Architectures for distance education of Athletes

Raymond Leadbetter$^{1,3}$, David D. Rowlands$^{1,3}$, James Lee$^{1,3}$, M. Simjanovic$^2$, Daniel A. James$^{1,2,3}$

$^1$Centre for Wireless Monitoring and Applications, Griffith University, Nathan, Qld, Australia
$^2$Centre of Excellence for Applied Sport Science Research, Queensland Academy of Sport, Brisbane, Qld, Australia
$^3$Queensland Sports Technology Cluster

ABSTRACT

The improvement of athletes through coaching is critical for their development [1, 2]. Any athlete unable to access coaching due to distance or lack of personnel can be disadvantaged. Competitive sports such as cross country mountain bike riding contain sub-elite athletes who want to improve and progress to the elite level, but are unable to do so due lack of coaching support. This is a disadvantage for the entire sport since the athlete’s skills and training methods are not being supervised. The web can be used to help this problem by giving athletes access to a specially designed coaching program without a coach being physically present. Therefore a “virtual coach” web site was created.

The design encompassed the development of a coaching program using a web based interface for use on popular desktop systems and mobile devices. Development aimed at creating a simplistic design that was easy to understand and navigate. The architecture aimed for flexible content delivery together with the ability to collect metrics about the websites usage patterns.

Virtual Coach was designed for flexibility, stability and security. The site content was provided using Apache HTTP Server (Apache) as the web server on a commercial host. Apache was chosen due to its efficiency, stability, and the fact that it is the most widely used web server [3]. Using Apache, communication from users to the virtual coach system is secured with SSL/TLS Strong Encryption (HTTPS). Content served by Apache is written in the HyperText Markup Language (HTML) which is understood by all web browsers. It specifies how plain text should be displayed when drawing web pages. HTML requires considerable coding for sites with many pages of content. High amounts of HTML can be reduced and the site made more interesting by using dynamic content. Dynamic content is when the web server generates the HTML to display required information; this can be unique for each user or change when specific conditions are met. The
dynamic content for virtual coach is generated on the server using PHP: Hypertext Preprocessor (PHP). PHP is a server-side scripting language capable of generating dynamic web pages. Using PHP, the virtual coach system generates web pages from a common template keeping the layout but changing the content. This saves development time by reducing the amount of HTML coding and greatly simplifying system wide changes. PHP is also able to communicate with MySQL which is a database server used to securely store all required information. MySQL can perform unique queries from information obtaining specific results speeding up data analysis.

The content of the web pages were developed by an experienced mountain biking coach and was aimed to provide workouts and training exercises which were provided in separate modules. The athlete would progress through each module in a time frame defined by the coach. Within each module, the content was split into various levels based on the user’s skill and fitness. The modular format allowed for sections to be completed and fitness to be assessed for each module which would determine the next module to be attempted. This provided motivation for the athlete to complete the modules and progress in fitness level.

A field test of the virtual coach system was conducted using 50 cross country mountain bike riders. Participants were given a unique login and their site usage was tracked and logged by the system. Logged data included login times; page views; time spent per page and per section. The system also recorded fitness scores and gave feedback based upon the fitness scores. Data saved by the system allowed the comparison of user adherence and fitness results as well as personal improvements for each athlete.

The virtual coach system was found to provide an easy to use website that athletes could access when it suited their needs. This could be in the home environment for remotely located users or in the field from a mobile device. Overall the virtual coach was found to be an effective method of providing coaching support to the athletes without the need for a coach to be physically present.

REFERENCES

