Footfall counting: discgolf

Discgolf is one of Sweden's fastest growing sports and its player base is growing rapidly. This increase in popularity has made it difficult to gauge how much money should be put towards maintaining and developing discgolf courses around the country. Eliminating this guesswork is possible by accurately counting the number of people utilizing the courses available. Additionally, a system like this could provide players with real-time data of when course crowding is at its highest.

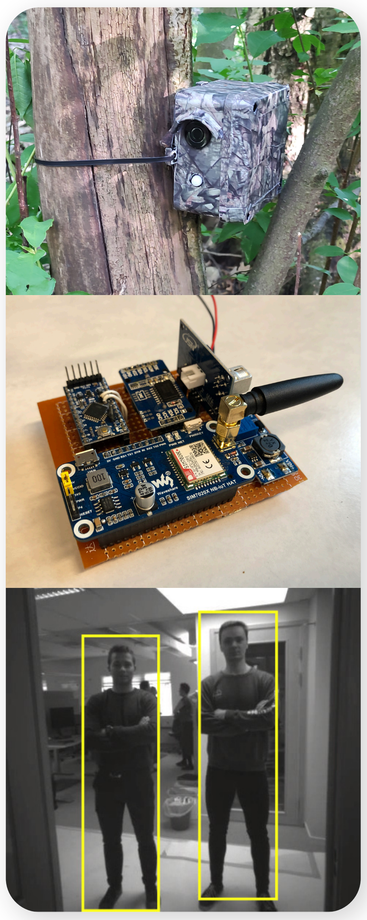
In this project, various techniques for counting people were explored. A working prototype was built and tested.

Technical implementation

There are multiple ways of counting people, but most often it's done by means of a Time-of-Flight sensor or some sort of computer vision algorithm (a deep-learning algorithm for example). Both alternatives were explored in this project.

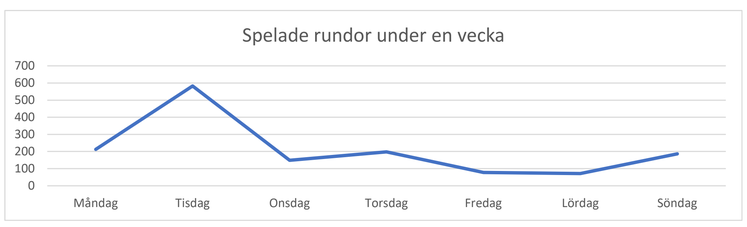
The final prototype was comprised of an ultrasonic senor, a PIR sensor, an RTC-module, an NB-IoT module, a temperature probe, a DC-DC converter and a microcontroller. A lot of effort was put towards battery-usage optimization and solving network connectivity issues.

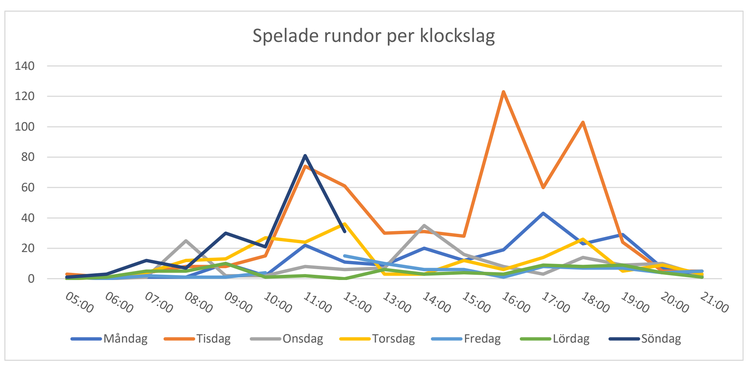
By measuring the distance to passersby crossing the ultrasonic sensor's beam path, the system counts groups and individuals (see the figure to the right). A drawback of using this technique is poor accuracy when counting people walking side by side. This issue can be mitigated by placing the system next to a narrow path. To increase battery life, the main sensor (ultrasonic) is only powered when the PIR sensor detects human presence. The system sends data wirelessly to a database once an hour through the NB-IoT network. With the help of PHP and SQL, the data is displayed on discgolfcounting.com.



Results

The footfall counter was tested during a week in May at "Dom-mar-ringens" discgolf course (the system was mounted at the cross indicated on the map). The results are shown in the graphs below (they can also be viewed by scanning the QR code found on the poster).





1TE708 Independent Project in Electrical Engineering

Development of a people counting system for discgolf courses

Group members: *Jesper Bolin, Isak Bolin*

discgolfcounting

UPPSALA UNIVERSITET