Introduction

Goal
- To provide end-users with a real-time, cost effective, intuitive and unobtrusive system to detect and help correct postural anomalies.

Background
- Most posture analysis systems are highly complex, expensive technologies that require a professional to operate them.
- Most of these technologies are obtrusive limiting their effectiveness.
- The more cost effective solutions log changes which are analysed by a professional after the exercise is finished. They do not provide real-time feedback.

Posture Correction
- The prototype system employs Sunspots from Sun Microsystems in conjunction with a Bluetooth module. It communicates with a Wii balance board, which reports mass events based on 4 sensors.
- This Bluetooth chip allows us to interface with (potentially) any Bluetooth capable device. The mobile device is used for providing pseudo real-time corrective postural feedback to the user.

Research Challenges

Posture
- Neutral posture is an important starting point for the application. This needed to be identified with regards to the different exercises.

Extensible
- The microprocessor plays an important role in extensibility. External sensors can be added to create a full body sensor network. More Bluetooth devices can also be interfaced with the system.

Configurable
- The sensitivity for the postural analysis can be configured for all exercises based on body mass percentage.

Intuitive
- The system needed to be designed with ease of use in mind. A user should be able to work it without the use of a professional.

Cost effective
- There are many expensive alternatives for posture analysis, which are normally used in a clinic or hospital. The Wii balance board, interfaced to a Sunspot and Android phone, provides us with an inexpensive prototype platform exploiting wireless sensor capabilities.

Non-intrusive
- The system was designed in such a way that it doesn't obstruct or interfere with a users movements.

Real-Time feedback
- A user is presented with real-time corrective feedback to guide and inform their innate sense of proper posture.

Experimentation

Experiments were developed based on different possible neurological disorders. Physiotherapists have identified the most important group of exercises for patients affected by neurological disorders.:
- Standing
- Bridging
- Sitting
- Push-ups
- Lateral raises

Conclusion

Posture Correction has implications for:

Health
- Patients can use this intuitive system effectively in their own home without having to go to a clinic to retrain their motor neuron skills. Preliminary evaluation by 2 chartered physiotherapists and a physical therapist has demonstrated that using this system at home promotes a more rapid recovery.

Fitness
- It has been demonstrated that this system will greatly aid in the recovery of shoulder injuries. It promotes balanced exercises to the correct muscle groups.

Extensibility
- The system is designed in modules making it easy to configure and extend with external sensors and Bluetooth devices.

Further Reading

References