Cycling Timing System

Initial Project Description

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Introduction

We propose to improve upon the current technology for the timing and more specifically the ordering the riders in cycling competition. Using an electronic identification system, such as Radio Frequency Identification (RFID), we plan to develop a system that allows real time determination of finish time and finish place.

Background

The order of finish of a bike race is determined by the front edge of the front wheel. The current standard is to use a video recording system to record the riders as they cross the finishing line and subsequently determine the order of finish from that recording. At the highest level of cycling, a digital camera with optical sensors is used to relay an image of the finish line to a connected PC where the image is stored for review. Using specialized software, the order of finished is manually determined (i.e. a human must identify each cyclist by their corresponding bib number). In wealthier races, a $25,000 electronic system is used, which employs magnetic signal transfer, to augment the video imaging system. However, this system does not have the necessary precision to replace the video system, and for riders closer than 0.03 seconds the video is used to determine the placing. This process can take a team of professionals more than 5 minutes to order a full field of about 200 riders, even with the magnetic signal transfer system. At lower levels of cycling, where the overwhelming majority of races take place, an ordinary VHS camera is used making the process not only less accurate, but ordering a field of 50-60 riders (a common field size for the collegiate level races) can take the timing team up to an hour.

Project Goals

Our major goals are to not only design a low-cost solution but to achieve an overall greater timing precision than the current technology allows for. One possible solution is to place a very low-cost RFID tag on each bike that would uniquely identify each rider's bike. We would then be tasked with developing a sensor array capable of determining the exact time each rider crossed the finish line and relaying that information to a connected computer system such as a laptop PC or timing board.