

MODERN TECHNOLOGY IN SPORTS

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From the beginning of the human civilization “sports” has become an important part of human life. It is also developing continuously with the evolution of Human Civilization with the blessings of modern technology. In modern era every aspect of sports enhanced with the use of new technology, especially, limitations of monitoring process carried out by naked eye. It is also realized that, use of these technologies would enable proper ranking of a sportsman or a team according to international standards. As examples, “Hawkeye technology” use in Cricket for ranking ball delivering speed and “Swing angle technology” that is used for ranking the best technical batsman. In football and rugby, monitoring systems are used for evaluate running speed distance of individual athletes for ranking of best performance team [1].

Even though, the use of modern technology in sports is in sophisticated level in international context, Sri Lanka yet far behind in sports technology other than in cricket (Figure 4). However, other sports like weightlifting, high jump, long jump and hurdles are holding higher popularity in Sri Lanka, but those events rarely use relevant technologies due to their high maintenance cost.

When not using advanced technology in sports, Sri Lanka lost competitive advantage against other countries used such technology to improve skills of athletes. As an example, Technology of Global Positioning System (GPS) technology is used in GPS-R to measure the running path and ball throwing path in Rugby and this technology also used in Cycling, Marathon and etc. A special body kit is used in this method, and the technique tends to be of very expensive. V-scope is a popular technique that is used to evaluate the performance of weightlifters. The type of data that can be acquired for a snatch, see Figure 1, using the v-scope [2] can be seen in Figure 2. This information is very important to prevent technical faults of an athlete. Even though these technologies are much beneficial of improving the competitiveness of the sportsman in many events, Sri Lanka yet to implement them because of the higher cost should be incurred.

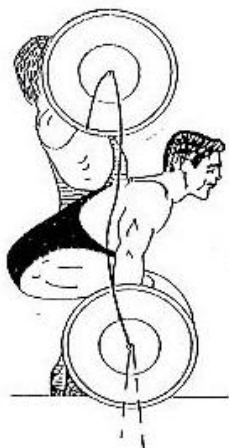


Figure 1: Weightlifting Snatch

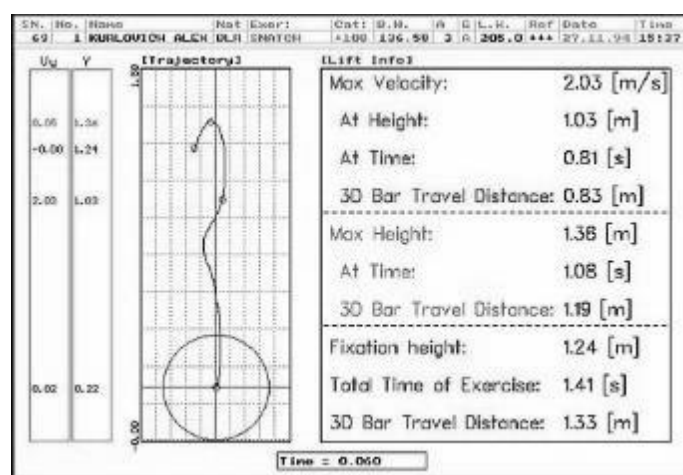


Figure 2: V-Scope Trajectory and data table

Sport motion tracking is another important technology that is commonly used in. Its work is tracking weightlifting bar movement and Sports athlete's body moments. This is achieved by obtaining the points of interest of the bar or athlete's body and is subjected to a particular motion in two consecutive frames. Continuation of finding the correspondence of the next two consecutive frames, while using the previous result as a new object, makes up the tracking process.

Speed motion tracking systems use video sequences to estimate object motion. Some of the most challenging tracking applications involve speed moving objects like weightlifting bar movement. In particular, human motion capture is widely used in visual effects and scene understanding applications [3]. Estimates of tennis ball tracking are also very fast movement (Figure 3). High speed video (60 to 300fps) cameras used to capture these Speed Motions.

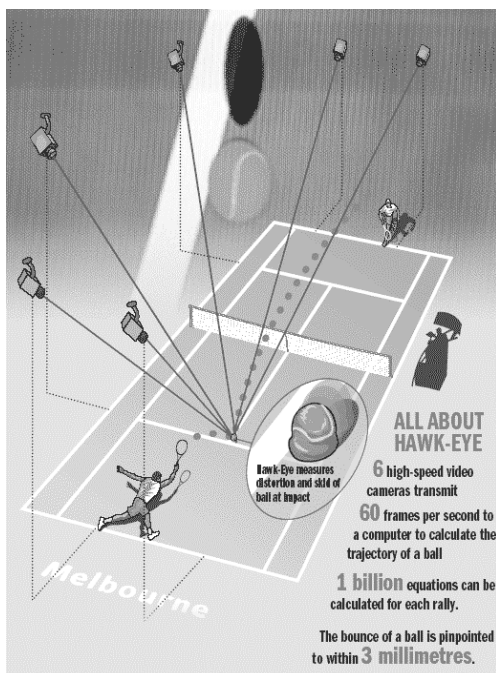


Figure 3: HAWK-EYE using in Tennis

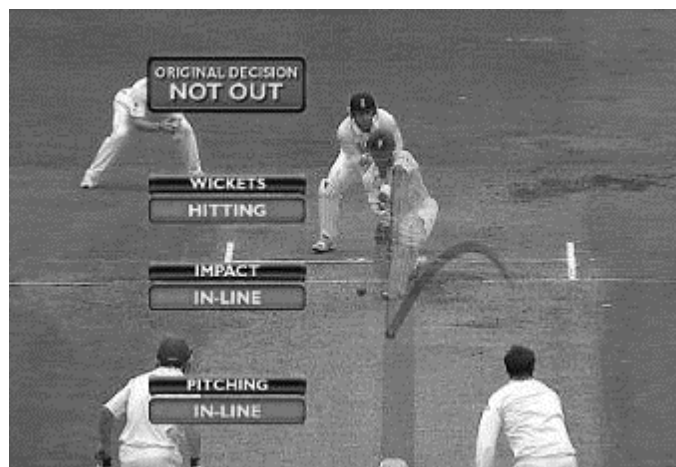


Figure 4: HAWK-EYE using Cricket

Possessing HAWK-EYE, V-Scope and GPS-R like techniques is very expensive for developing countries. However, for Cricket it is possible to obtain the service from counties like Australia. But for other sports such as weight lifting and rugby, it is not feasible due to the cost incurred. A promising solution is using image processing techniques to track the trajectory and motion in sports due to its low cost.

Reference

1. H. H. Innovations., "<http://www.hawkeyeinnovations.co.uk>".
2. www.dynamic-eleiko.com/products/vscope.html, " (accessed 1st August 2013)".
3. T. B. M. a. E. Granum., "A survey of computer vision-based human," *Computer Vision and Image Understanding*, p. 73(1):82-98, 1999.