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An architecture for iPod/iPhone applications in field sports

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The advent of the fully featured iPhone/iPod with its user friendly multitouch user interface, high end graphics display, accelerometers, magnetometers, GPS, WiFi, Bluetooth, and useful processing power means that an off the shelf technology is now readily available for sports monitoring applications. This study determines the suitability of the iPhone/iPod for use in field sports, outlines the architecture used, and then applies the technology to a field sport such as Cricket.

A centralised star network was employed using 8GB iPod Touchs connected to a laptop using a wireless access point to allow multiple iPods to connect to the laptop. The subsystems used in the iPods were the WiFi subsystem for connectivity and the accelerometer subsystem for motion measurement. These subsystems exist on both the iPod touch and the iPhone and so this study is relevant to both. An application to stream triaxial accelerometer data over the WiFi to the laptop using UDP was running on the iPod. The software running on the laptop was written in Unix using perl, and gnuplot scripting and was used to collect and display the data in near real time. This method is scalable under Unix as additional instances of the data collection software were launched for each connected iPod.

In order to determine the suitability of the iPhone/iPod to measure a field sport, the transmission characteristics of the iPod were measured. These consisted of connectivity with distance and radiation pattern measurements. The results indicated that the iPod can communicate over the distance of a 100m, and that the orientation of the iPod will not overly affect the communication, and that the body occlusion will reduce the signal strength which could affect the distance of communication.

Triaxial accelerometer data for an iPod placed on the upper arm of an amateur bowler in cricket was captured using the iPod. The foot steps in the run up and rotation associated with ball release were able to be seen.

Overall this study has shown that it is feasible to use an iPhone/iPod in to monitor athletic performance at the distances required for some field sports.

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