

# Simulation Data Generation Algorithm

Purpose

Generate time series data for enter and exit car-parking event

The final data is parking lots’ Vacancy Percentage, means:

Vacancy Percentage = Current Vehicle Number / Total Parking Space

**Generation Strategies**

* For each parking lots generate a vacancy percentage value every 15min
* Suppose Monday to Friday as working days and Saturday and Sunday as weekends, ignoring the effects of other holidays such as New year and Christmas etc.
* Each parking lots apply with the same working days and weekends vacancy percentage value modes
* During working days, vacancy percentage value applies to 7AM to 4 PM at high level and rest time as low level, but the switch between high and low will be as smooth as possible
* During the weekends, the fluctuation of vacancy percentage value is relatively low
* The overall data generated span for recent 6 months
* The final data generated should be added with random noises
* Data generation program should be independent from the application, and needs to be deployed, run separately

**Data Field**

TimeStamp, Parkinglotid, vacancy percentage value

# Model Training (discuss later)

Linear regression cannot fit and discover the mode of the data, more complicated model should be applied, using Neural Network model is better option.

**Model 1:**

Model: MLP 2-3layers  
input:

Weekdays, current hours, carparkinglotid, current vacancy percentage value

Output/prediction:

Vacancy percentage value of next N hours later

**Model 2:**

Model: LSTM 1-2layers, suitable for time series data

Input:

Weekdays, current hours, carparkinglotid, current vacancy percentage value, latest 5 hours vacancy percentage values

Output:

Vacancy percentage value of next N hours later