

Project Title: PATHS – Pedestrian Adaptive Trajectory Hypothesis System

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Keywords: Artificial Intelligence, People Tracking, Computer Vision, Graph Neural Network (GNN), Inference.

Project Summary:

Crowds have become synonymous with big cities around the world. This is largely due to increased urbanisation over the past 100 years. This has caused problems for authorities dealing with large dense crowds in airports, stations, stadiums, shopping centres, religious sites and hospitals. Research exists that explores the tracking of people moving when walking both individually and in groups. However, this research is largely based around detecting anomalous behaviour in security contexts, analysing surroundings in autonomous vehicles and effective navigation for robots. There is very little research that has been conducted regarding managing dense crowds of people effectively using pedestrian trajectory prediction.

Through the PATH (Pedestrian Adaptive Trajectory Hypothesis) system, this research will explore pedestrian trajectory prediction for the purposes of monitoring crowd behaviour and predict optimal routes for crowd movement. The research project will investigate different solutions for effective pedestrian identification and tracking. This will be the starting point for any trajectory prediction and it will be combined with contextual data regarding the pedestrian (movement, velocity, environmental conditions) and other pedestrians within the group. The movement of the group will be mapped on a graph-based deep learning approach in this unique pedestrian trajectory prediction system. It is expected that the movement of other pedestrians around each individual will have an impact on their future trajectory. This original research, utilising graph-based deep learning approaches will provide a unique contribution to the field and build on the deep learning based pedestrian trajectory prediction systems that currently exist.

Candidate Qualifications/Requirements:

MSc in Computer Science or Computing related discipline **OR**

BSc in Computer Science or Computing related discipline with a strong motivation and proficiency in the following requirements:

- Strong mathematical background and understanding.
- Experience of Machine Learning, Deep Learning and Computer Vision.
- Strong programming skills, especially in Python.
- English proficiency with good communication skills.