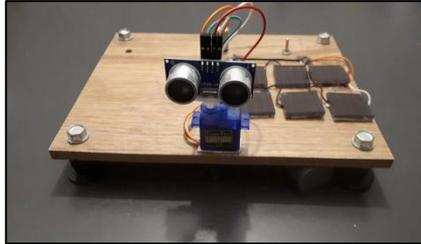


ARDUINO RADAR PROJECT

For this project we have used: an ultrasonic sensor, a servo motor, an Arduino board, jump wires, 6 solar cells and a rechargeable battery.



The Arduino Uno board was the brain for this project.

Arduino is an open-source platform used for building electronics projects. It consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board, but we will talk about this later in this presentation.

The Ultrasonic sensor

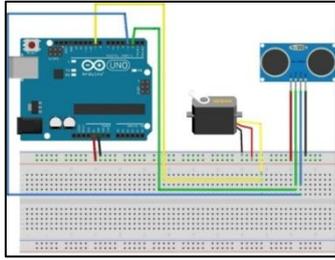
An **Ultrasonic sensor** is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object. So, our ultrasonic sensor (model HC- SR04) will basically identify objects in area and measure the distance up to them.

Servo motors (or servos) are self-contained electric devices that rotate or push parts of a machine with great precision. Servos are found in many places: from toys to home electronics to cars and airplanes. Servos also appear behind the scenes in devices we use every day.

In this project we used the Micro Servo motor SG90 to rotate the ultrasonic sensor.

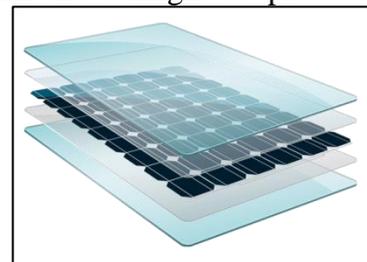
We have connected the Ultrasonic Sensor HC-SR04 to the pins number 2 and 3 and the servo motor to the pin number 9 on the Arduino Board.

Our Arduino board is powered by solar electricity. We have connected 6 photovoltaic solar cells in series. These cells are able to recharge a 2200 mAh battery. So, basically the portable battery powers the Arduino board and the battery it's recharged with solar power. This fact is very important because we use bio-energy and that makes our radar project portable.

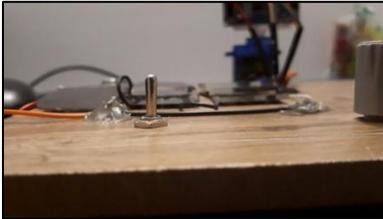


About solar power

Solar Power can also be thought of as “Solar Electricity” and the key to solar power is the solar cell, or photovoltaic cell. Solar power is one of the most viable and cleanest forms of renewable energy because we can use the sun's energy within the sunlight to produce electricity by means of solar cells. The solar cell operates according to what is called the photovoltaic effect, where photo means light and voltaic means electricity. Solar cells are more technically called Photovoltaic Solar Cells.



PHYSICS WORKSHOP



I, Sebastian Gozner, together with my fellow George Seica, have learned a lot together in this physics project. Part of the theory learned in Physics classes was put into practice. The Internet was a great help, but as we did not find everything in the online environment, we needed to challenge our minds to build this project. Radar projects have already been made, but the idea of making it portable and being powered by the electricity produced by some photovoltaic cells has been the challenge.

In this project there was involved knowledge from several fields, such as: mathematics, physics, robotics, programming.

We have learned:

- what teamwork means;
- about renewable energy and how you can use solar power;
- how a development board such as Arduino works and how it should be programmed;
- how to use a servomotor;
- how to use an ultrasonic sensor

Every stage of the project has taught us how important it is to implement the theory in a given field

This project means a lot to us and we will definitely repeat the experience.

