Development of a low-cost device for forest fire prevention and monitoring of environmental conditions

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SMARTForest

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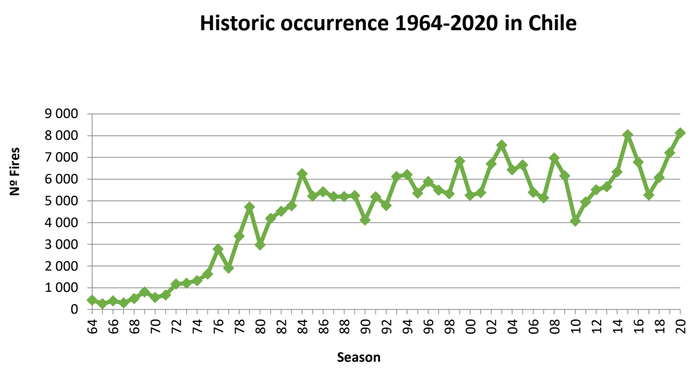
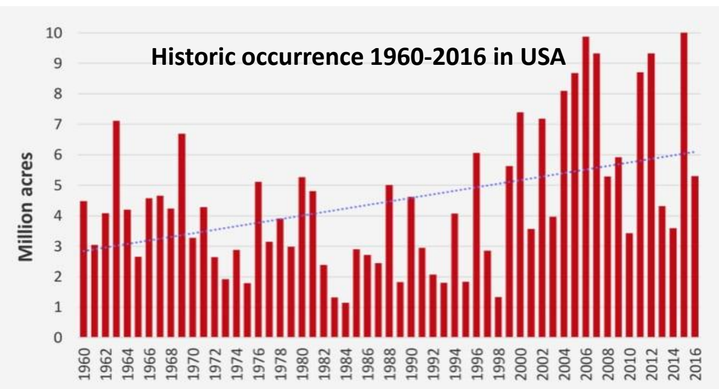
INTRODUCTION

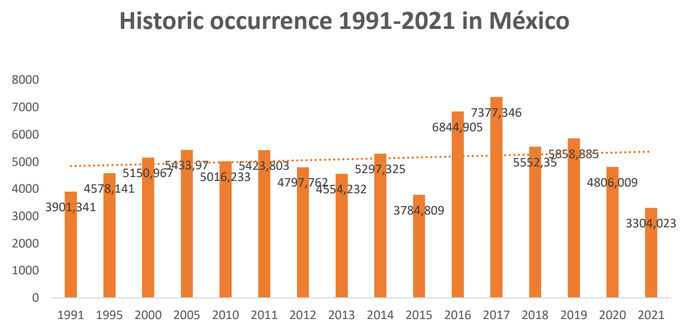
- The project consists of the development of a low-cost device capable of providing early warning of the outbreak of a forest fire.
- The device will be installed in strategic areas of the forest, considering factors such as wind direction and areas considered susceptible to start a fire. For example, areas where people tend to camp and may leave glass fragments that could start a fire.
- Due to the characteristics of the device, it can be used not only as a warning system in case of fire, but also as a real-time monitoring system of the environmental conditions of the place where it is installed.

PROBLEM STATEMENT

Statistics show that forest fires are occurring more frequently and are of greater magnitude. They can become so large that they cannot be controlled in any way. Current methods of forest fire prevention involve costly ways of achieving this.

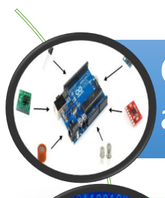






OBJECTIVES

Design of a low-cost device for forest fire prevention and monitoring of environmental conditions:

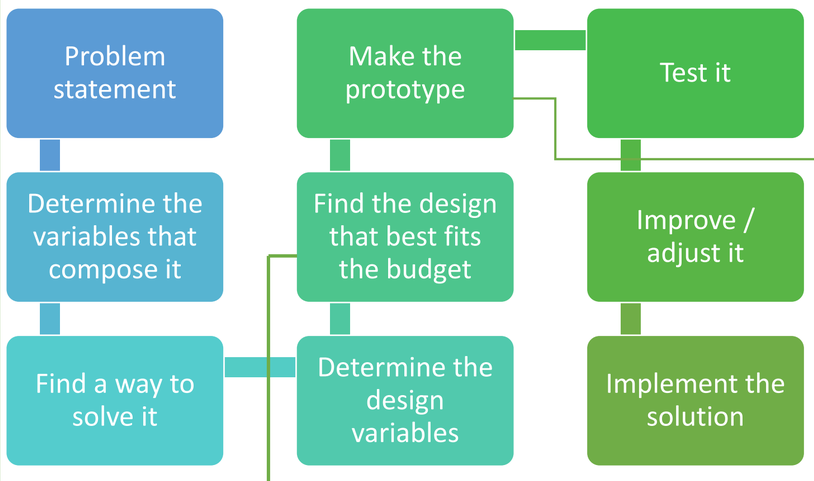


Capture data on temperature, humidity and presence of combustion gases.

Search for combinations of these variables that signify the potential appearance of a fire in the near future.

Real-time data monitoring

METHODOLOGY

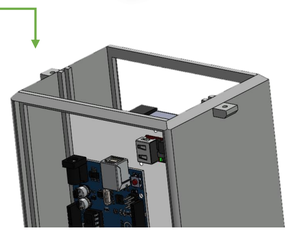


How to power the device?

- With solar panels

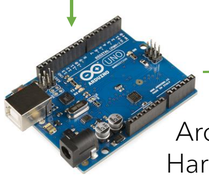
How to make it waterproof?

- Case desing with chamfer



Gravity effect will not let the water get into the device

Some of the Parts:

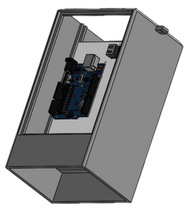


Arduino Hardware

NRF24L01 Transceiver Module

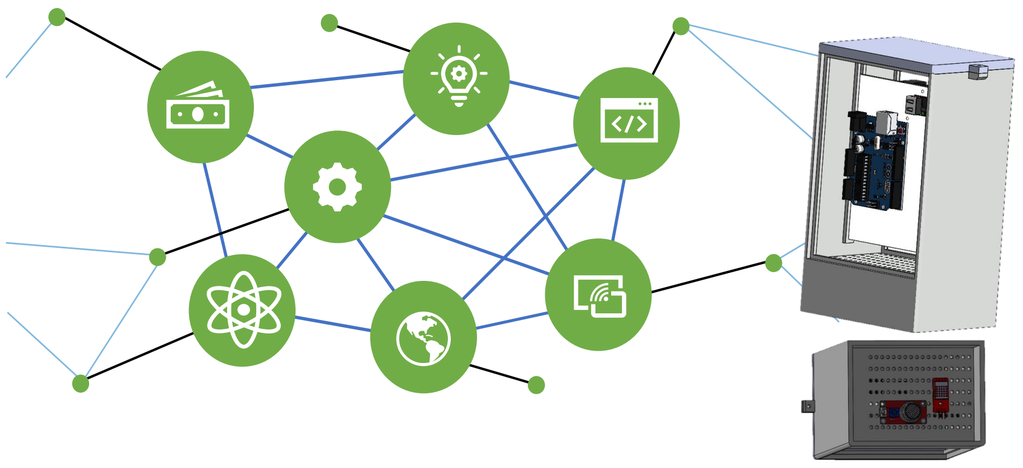
DHT11 Temperature – Humidity sensor

MQ2 Smoke sensor



Simple case for easy and cheap production

RESULTS



ENGINEERING → ENVIRONMENTAL ETHICS → SCIENCIE → LOW COST SOLUTIONS → CLEVERNESS → SMARTForest

CONCLUSIONS

Forests acquire a higher degree of protection and prevention against forest fires, thus helping to conserve the environment and reduce the impact of climate change.

The manufacturing cost was optimized to less than $150 without buying the components in large batches, which means that the price can be further reduced.

Using the selected sensors, it was possible to capture temperature, humidity and gas data, as well as to motorize the data in real time.

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