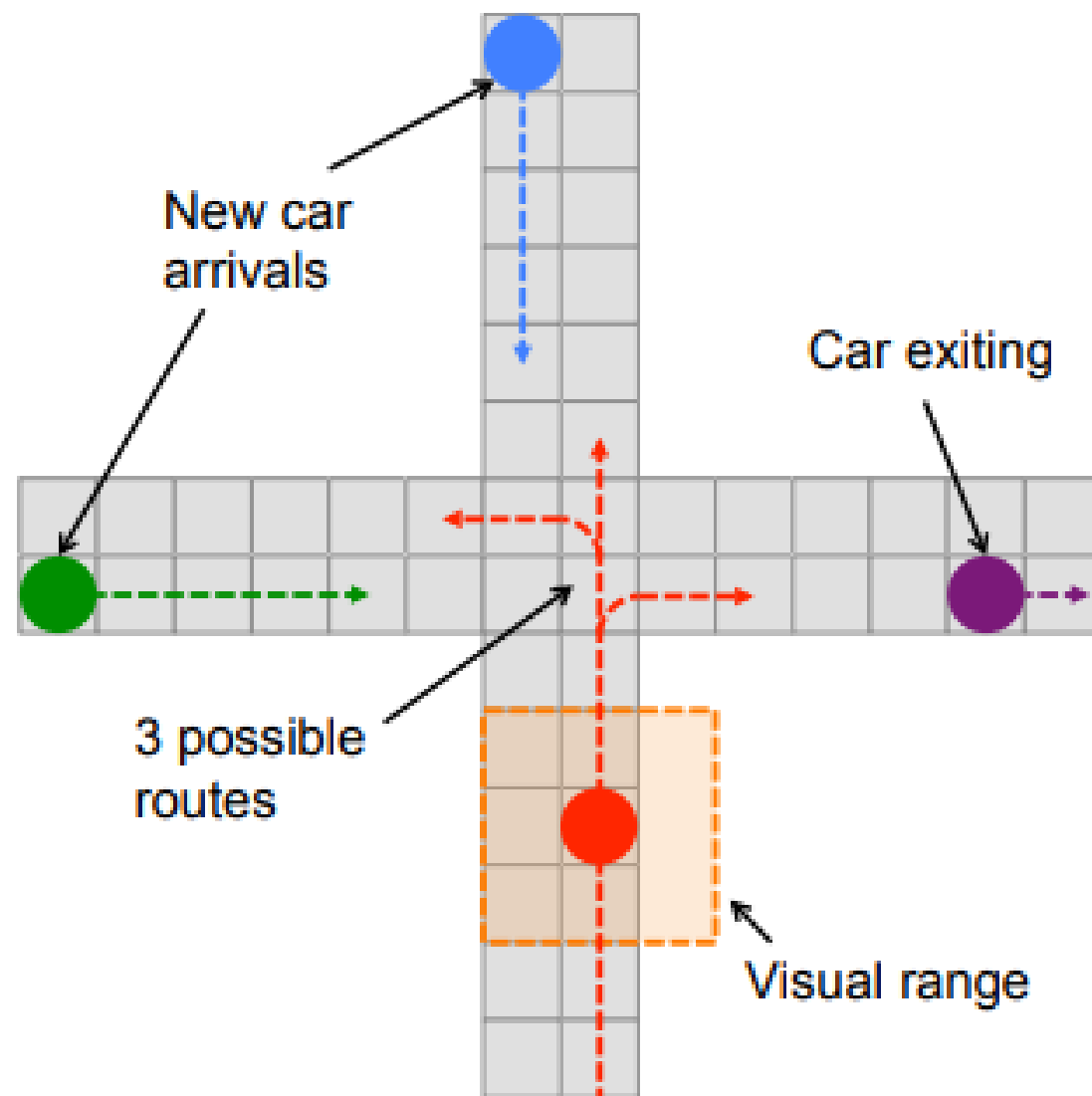
Environment

Evaluation Process

- Teams:
  - Single teams
  - 2-agent teams

- Metrics:
  - Time Steps Count
  - Number of Dead-ends
  - Number of Collisions

Types of Agents

- Random
- Greedy
- Cautious
- Decent

Random

- **Baseline**
- Chooses an action at random (Gas or Break).

Greedy

- Its goal is to reach its destination as **fast** as possible.
- It only moves forward.
- Only chooses the action Gas.
- Has the **least amount of time steps**.

Decent

- Wants to be as **safe** as possible, avoiding all collisions.

- Chooses an action based on the intentions of the other agents.

- Will choose Break, to yield passage to a car at its right.

- Reaches **zero dead-ends** and **zero collisions**.

Cautious

- **Intermediate approach** between Greedy and Decent.

- Wants to reach its destination quick but wants to avoid collisions.

- Chooses Break only if there is a car in its next position.

# Communication between Agents

- At each time step, each agent can inform the rest of the agents about its intention of **moving** or **waiting** for its turn to move.

- They share their **current coordinates** and the **coordinates of their next position**, the position they intend to occupy in the next time step.

Demonstration of the Agents
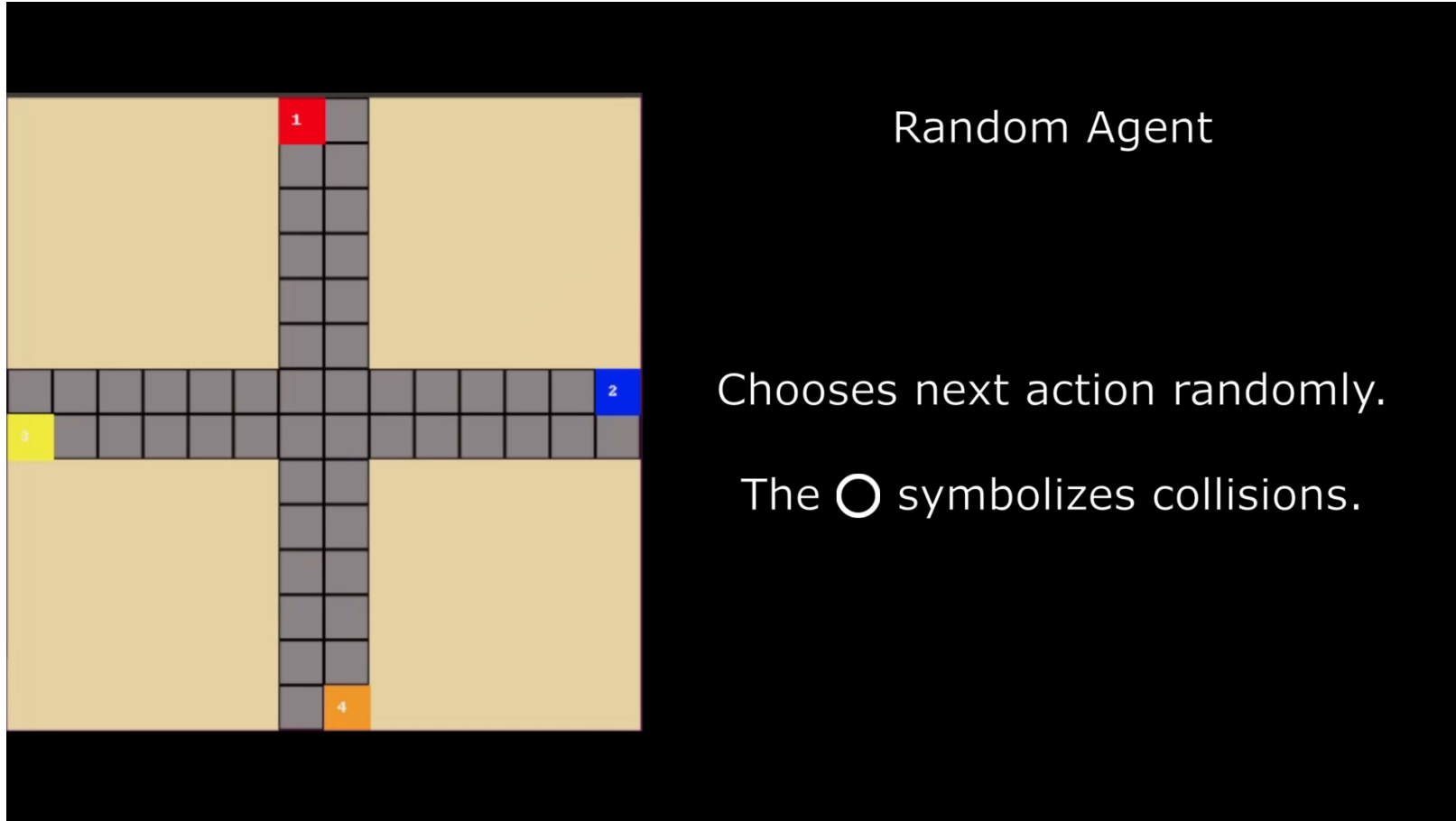
Conclusions

- From the results we obtained in each of the metrics we concluded that:

    - the safest approach would be the Decent one;
    - the fastest the Greedy one.
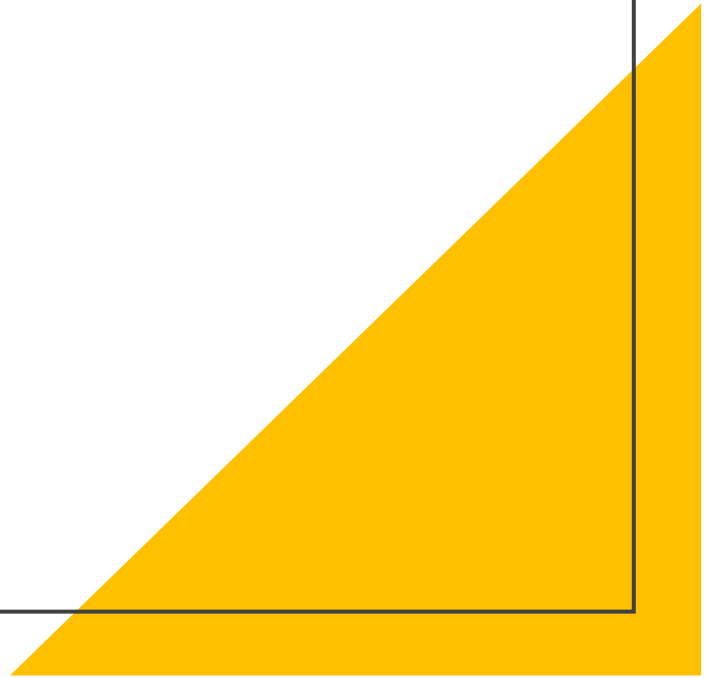
Future Work

- Analyse the effect of communication with the implementation of a Decent approach that does not have access to communication.

- Analyse the results obtained according to the defined metrics for a team composed of all the developed approaches.