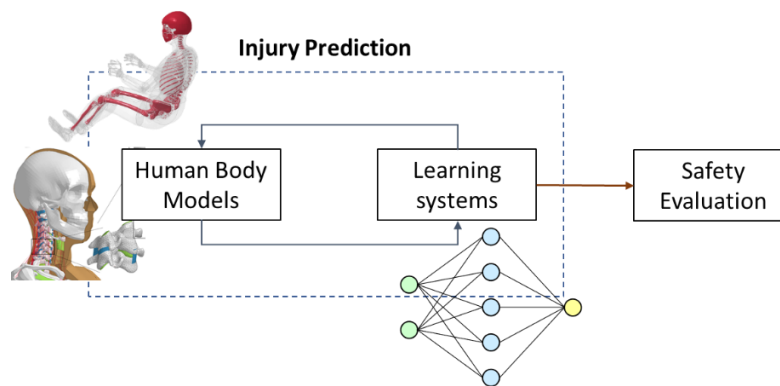


Vehicle occupant injury prediction using AI

Finite element Human Body Models (HBM) are widely used in the injury analysis of vehicle occupants and other road users (pedestrians, cyclists). HBM is an indispensable tool for assessing safety in future designs like autonomous vehicles. These models, however, are computationally expensive limiting their utility for quick design evaluations. This project aims to develop a machine learning pipeline to utilize information from human body models (such as deformations, accelerations, strains) to predict human injury responses in interaction with vehicles.



Objectives and methods:

The objective is to develop a machine learning pipeline for prediction of injury with HBM simulations

- Identify methods (from scientific literature, industry practices, etc) used for surrogate modeling of expensive simulations/data.
- Perform sensitivity analyses of HBMs to identify influential model inputs
- Evaluate influence experimental designs on prediction accuracy in non-linear problems.
- Implement a pipeline of learning system (for example, based on neural networks, regression, etc.) in Python
- Demonstrate the pipeline for HBM in selected load cases.

The project is suitable for 1-2 students.

Learning outcomes

The students will use state-of-the-art machine learning/surrogate modeling Python libraries for evaluating computational models. The HBMs will be simulated using FE solver LS-DYNA.

Supervisors/Examiners

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