UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

JUNIOR ACADEMY OF SCIENCES OF UKRAINE UNDER THE AUSPICES OF UNESCO

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SPORT TIMING SYSTEM “SKIt”

Abstract

SKIt (Sports Timing System) project was previously appointed to record the time of distance passing by snowboarders - pupils of Ternopil youth sports school "Extreme". Untill now, measurements were usually performed using stopwatches. Coordination of operators’ actions were implemented by walkie-talkies. At the same time, there was a large measurement error, which affected results and often caused dissatisfaction of participants. Therefore, there was a necessity to develop a proper timing system, as professional ones are quite expensive and not affordable for most sports clubs.

Introduction

Sport timing system is designed to automatically measure the passing time of a certain distance from the start finish. This device can be used in sport sections for different age categoriesin athletics, cycling, snowboarding, etc., where registration of exact time is used.

The goal of the project was to automate the measuring passing time for snowboarders at a certain distance . But in the process of project development, the goal grew into the creation of an universal system for athletics and snowboarding lessons.

This is an example of social innovation. Our project is designed to be used by low-budget organizations and other social sports clubs. In line with the UN Sustainable Development goals (Good Health and Well-Being section), one of the goals of system development is to encourage people to play sports. Because with “SKIt” you can easily track results, achievements. An important feature is that the device is universal, so it can be used in various sports, where it is necessary to measure the distance.

The essence of development

The essence is to develop device operation algorithm, selection data transferring technologies between modules to meet the needs of effective and reliable operation of the device.

Materials and methods

The system contains start and finish modules, data transmission between which is carried out via the LoRa radio channel. Both of modules are presented on Figure 4 and Figure 6.Each of the modules is controlled by the Arduino microcontroller platform and contains a sensor that allows you to monitor the intersection of the start and finish lines. On Figure 1 the structure of timing system is presented. Source: author`s development.

The system works in two modes:

- training mode, in which the moment of start and finish is fixed by the system automatically;
- competition mode, in which the participant starts on the light and sound signal using the operator's remote control.

An information board on the start module is used to display the measurement results. In addition it is possible to connect mobile monitoring devices to the local web-server of the system via the Wi-Fi channel. The Scheme of system operation are demonstrated on Figure 2. Source: author`s development.

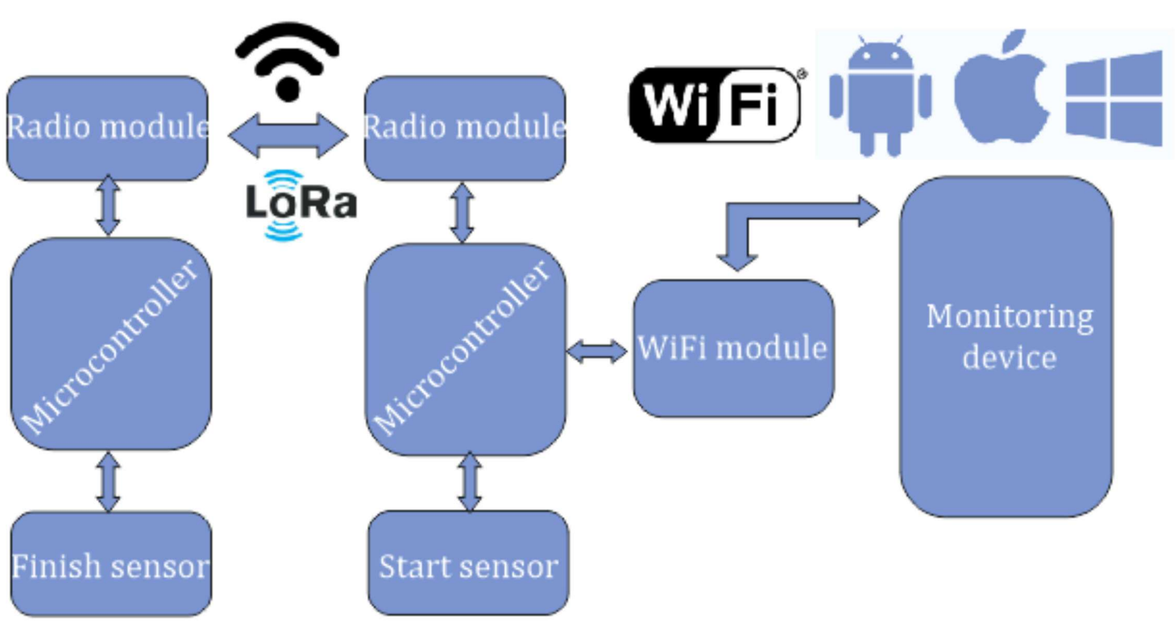

Fig. 1. Block diagram of system

Source: author`s development

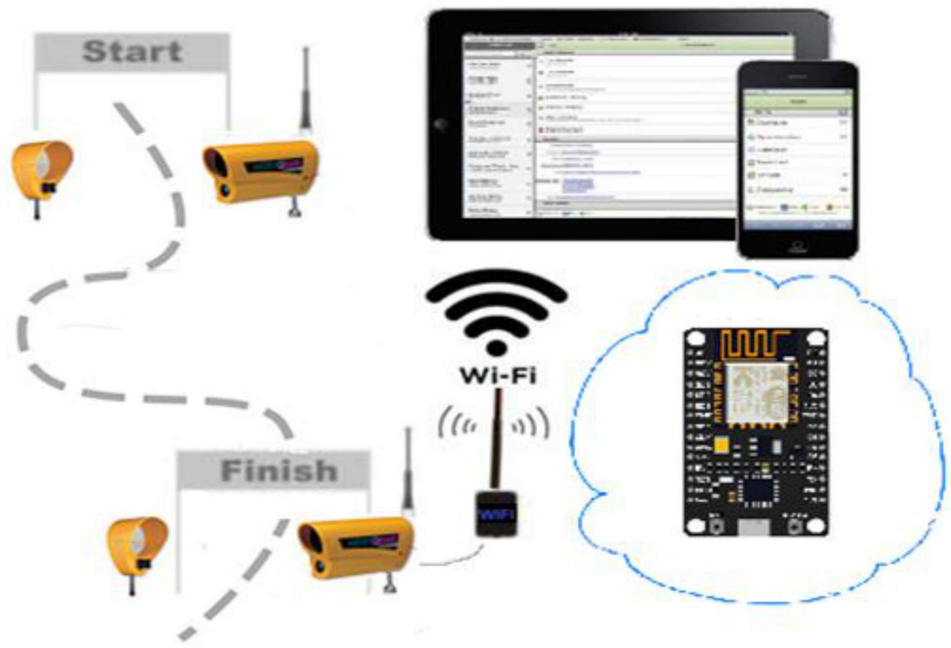

Fig. 2. Scheme of system operation

Source: author`s development

Results

As a result of the project work according to the tasks for the development of the system, analysis of and analytical review of existing solutions were made. Structural and functional schemes of the device were created, algorithm of work was developed, methods of information transferring between modules and their synchronization was chosen. Control programs for microcontroller modules were written. A prototype of device was created. In the process of testing, we identified and corrected shortcomings and expanded some features of the system.

Conclusions

SKIt successfully demonstrated its work in competitions and training in athletics, snowboarding, and skiing. Developed device is fully functional and ready for release. System can be used in sports sections of different age categories. On Figure 3 is presented use of the system altetics lessons and on Figure 5 is presented use of the system snowboarding lessons. Source: author`s development.

Perspectives

In the future, it is a plan to develop a more compact model of the system and launch small-scale production to sell or rent the device.

Fig. 3.Testing the system in athletics lessons

Fig. 4.Start module

Fig. 5.Testing the system in snowboarding lessons

Fig. 6. Finish module