

### **Post-graduate Graduate Research Assistant (GRA)**

Project Title: **Confined Parking Spaces and Congestion Prediction using Deep Q-Learning Strategy**

Keywords: Reinforcement learning, congestion prediction, deep q learning, artificial intelligence

#### Research Summary:

Searching for parking in large cities can be a painful experience. The existing technologies that provide parking information based on sensors are very costly and limited. Drivers do not have access to real-time accurate parking information such as nearest parking locations and available parking spots. The objective of this research is to develop a low-cost vehicle counting device using IoT technology to record vehicles' entry and exit time, the real-time parking availability information can be derived from the recorded data and disseminated to the drivers. Effective methods for traffic congestion prediction will also be formulated based on parking space availability. This research will be divided into two parts: (1) Development of low-cost IoT device and cloud architecture, (2) Formulation of traffic congestion a method using deep Q-learning framework. IoT devices will be designed to collect real-time vehicle entry and exit data and sent it to the cloud. The collected data will consist of time-in and out of the vehicles for each day. Data analysis will be performed to identify patterns in the parking data. The patterns will be used to make real-time predictions regarding the availability of parking in the area. In some cases, the parking data could be random. Trending and de-trending techniques will be employed along with the time series analysis to separate the deterministic part of the data from random parts. A Deep Q-learning strategy will be explored and compared to other deep learning methods to provide a better traffic congestion forecast in selected areas. A Master's student will be trained for this research. One Scopus and one WoS indexed journal will also be produced. The expected outcome is a real-time parking system to provide parking availability prediction and improve the traffic in the city that could realize the smart parking criteria in the MyDIGITAL blueprint.

#### Position:

- ONE Graduate Research Assistant (GRA) MSc. IT by Research (FRGS grant Scheme)
- Salary RM 2000 x 24 months
- Post-graduate tuition fee waived for 2 years.

#### Requirement:

- Learned AI algorithms (Preferable B.CSc./ B.IT. with AI knowledge)
- Python, C# and IoT (raspberry-pi) programming
- Keen to learn other programming languages
- Start on 1<sup>st</sup> Sep 2022, @ FIST Post-graduate lab, MMU Melaka, Malaysia
- Can read research papers, write reports, perform data analysis, conduct experiments
- Can work independently, has good communication skills and travel

#### Expected outcome:

- Completed thesis within 2 years
- Successfully published 2 journals in Scopus & WoS
- Demonstrable research results
- Optional: copyright and competition awards

Interested, kindly send your CV and email to Dr. Michael Goh ([michae.goh@mmu.edu.my](mailto:michae.goh@mmu.edu.my)) by the latest on **20 Aug 2022**.