Being faster than in Real-Time

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Being faster than in Real-Time

- Predicting avatar movement in VR
  - Increase UX
  - Increase immersion of body perception
  - Tackle latency

- Apply prediction to virtual Avater

- Recent work shows feasibility of this approach [1]

- [1] Huy Viet Le, Valentin Schwind, Philipp Göttlich, and Niels Henze. 2017. PredicTouch: A System to Reduce Touchscreen Latency using Neural Networks and Inertial Measurement Units. In Proceedings of the 2017 ACM International Conference on Interactive Surfaces and Spaces (ISS '17). ACM, New York, NY, USA, 230-239. DOI: https://doi.org/10.1145/3132272.3134138
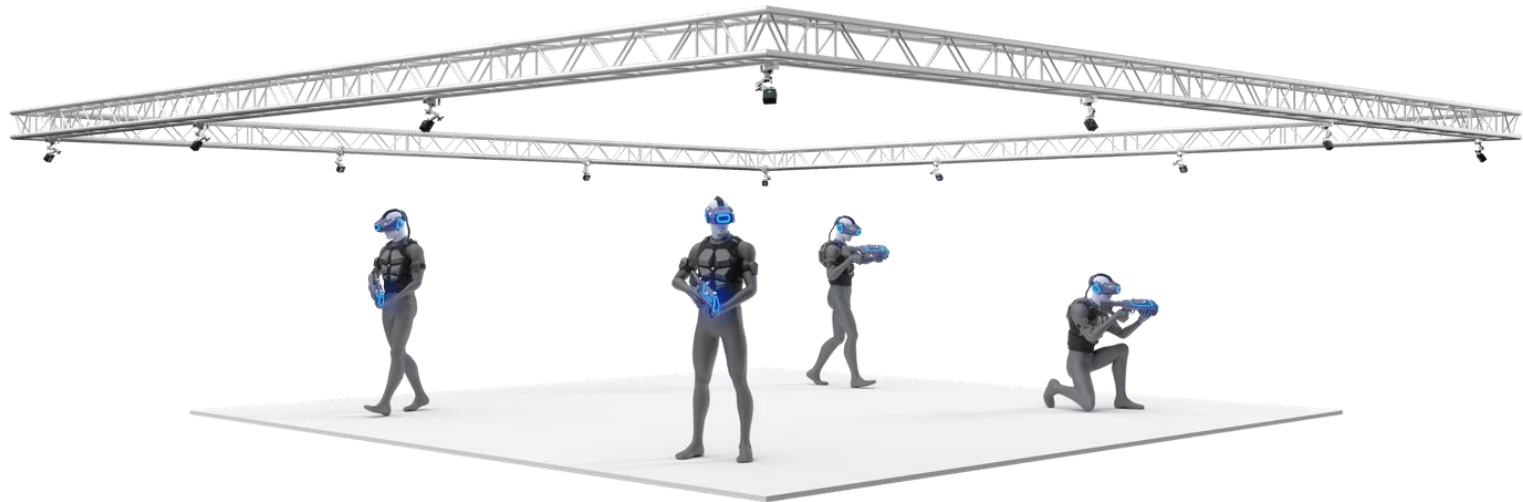
Environment

Image source: https://optitrack.com/

Environment

Image source: https://unity.com/

Image source: https://optitrack.com/
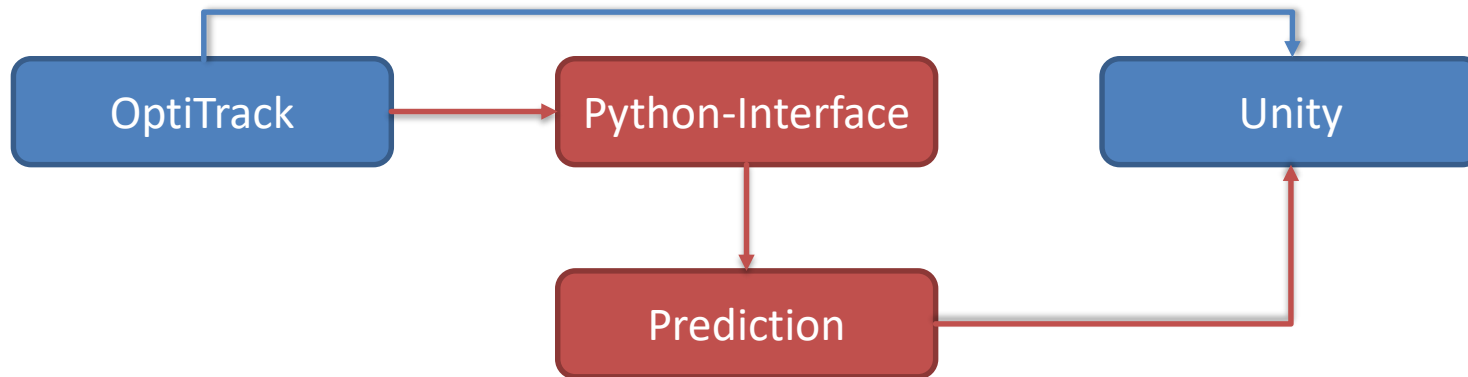

Image source: https://tensorflow.org/

Image source: https://python.org/

Problem Statement

- Research question boils down to:
  - Is it possible to increase user perfomance/ immersion by prediciting movement using NN?
  - Quantify it!

Methods: Step 1

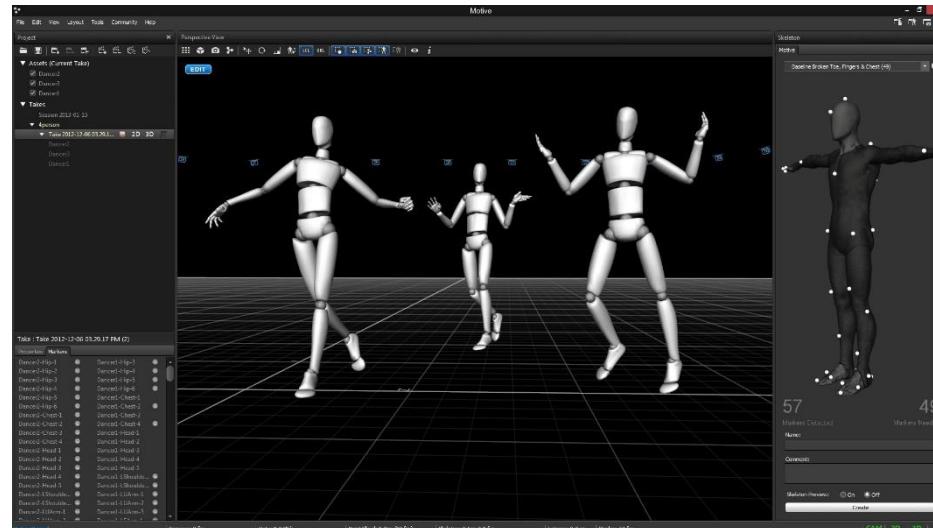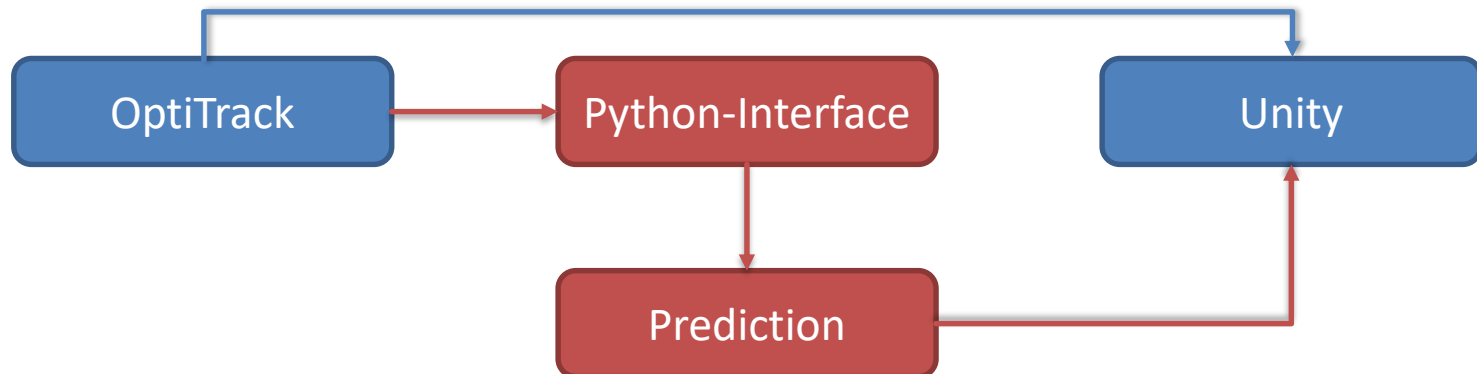- Analyzing which data we actually need

- Collect motion capturing data

Image Source: https://optitrack.com/

Methods: Step 1

- Designing a python application to intercept data
  between OptiTrack and Unity

Methods: Step 2

- Creating and training the neuronal network models

- Validating predictions with already gathered data

- Tuning of the hyperparameters

- Creation of a Unity application to display the data collected via motion capturing and adapted with the help of the NN

Methods: Step 3

- Conducting user study for performance measuring

    - Level of presence

    - Limb ownership

Project Plan
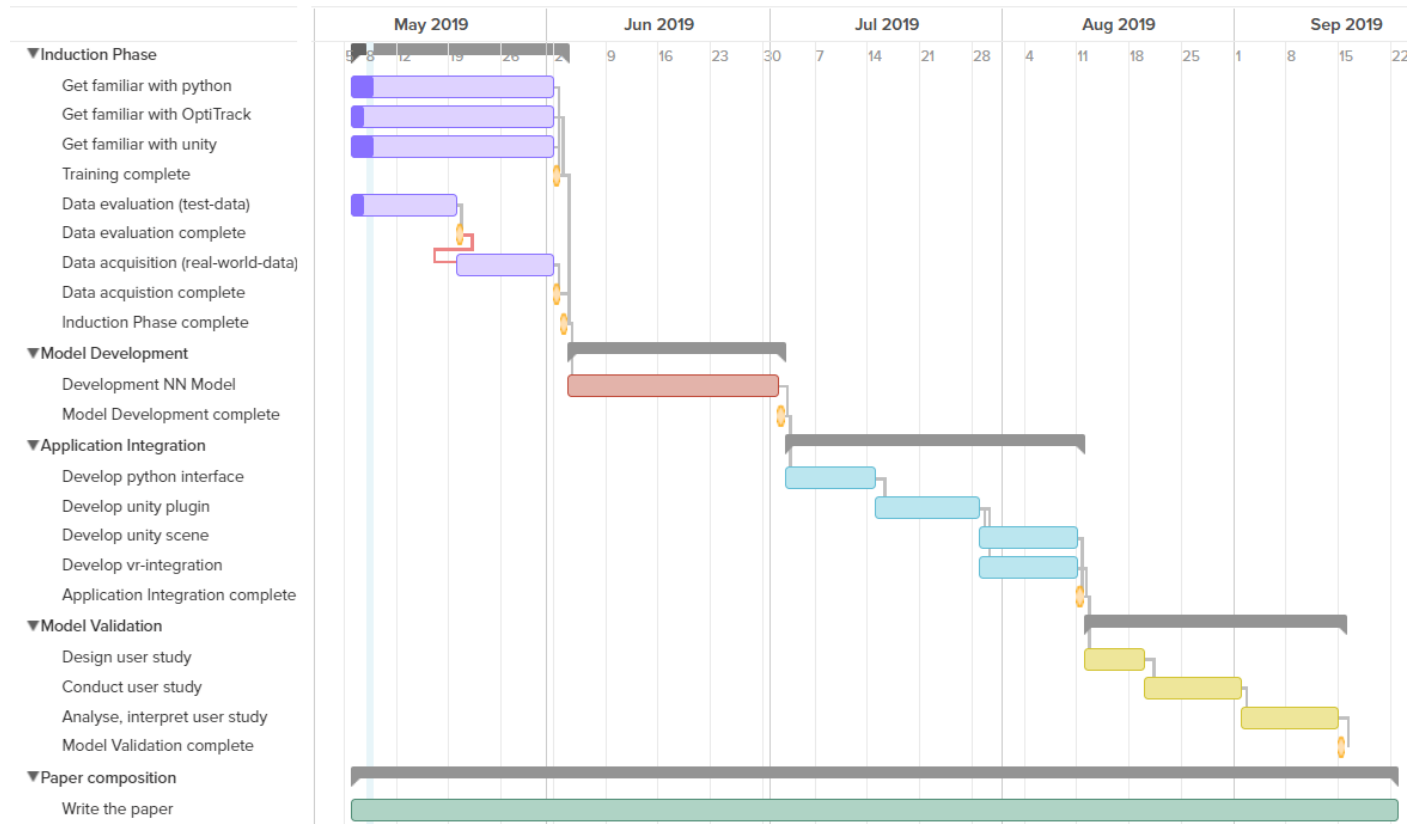
User Stories

- As **user** I want to move in VR without latency to have a realistic experience

- As **developer** I want to create a VR without latency in order to ensure an optimal immersion

- As **scientist** I want to monitor the effects of latency on the users' immersive experience in VR in order to compare various latency levels with those of various users

- As **scientist** I want to measure the effects of latency towards the users' performance in VR in order to quantify those.

GitHub

GitHub

GitHub

GitHub

Vielen Dank
für Ihre Aufmerksamkeit!