|  |  |
| --- | --- |
| Immagine | Moving Picture, Audio and Data Coding by Artificial Intelligencewww.mpai.community |

**Public document**

|  |  |
| --- | --- |
| **N1266** | 2023/06/14 |
| **Source** | Requirements (SPG) |
| **Title** | MPAI-SPG Status report  |
| **Target** | MPAI Members |

# Progresses

Across the two projects we have potentially identified un underlying problem with the application of predicted data during the game simulation. More precisely the simultaneous application of positional and physics data to the simulated entities leads to conflicts to the Unity game engine graphical representation leading to unreliable results. Therefore, we are investigating which is the most proper way for applying the predicted data.

Concerning the two user cases (UC), there are no significant progresses to be reported on the Pong UC, whereas on the Racing Game the core progresses are as follows:

* Identified in LSTM the most promising predicting network architecture.
* Improved prediction training results: mean absolute error increased from 0.2 to 0.5 in last training iterations.
* Introduced the concept of “surroundings” to the training process. Up to now we were training solely with information of the single car, with no data on its surroundigs, e.g., where is the car inside the track, what is ahead of the car, are there cars around, how close are they. In the first iteration of this new approach we have considered only the position of the car inside the track and considering this information during the training process has so far yielded better predictions. Thus, this seems a promising direction which will require further investigation.
* Implementation of the prediction system into the game. The system is now capable of predicting the next frame car’s information based on a buffer of the last 2 seconds of the real driving car.

# Future Plans

Addressing the Pong UC we plan to:

* Verify and eventually fix problems in the application of predicted data to ensure it is consistent with the requirements of the Unity game engine
* Evaluate a new network training process according to the findings and best solution found in the Racing Game UC

Addressing the Racing Game UC we plan to:

* Further investigate the training outcomes when surrounding data is fed to the network. Therefore, we wish to expand the training data encompassing information like distance from walls and relative positions of other cars
* Extend the prediction system to function not only on real data of the car but also on predicted data as this will be the real use case when network latency will be introduced
* Implement the network lag simulation infrastructure