# Sensing for Sport: A Smart Phone Alternative

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## ABSTRACT

An area of interest in sports monitoring is inertial sensor technology, with sports scientists, coaches and athletes currently having the option of using custom hardware or off-the-shelf dedicated sensor packages. Custom hardware has the advantage of being designed to meet requirements specific to an application at significant cost of resources including money, time and personnel. Purchasing commercial devices is generally a faster, cheaper option, but users are limited to the hardware provided by the manufacturers. While either of these options may be suitable for some applications, smartphones offer an alternative through low cost, ubiquity and flexibility.

A persistent issue with commercial sensors is that of non-standard design among manufacturers. With several communication protocols available (Bluetooth, Wi-Fi, proprietary) and no clearly defined data formats, interoperability between different manufacturer devices is practically non-existent. Another issue that has been well documented is the high power consumption of these protocols relative to the amount of data being transmitted [1]. The most recent Bluetooth hardware and ANT (a proprietary low power, sensor oriented protocol) attempt to address this problem. However, they also require specific hardware and add to the number of protocols available for implementation.

Smartphones offer a low cost generic solution and similar to off-the-shelf packages, remove the costs of design and development. They contain a variety of common sensing devices including accelerometers and GPS and have seen previous success in sports applications [2]. By offering communications hardware for several protocols, they also provide flexibility through data collection from external sensor devices for local processing and storage [3]. In addition, data collected on the phone can be uploaded to external devices or servers which may provide more processing, analysis and storage capabilities [4].

The potential use of smartphones for monitoring applications is faced with some challenges. As with many wireless devices battery capacity is a major issue, but can be partially alleviated through careful management of the hardware and software [5]. Secondly, the embedded sensors may not be as accurate as dedicated devices for some applications. However, they are still capable of showing overall trends and patterns. It is envisaged that as smartphone technology evolves, more advanced sensors will be included and power efficiency will improve.

Each of the options has its benefits and disadvantages and the choice will depend on the nature of the application. Custom hardware can be costly but allows greater flexibility and application specific design while off-the-shelf sensor packages provide a range of low-cost devices for immediate implementation. Smartphones have proven to be a viable alternative in sports monitoring where reduced cost is necessary while still maintaining a degree of flexibility.

## REFERENCES


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