

Szechenyi Robotics

Team Description Materials

Dear Robocup

Logistical info:

- Team Name: Szechenyi Robotics
- Organization: Szechenyi Robotics
- Country: Hungary
- Contact person: András Bakti
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The team

We are a team from Hungary. We are the students of Nyíregyházi SZC Széchenyi István Technikum and Kollégium, and there are four of us. Our mentor is Mr. András Bakti. This is our first project, and we are very ambitious about this competition.

Róbert Dávid Vass: Dávid is mostly focused on programming, but he also likes building and engineering. He handle the logistics too. He made the robot move with our controller. Because of family reasons he cannot go to the tournament with us but he helped us a lot with the coding.

Krisztofer Kevin Máté: He is the spokesperson for our team. He is focused more on programming too. He did some work in both things but more in coding, and he provided us with the tools that we needed to the robot.

Marcell Csabai: He focuses more on the building and engineering of our robot, but he is interested in programming as well. He did a really good job at hardvers too and he helped József so much. He equipped the motors to the robot.

Szabolcs Joó: He has already proven himself with his building skills, but as the time went on he started to get better at coding, and he helped us a lot in it. He good at building too, but now he codes more with us.

József Juhász: He is the newest member of the team and he is the man of the hardvers and he built the robot pretty much with Marcell. József learned about the coding as well but he did the most in the hardvers.

Mr. András Bakti Mr. András Bakti is the team's mentor; he helps with the acquisition of needed parts and gives advice on the robot's assembly and programming.

System Description

Our robot's body is made out of plexiglass. Our robot's brain is a Raspberry Pi 4 4G. It has four DC motors with four RC wheels. It has three 18650 power supplies. We also use a Pihut MotoZero. It has a Pi camera for video output.

The computer of the robot is a Raspberry Pi 4 4G, which handles everything.

We use a Raspberry Pi controller to control the robot. So it is basically controlled via joysticks.

Setup and packing of your robot and operator station

To set up the robot, all we need to do is charge up the batteries for it and put them in the robot's battery pack. If the batteries are not charged enough, it's not a problem because we have backup batteries.

For the operation of the robot we will use our laptop because that's more easier to use and to code. We tried it and it is so much faster than the controller so we made a good change with that.

Mission strategy.

We acquired parts that are easily manufactured and cheap, which means this robot with the right design can easily be made at a low cost and distributed widely. We want to make this robot as easy to make and control it so we don't need to worry about the financials and the mechanics of how to control the robot.

Experiments and testing that you have done or will do.

We made movement tests with the robot, but we still need to test the camera of the robot. We made so much tests about control the robot properly and more easier to control for anyone. Its still in progress to have done the whole code and robot, we are going in a pretty good way to make it in time.

How the particular strengths of your team are relevant to applications in the field

Our team members are focused more on software, and our mentor is focused more on the engineering side of the robot. But that doesn't mean we are not interested or haven't started learning the basics of assembling the robot, soldering, etc. I hope our team can help in any area of robotics. We worked pretty hard on it and we get used to stay in the school to work on the robot and we did learn a lot about the software and the hardver and i think that we made a really really good progress. We do not have a problem that we couldnt solve one way or another.

What your team has learned so far

Since we started making our first robot, a couple of months have passed. In those months, we went from a complete unknown in robotics to making a completely new robot. We learned a lot about Python programming, about GPIO pins, and overall how a robot works and moves. We learned how to work together as a team and how to solve problems that seemed impossible. There are so many ways of programming that we have started to understand and we actually we have so much fun making this robot.

What do you plan on doing between now and the competition?

Although we are really happy with how our robot is going, that doesn't mean we are done. We are far from that. We still need to learn a lot about programming, including how to make our code way more efficient, use different packages, and make the robot more compact and easier to assemble and disassemble. We plan on learning all of this and improving our robot. We also plan to make a robot arm; we've already started its development, but it's still in a very early phase. We need to get ready to how we will control and how we can make things better as a team together. We have to make sure that the robot camera and the robot movements are working nicely, clean and as fast as possible.

Costs

Components	Cost of the components (€)
Raspberry Pi 4 4G	79,75
4x Steel gear DC motor	7,09
4x RC wheels	109,72
Pihut MotoZero	11,74
3x18650 Li-on batteries	14,22
2x SG90 servos	4,42
Raspberry Pi camera V2.1	34,89
3x Mg995r	20,25
Lithium Ion Battery Holder	4,50

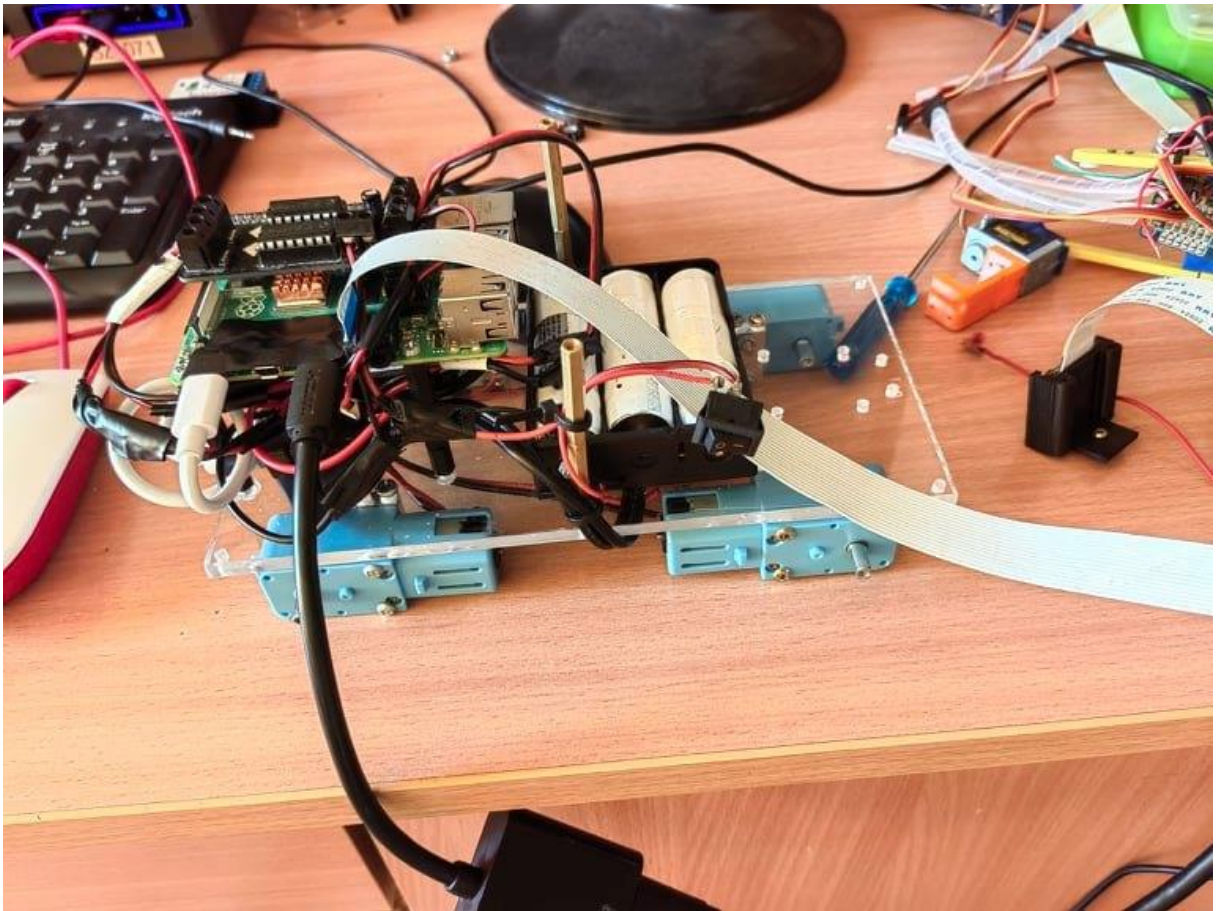
Overall cost: 286,58 €

The reason to change the Adafruit motor shield was because when we tested it too much, it stopped working, so we needed to change that. The reason why we don't use the Pi controller is because we will use our laptop that we will bring with us.

A list of software packages, hardware, and electronic components that you have used or plan to use:

- OpenCV - <https://opencv.org/>
- GPIO zero - <https://gpiozero.readthedocs.io/en/stable/>
- Raspbian OS - <https://www.raspberrypi.com/software/operating-systems/>
- python 3.11.2 - <https://www.python.org/>

Pictures:









Here is the most part of the code but we need to do some fixing on it and we still try to make things as good as possible but i think we made such a great progress and we will try our best:

https://github.com/Denix660/Szechenyi_robotics