PiPark Summary

For almost everyone, driving is one of the most convenient ways of travelling and commuting. However, with an ever increasing number of cars on the roads the impact of CO_2 emissions on the environment is reaching a critical level [1]. A contributing factor to these high levels of damaging emissions is cars idling and making unnecessary extended journeys around city and town centres during peak traffic hours looking vainly for a space in which to park.

We have created a solution called *PiPark*; a smart parking system (SPS) that utilises a Raspberry Pi® with a camera attachment.

The PiPark is designed for use in covered and open car parks as well as for street-side parking. This is achieved by mounting the devices above the car park, either at the top of a lamppost (where it can make use of the lamppost's power supply) or onto the wall or ceiling of an indoor car park. After an initial setup, which typically takes five to ten minutes, the PiPark uses its camera to survey its surroundings monitoring the availability of multiple parking spaces at a time. Periodically the PiPark relays availability information to a central server, which stores and presents the data on a webpage allowing users to view how many spaces are free and where the free spaces are.

The software we have created for both the Raspberry Pi® and the server allows for multiple units to be used in a single car park, and multiple car parks to be used on the website. The website shows users a list of car parks with the available spaces in each one, and easily allows car park administrators to add, remove or edit car parks.

With this system, people are able to view the webpage before they set out on a journey. They will be able to locate car parks with vacant spaces, therefore reducing the wasted fuel in travelling the extra distance between full car parks. Along with this, congestion around car parks can also be reduced, as less cars will be attempting to travel to full car parks. This data from the spaces can also be used by car park operators to determine popular car parks, and take appropriate actions such as expanding them or redirecting drivers to more empty car parks. Over longer periods of time, there is also the possibility to measure statistics on usage at different times of the day, or on individual spaces. There is further scope to adapt the system so that the availability of spaces could be displayed on a smartphone app, or even to a satellite navigation device so that drivers will always be aware of whether there are free spaces or not.

A PiPark unit costs around £50 ($83); a significantly cheaper option than competitive products such as Urbiotica's U-Spot, which despite being a small SPS device, according to Popular Mechanics is reported to cost between $200 and $400 [2]. In addition to the PiPark's economic advantage it is easy to install and has many mounting solutions, which again is an advantage over competitive SPSs that often require the digging-up of individual parking spaces and the installation of many units as each one is only capable of detecting the occupancy of a single parking space.

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[1] http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-transport/car-pollution/

[2] http://www.popularmechanics.com/technology/gadgets/news/smart-parking-systems-steer-drivers-to-open-spaces

The Pi Park is a simple, inexpensive and effective solution to reducing the CO2 emissions of traffic in cities and towns across the world.

[1] http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-transport/car-pollution/

[2] http://www.popularmechanics.com/technology/gadgets/news/smart-parking-systems-steer-drivers-to-open-spaces