

AUTOMATIC LAP COUNTING SYSTEM FOR ATHLETIC

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ABSTRACT

The present day inventions relate generally to counting systems, and more specifically to technologies for counting athletic laps and providing feedback to racers in athletic events. Lap counting is the most important part of the athletic and race working events. This system can easily count the lap in number of athlete's and display the details of athletes during events. Some countries including Sri Lanka use the manual human involved systems for lap counting. It can caused some errors in counting laps. Our country use human involved manual systems in which the athletes' laps are written down on the paper. Thus human errors can result or confusion with missing the exact number of laps. The proposed novel low cost system can minimize such errors of missing laps. The main objective of this research study project is to design a low cost, user friendly and reliable lap counter system for athletes as well as judges. Using the proposed monitoring system the comprehensive details of the athlete and required information about competitor can be accurately recorded and can be obtained any time. Not only for the athletic competitions but also it can be used in practice sessions and coaching camps etc. The manufacturing cost gain of our proposed locally designed system is about 10 percent lower than that of imported sophisticated one. Also, the newly designed automatic lap counting system can be easily adoptable for Sri Lankan athletic style.

Keywords: Automatic Lap Counting system for Athlete, RFID based detection System

1. INTRODUCTION

The commercially available lap counting systems were developed using various technologies, nevertheless majority of them consisted of major drawbacks and limitations. The Literature related to existing lap counting systems are described below. Lap Counter with Bell method can be used to calculate the number of rounds of only one athlete², surrounded by the number of count. Figure 1 shows the leading player lap counter and but he can't identify his current lap. Here in this indicator contains 10 numbers from 0-9. This is a manual system. Photo

finish system³, photo-finish¹ occurs in running race when multiple competitors cross the finishing line at nearly the same time. As the naked eye may not be able to distinct the exact approach to indicate between which of the competitor crossed the line first, second and so on. Then a photo or video taken at the finish line can be used for a more accurate post. But in the prevailing system which can be used in Sri Lanka detect the motion of any part of the body even hand motions are can be detected in this system¹.

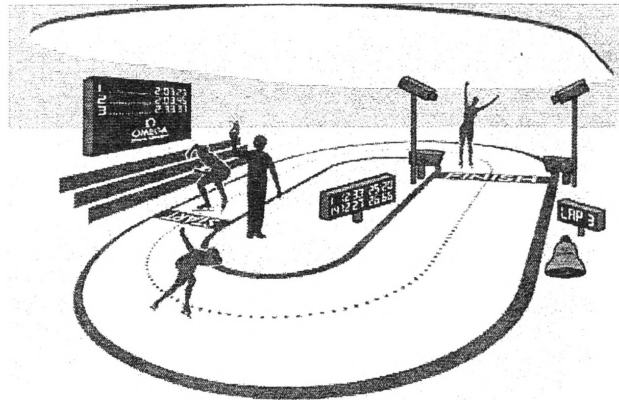


Figure 1: Photo finish system¹

2. EXPERIMENTAL

Before designing the main circuit, the internet surfing was used to obtain understanding for different types of wireless data transferring methods in sports events. Then literature about data transmitting/receiving using radio frequency and its functionality were studied. The following basic schematic diagram given below can be used to describe the system.

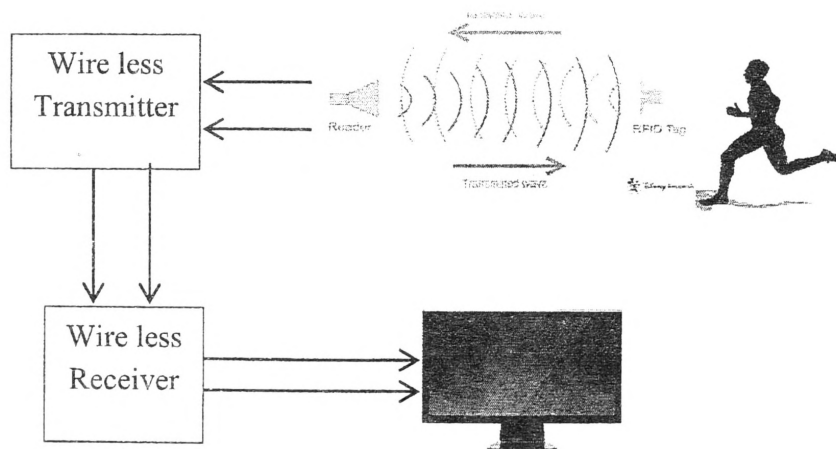


Figure 2: Schematic of the system design

In the illustrated system, when the race started a signal is sent to the main system. After the athlete reached the starting position again and when it is just passed (after completed 1st lap) the RFID reader is used to approach signal from the RFID tag in the athlete body. Then, detected signal is sent to the wireless transmitter. After that, it transmits to the main system after detecting at wireless receiver. Finally the microcontroller based system display is used to display the final processed data after microprocessor based analysis.

3. RESULTS AND DISCUSSION

After designing and implementing the complete proposed automated lap detection system, evaluation stage of it is implemented in two steps. Initially, the data receiver unit is evaluated to verify whether the section modules of the proposed system is functioning properly. Subsequently error of the transmission unit is evaluated to verify that counting measurements are transmitted without any interference or error.

This proposed system measure number of laps and athlete parameters such as the best (minimal) time record of the athlete, ground record time, event record time in high accuracy and clearly. This proposed RFID technology is difficult to use for measuring such time dependent events with linear RFID systems⁶, the performance of this systems can be improved in order to measure time in more accurate manner.

4. CONCLUSION

Using the proposed Automatic Lap Counting system for athletic events it can be developed to count number of laps that an athlete completed more accurately. In this work, a prototype simulation system was designed and constructed. With high accuracy number of laps and athlete details are gained by improving system designs and using high end devices, such as heart beat sensor, line detection IR sensors etc. Compared to the cost for imported commercially available Automatic Lap Counting system (such as photo detection system) which is approximately 50000LKR, the cost benefit of implementing this system is nearly 10%. Furthermore, the reliability and usability of this system is improved by using wide range RFID readers/tags which cost nearly 500LKR each.

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