Istituto Tecnico Industriale Statale
Silvio De Pretto
Schio (VI)
ITALIA

Laboratorio Sistemi Automatici
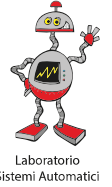
TEAM: SPOCIONI

Components:

Pogetta Matteo
Berlato Matteo
Grendere Marco

Thiella Matteo
Zanella Sebastiano
Gwntili Marco

Time for development: 300 hours
Project Cost: 500,00€

ATMEGA2560 microcontroller

As a main control unit an Arduino AtMega 2560 has been used. This board is based on the 8-bit microcontroller Atmel ATMEGA2560. To interface Arduino hardware an electronic card using a matrix board is made. The card has been connected to the microcontroller by means of the strip and various tracks that carry signals to the sensors which are connected by means of connectors were subsequently created.

IR distance sensors

To detect the walls inside the arena, short and long range infrared sensors were used. By send\consequently return the measurement.

Gyroscope and accelerometer

To perform the curves with a rotation of 90 ° and detect the eventual ascent or descent an IMU (Inertial Measurement Unit) was mounted which consists of a card with inside gyroscopes and accelerometers on three axes (X, Y, Z).

Infrared temperature sensor

For victims detection two temperature infrared sensors TPA81-8 pixel have been used. These devices are able to read the infrared rays irradiated from the bodies in its field of vision.

Rescue Kit release

Our kits, made of iron.

The kits are released by means of a system inside the structure, through the sliding of a specially designed gear driven by a step-by-step motre.

Battery

To power the robot a rechargeable lithium polymer battery (LiPo) as 14.8V has been used.
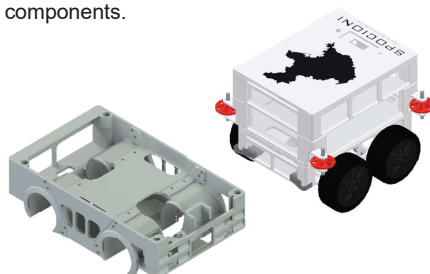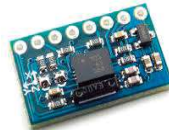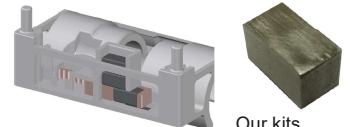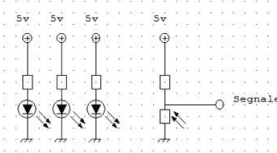
Touch sensor

It often happens that, due to obstacles or debris on the racetrack, the robot will fail to align properly and go to impact against the walls of the arena.

Light sensor

To detect the color of the underlying surface of the robot a light sensor has been designed and realized. It is formed by three LED diodes with high brightness which have the task of illuminating the floor and by a photoresistor that detects reflected light from the surface.

Motor drivers
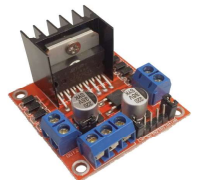
Two L298 drivers were used to control the speed and direction of the motors, which control two motors each, thanks to a transistor.

Chassis

The structure was designed with Autocad 3D and later realized with a filament printer for the two upper floors and a resin for the lower one. The structure consists of three independent planes so as to better organize the various components.

Programming language

As software development environment Atmel Studio 6.2 and the selected language C have been chosen because of its versatility. The program was divided into several libraries by assigning to each its task.

```
Voidchoose(){
//valore distanza 100
intdestra=0,avanti=0,sinistra=0,v_destra=150,v_avanti=150,v_sinistra=150;

adc_set_address(2);
if(adc_read()<120)destra=1;
adc_set_address(1);
if(adc_read()<130)avanti=1;
adc_set_address(5);
if(adc_read()<130)sinistra=1;

if(dir==0){
    if(destra==1)v_destra=mappa[x+1][y][z];
    if(avanti==1)v_avanti=mappa[x][y+1][z];
    if(sinistra==1)v_sinistra=mappa[x-1][y][z];

    if((v_destra==v_avanti)&&(v_avanti==v_sinistra)){
        if(free_box==0){
            free_box=1;
            ruota_destra(power);
            return;
        }
    }
```