**Literature Review**

Parking management systems have become a crucial part to busy places whose parking lots are frequented a lot by drivers, especially with the large number of cars that are owned by people. The systems that have been put in place have helped drivers remember the location that they parked at, as well as provide them with real time updates to their availability. Based on our research on existing software systems, we found out that they offer various benefits. For example:

* **My Car Parking by DRD**

This is a free application on the android platform which allows users to:

* + Save their location
  + Provide guidance to the car location using Google Navigator based on Google Maps service
  + Allows users to set a reminder for a parking ticket expiration date, with a notification alert about it
* **Sunway Pyramid Shopping Mall Car Park**

This is an integrated software system, which performs the following:

* + Use billboard indicators to inform and guide drivers to available parking bays
  + Use of infrared and ultrasound sensors to detect cars
  + Display the number of parking bays that are available in a particular zone on sign boards
  + Make use of real-time detection of parking bays and their availability

We saw that these benefits could also be applied to the University of Nottingham Malaysia Campus, and hence form the basis of this project.

Any driver that frequents the University of Nottingham Malaysia Campus knows of the pain and hassle often involved in finding the ideal parking spot for the day, and it is often a case of the early bird catches the worm scenario. As students part of this problem, we sought out to better manage frustrated drivers at the university, based on the previous research.

However, our implementation is unique in that it utilises proximity to buildings within the university, and provides with convenience-based querying of parking locations. Additionally, the implementation of sensors is in a more cost effective and eco-friendly solution which makes use of old Android smartphones.

This project set out to create a wireless parking mobile system, which would save the drivers at the University of Nottingham loads of time often spent in not only finding a parking spot that is available but one that is also convenient, and to also assist in identifying their parking location.

From initial meetings and thorough discussions of all possible implementations, we decided that the most effective and environmentally friendly approach would be the following structure:

* **Old mobile devices which would act as sensors for the parking system**

These would be positioned above parking spots in the car park, and would be connected to a constantly on internet and power supply

* **An online based database**

This would be a virtual storage of the parking locations as well as the status of the parking spots, either being occupied or empty.

* **A mobile application**

This would be used as a point of interaction with the parking system.

It will show the statuses of the parking spots, as well as provide querying interactions, such as finding a parking spot that is at a convenient location and also saving the spot that they’ve parked at.

Based on the experiences and capabilities of the team, we chose to develop for the Android platform, along with a server-side script implementation to handle the map and pushing of real time map data to user’s phones. For the sensor, a mobile app would be built in Java that would use image processing techniques which would detect the presence of a car.

Following the decision of the platform and technologies to be used for this project the proceeding sections of the report details out what was achieved and how this was achieved.