AI- Project

Collaborative HRI in industrial setting

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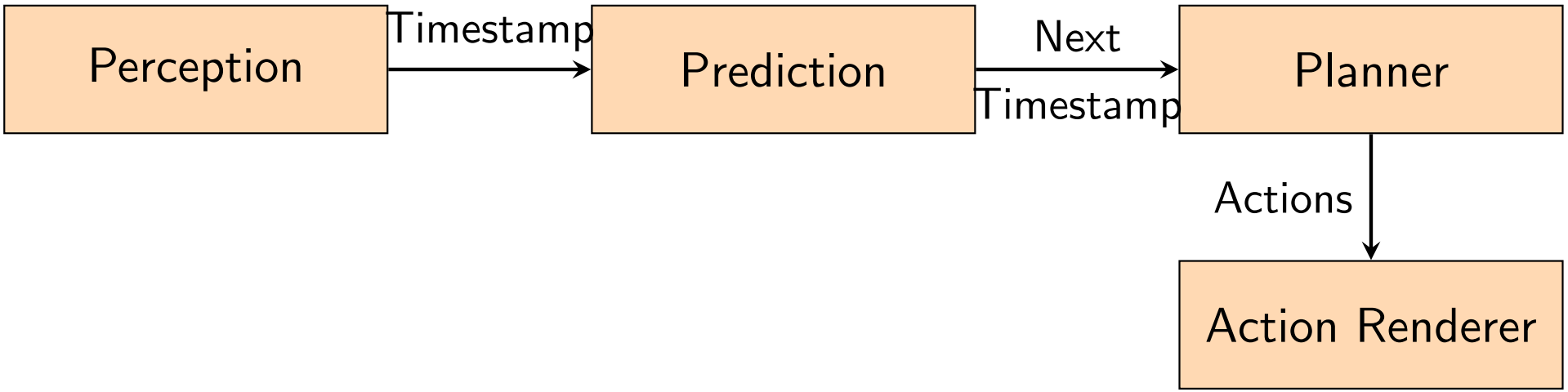
Outline

Goal Statement

Scenario

- **Robot** has to pick up a raw material from Location A and drops it in Location B.
- **Employee** will be waiting for the raw material in Location B and when he gets the raw material, the employee performs his analysis on the object and after he is done with the task, he will ask for the next raw material.
- We try to adapt the robot to employee behaviour, specifically, we predict when the employee finishes his analysis and asks for the next raw material. Using this predicted value, we plan a energy efficient trajectory for the industrial robot.

Architecture



Data Simulation

Based on data-set from the paper *"Using empirical evidence of variations in worker performance to extend TFTE capabilities of discrete event simulations in manufacturing"*, we generate a synthetic data that captures the semantics of the activity time for the chosen scenario.

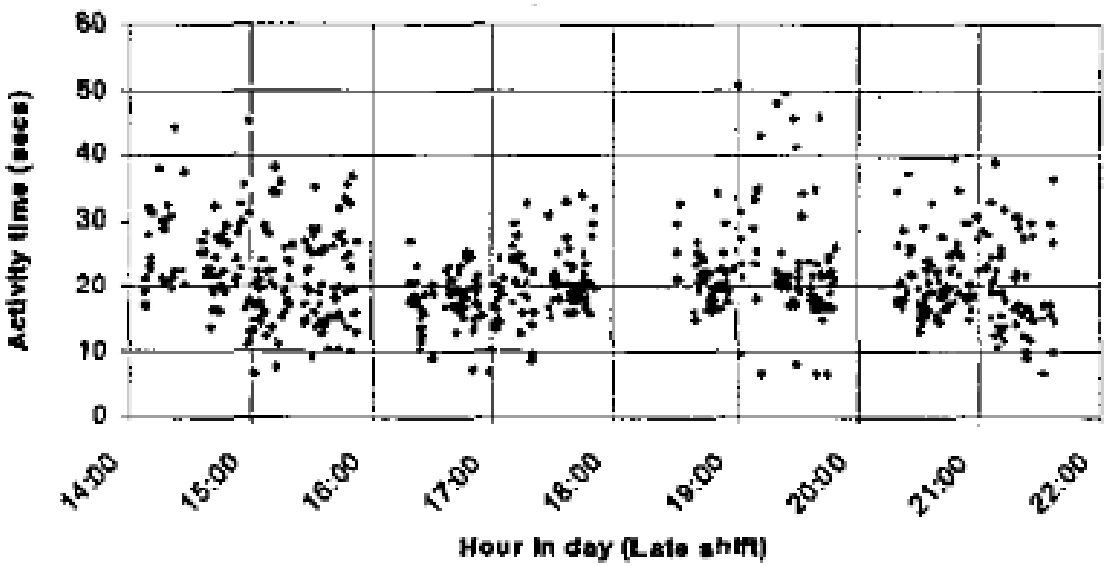
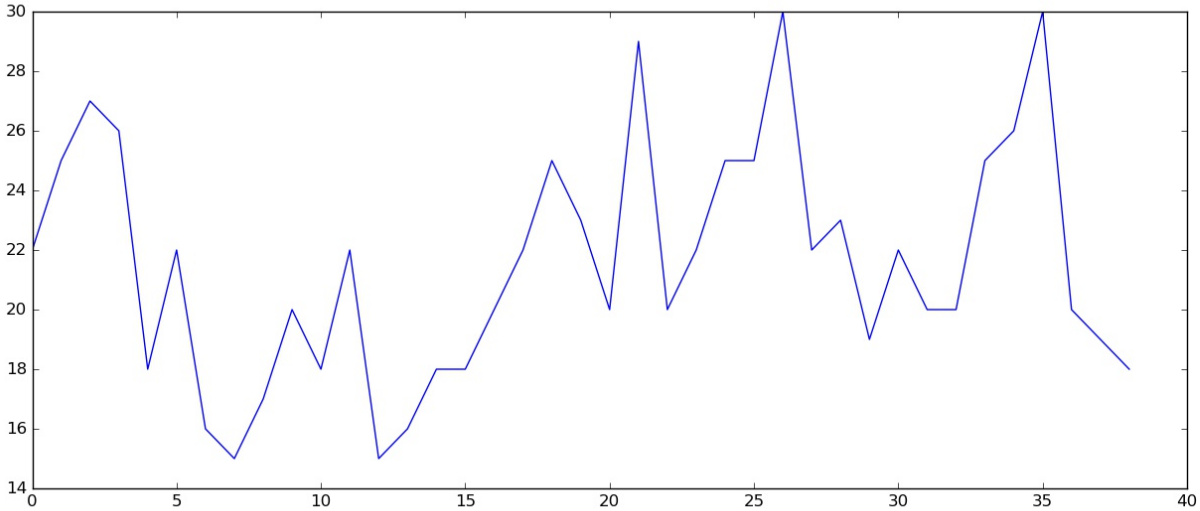


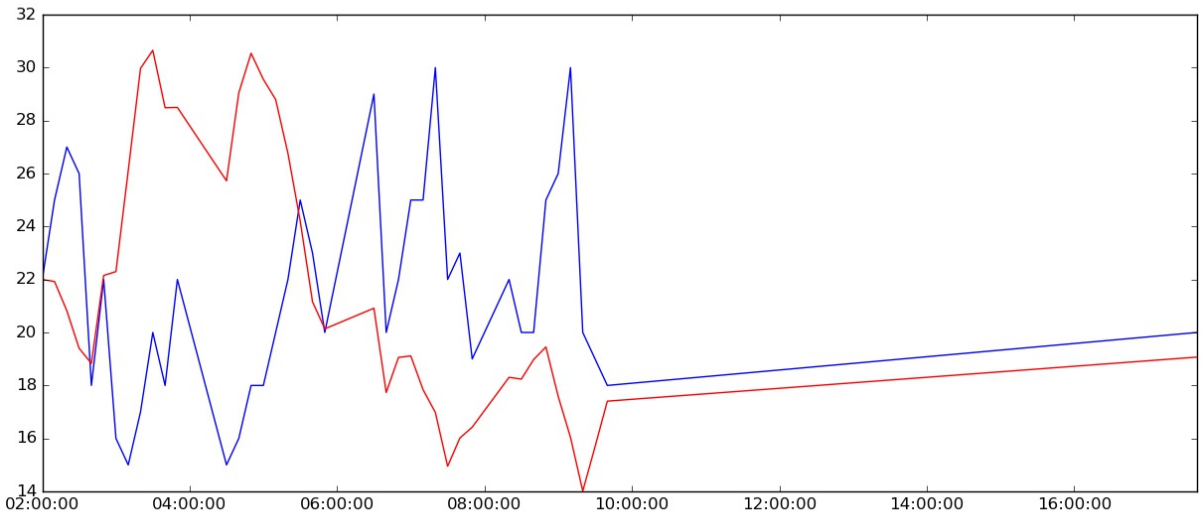
Figure: LateShift vs Activity Time

Data Simulation



Integrating Perception and Prediction

We successfully integrated Perception and Prediction module. When the hand is detected, the timestamp is noted down and is sent to the prediction module which tests the time-stamp against the trained ARIMA model. This will output the next timestamp at which the employee will require robot's assistance.



Demo