A RFID based Traffic Control System (MPRCS) Suited for Ambulance

Tsui, Chi Tang (School: CNEC Christian College)

Throughout the past decades, traffic jams during rush hour and other peak times of the day have been a significant issue, causing a considerable amount of financial losses and time costs. Additionally, under limited road space in CBD or crowded districts, the difficulty of giving ways to emergency vehicles exponentially increases. Resulting in patients missing their golden hour for treatment, property and financial loss due to fire. Also, current machine-learning traffic lights mostly rely on precise vehicle positioning through cameras, which is impractical in some regions like Hong Kong, since we don't have traffic light gantries for camera placement. Hence in this project, we design a traffic light control system based on radio frequency identification. Aiming to shorten the response time of ambulances and other emergency vehicles by automatically granting them a green light once detected. I proposed a reward function for deep reinforcement learning called MPRCS, Max Pressure with Remaining Capacity of Surrounding Lane (MPRCS). Large Language Models will also be used for extracting useful information from ambulance calls. Results were attained through simulation of Sha Tin New Town roadmap and 3x3 grid network with real-life traffic flow and lights data demonstrated an increase in vehicle average speed from all angles and outperforming similar models. The goal to cut down on special vehicles' travelling time was achieved, and a roughly 50% reduction in travelling time with the system proposed in this project was recorded.

Awards Won: