

Karate pyAction Game

What is it?

It is an interactive and reactive open source game, based on rules and techniques of Karate, in which two players, wearing red and blue Karate combat gloves, must hit, with the maximum speed and control of the fist, two targets placed in front of them.

Who strikes first, wins.

First idea

Initially the idea was to develop a system capable of measuring the speed of a punch pulled by a Karate athlete.

In order to obtain repeatable and as precise tests as possible, a Raspberry Pi Zero W card, a pressure sensor and a distance sensor were used.

Through the pressure sensor it is possible to measure the intensity of the shot, because in Karate the control of the technique is fundamental.

The punch should be pulled at full speed, but being careful to touch the target lightly (Skin Touch).

The distance sensor (SF-04) allows the athlete to be positioned at a certain distance, in such a way as to position the athlete, even in the tests after the same distance.

Development of the game

In a second phase the idea was born to create an interactive and reactive game, where two contenders must hit two different targets, at the maximum speed and at the same distance.

To achieve this, a Raspberry Pi Zero W card was used, to which two pressure sensors and two distance sensors were connected.

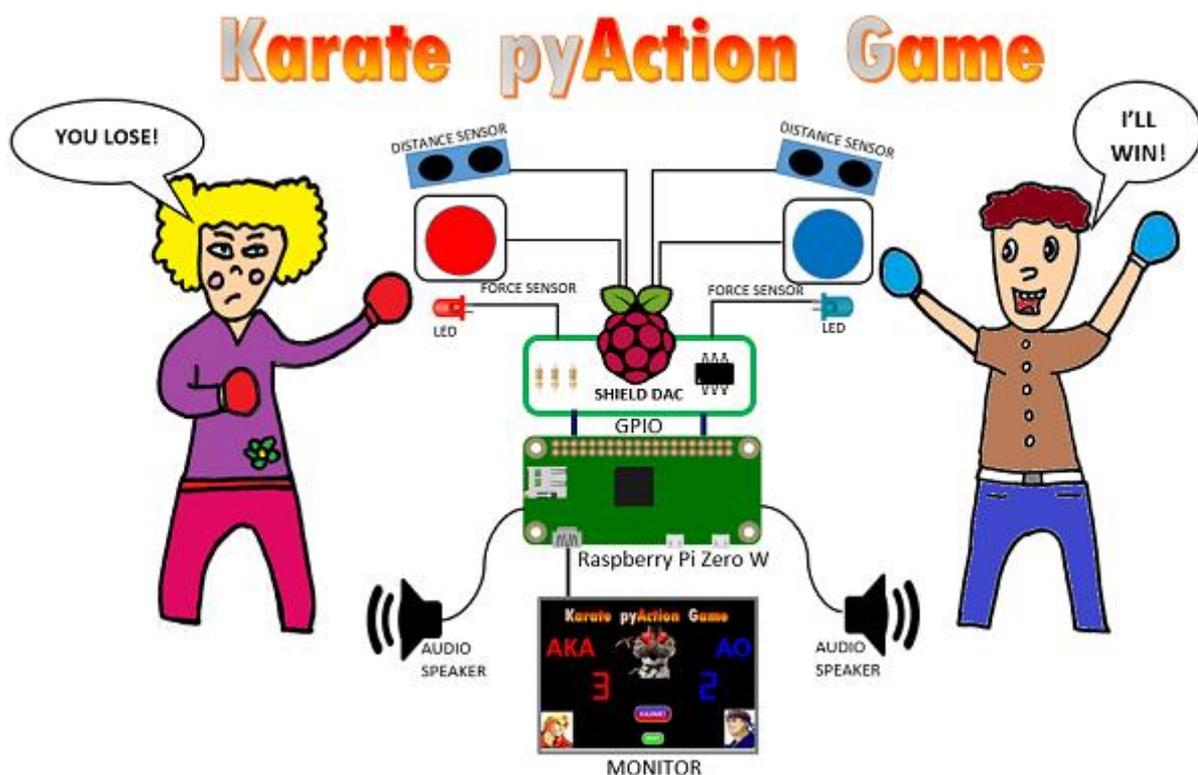
The software was developed in Python 3.6 with the use of the PYGame library, which.

The development software already installed directly on the Raspberry PiZero board allows to keep the count of the points scored by the two contenders as well as to measure the intensity of the pressure applied to the sensors.

Through the software and pressing the "HAJIME!" it is possible to give the start signal to the two contenders by playing the sound of a whistle and lighting up for a short time the LEDs positioned in front of them.

So the two players will have two stimuli of reactivity, a sound and a visual one.

First design of the project

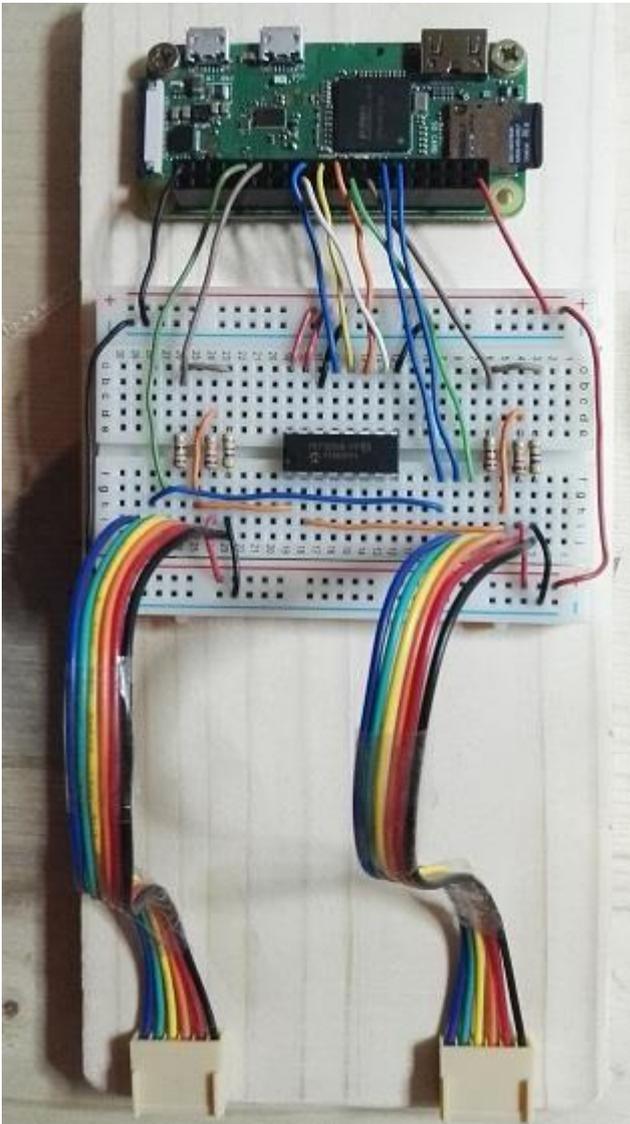


Implementation of the project

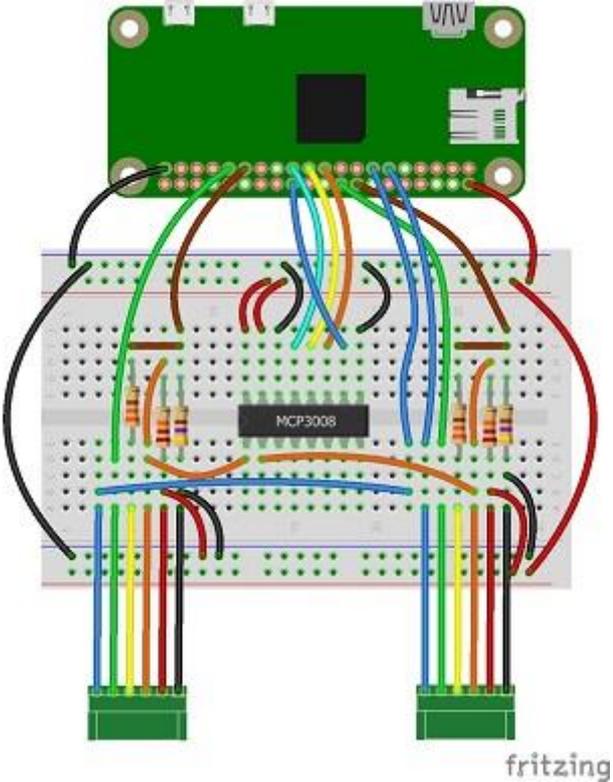
To implement the game the following components were used:

- No. 1 Raspberry Pi Zero W
- N. 2 HC-SR04
- N. 2 Force Sensor
- N. 2 Resistor 22 KOhm
- N. 2 Resistor da 100 ohm
- N. 2 Resistor da 470 ohm
- N. 2 Resistor da 330 ohm
- N. 1 DAC MCP3008
- N. 2 LED BLUE
- N. 2 LED RED

Raspberry Pi Zero connections - Breadboard

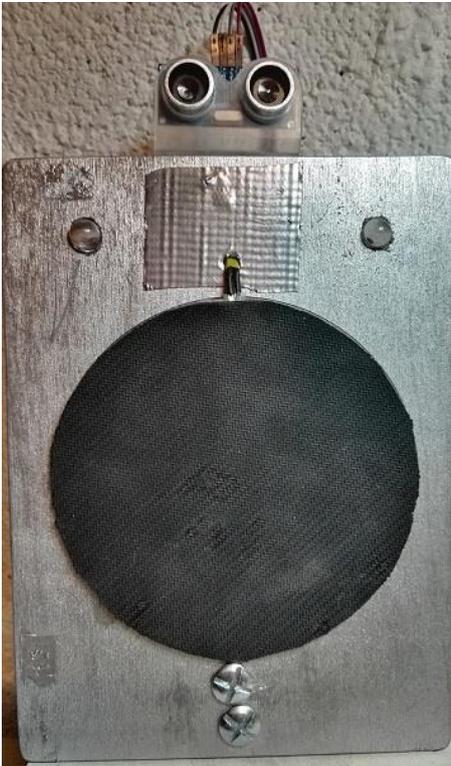


Schema fritzing

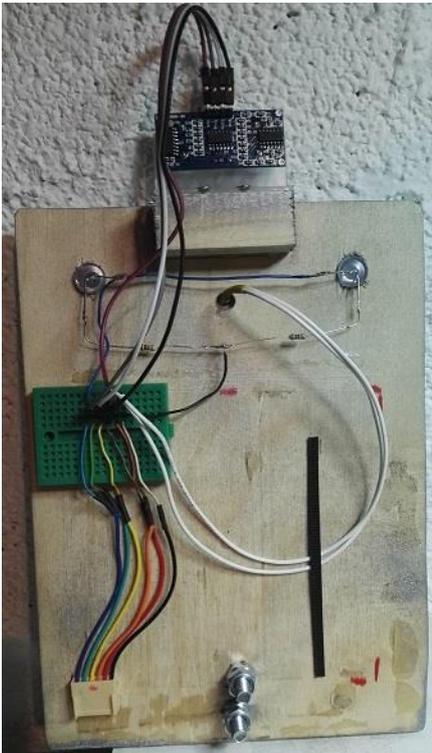


Panel Sensors

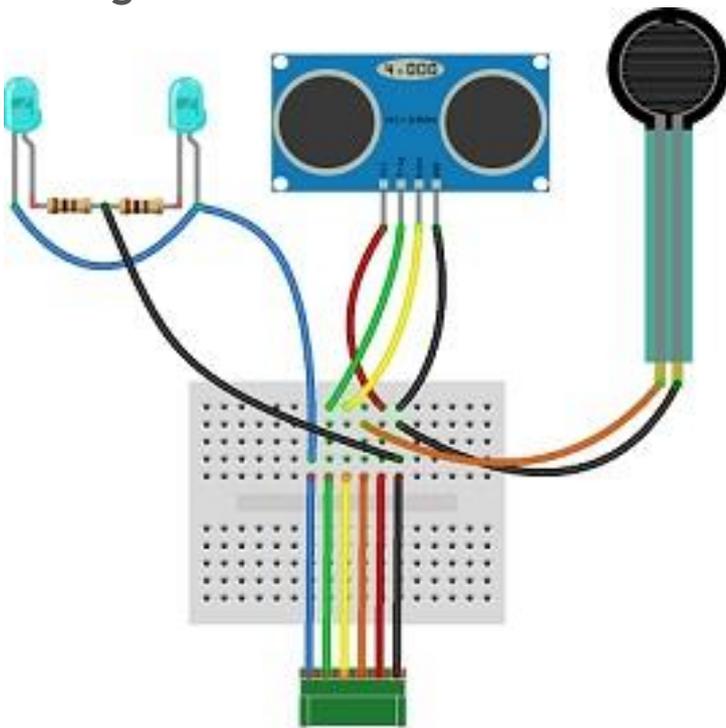
FRONT



BACK



Wiring



fritzing



Software developed in Python with PyGame Library

