

Developing a competitive evaluation system for relay runners

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In the domain of sports, be it at amateur or competitive level, a correct and objective evaluation system of the performance of an athlete is an important information for both the spectator and the player itself. The following project aims at giving this kind of information for the relay racers, by making the relay itself „smart“.

Introduction

Swiss Timing is a company specialized in timekeeping athletic activities.

As with everything, the development of new technologies brought us new devices able to measure the performance of the athletes during all kind of sports, such as:

- The electronic start system
- Starting blocks and false start detection systems
- Scan'O'Vision photofinish cameras
- Wind measurement technology
- And many more..

Since every sport requires a certain skill set, different methods for evaluating the performance are required, and with the advancements of technology there are a lot of new possibilities to take the advantage of.

In the domain of athletics relay racing, currently the baton is an hollow cylinder without any technology in it.

Goal

During a relay race the exchange sequence between the two runners will have serious impact on the total lap times. For this reason it is important to develop a system capable of giving an objective evaluation of the quality of exchange of the baton. The device will focus on sending information about the absolute orientation of the stick during the exchange period, and

is capable of detecting when and how long exactly the swap lasts. This will provide an objective evaluation method for both the spectator or athlete without requiring the use of a camera device and clear vision of the stick.

Principle

The baton includes already an integrated sensor unit, developed in a previous Bachelor work which detects the handover sequence.

The new device iteration will also include an inertial measurement unit, which will provide all the required information to determine an absolute orientation of the device itself. By combining all of these sensors we can then send the elaborated data to a computer or other device.

The baton relay is capable of integrating different communication protocols depending on the requirements. It has I²C and SPI bus interface which provides compatibility to a wide range of products.

Results

The final device consists of a series of sensor developed ad hoc for the athletes running the relay race. All of the hardware is inside the relay baton and the outside surface of the stick has been left untouched.



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Baton relay functionality showing an absolute orientation position change