October 1 - October 7, 2024

I got my science fair question approved by Ms. Bretner-

How can we create a mirco-plastic detecting device?

I started my project and created this logbook.

Read the science fair rules and project guide.

I wrote down what I wanted to learn about microplastics.

What are they? How do they get in the ocean?

Do they degrade? Why are they important?

October 8 - October 14, 2024

Learned about microplastics from podcasts, articles and videos.

I solved the questions from last week.-

Microplastics are tiny plastic particles, less than 5 mm in size.

They enter the ocean through plastic waste, synthetic clothes and fishing gear.

Microplastic can not degrade, as they last hundreds of years.

They are important because they can harm marine, pollute the food chain and affect human heath by entering the seafood we consume.

October 15 - October 21, 2024

I studied how microscopes and filters can help us to find microplastics.

I researched AI models to detect microplastics.

I wrote ideas down for my experiment.

October 22- November 4, 2024

I finished my background research on possible AI platforms to use.

I looked at the CYSF forms- Basic info and Ethics.

Planned my experiment to find microplastic images to train my AI model to help it detect it easier.

Variables -

Manipulated -

Responding -

Controlled - Microscope

November 5 - November 11, 2024

I wrote my hypothesis -

If I add distilled water to seasalt, and tap water and let it sit overnight to check the results with a UV light, then the seasalt will have the most visible microplastics, because sea salt comes from the ocean, which is where most microplastics originate from.

After I analyze the results, I will train the AI model to detect smoother.

November 12 - November 18, 2024

Materials & Methods used

Samples: Bottled Water, sea salt, rice, tea bags and honey.

Tools: Microscope, UV light, Arduino nano.

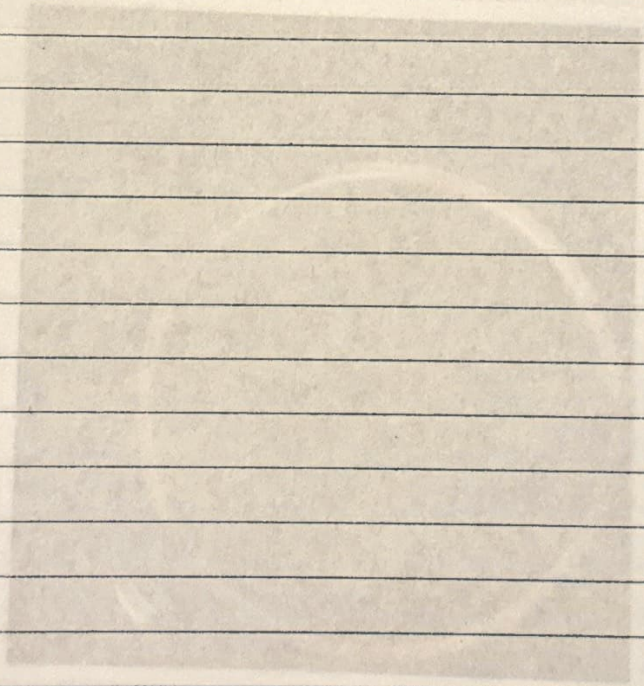
Process: Collect and filter samples.
Capture Microscopic images.

November 19 - November 25, 2024

I am going to search the open sources for more pictures of microplastics so that I can train the device more efficently.

I found 800 images of microplastics on Kaggle, an open source. These images were of the plastics inside a petri-dish.

Data Collection



November 26 - December 2, 2024

I started to code the prototype with Robo-Flow to annotate the dataset for microplastics.

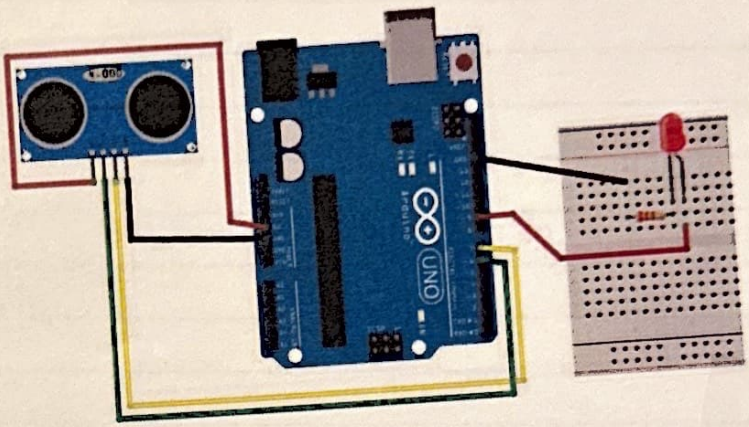
It took long, due to the 800 images that were included.

Data Collection

December 3 - December 16, 2024

Prototype

In this project, I have used Arduino Nano and an Ultrasonic Sensor to detect the microplastics in food samples.



December 17 - December 23, 2024

Prototype 1 wasn't funtioning due to false positives.

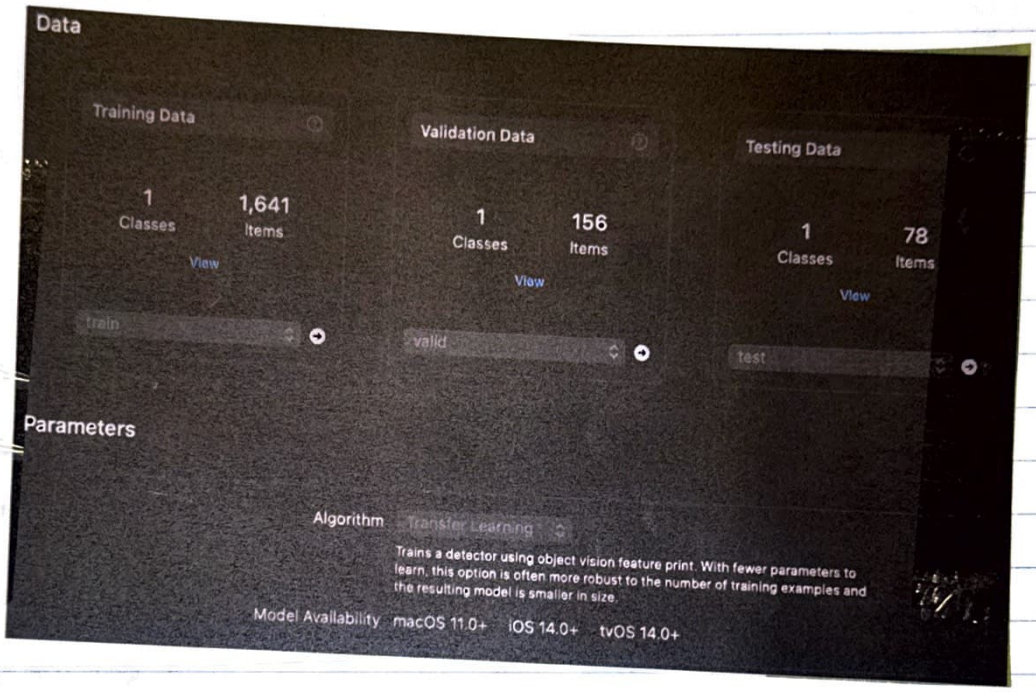
I started to make an app instead.

January 7 - January 13, 2025

Prototype-2

- I first got a dataset of microplastics in a Petri dish from an open source and annotated the areas with microplastics with Robo-Flow.
- I exported the annotations into a readable format for Create ML in Json.
- I trained the model with my dad's MacBook and did 38 000 epochs.

January 14 - January 20, 2025



January 21 - January 28, 2025

```
class ViewController: UIViewController, UINavigationControllerDelegate {
    @IBAction func camera(_ sender: Any) {
            return
        }

        let cameraPicker = UIImagePickerController()
        cameraPicker.delegate = self
        cameraPicker.sourceType = .camera
        cameraPicker.allowsEditing = false

        present(cameraPicker, animated: true)
    }

    @IBAction func openLibrary(_ sender: Any) {
        let picker = UIImagePickerController()
        picker.allowsEditing = false
        picker.delegate = self
        picker.sourceType = .photoLibrary
        present(picker, animated: true)
    }

}

extension ViewController: UIImagePickerControllerDelegate {
    func imagePickerControllerDidCancel(_ picker: UIImagePickerController) {
        dismiss(animated: true, completion: nil)
    }

    func imagePickerController(_ picker: UIImagePickerController,
        didFinishPickingMediaWithInfo info: [String : Any]) {

        picker.dismiss(animated: true)
        classifier.text = ""
        guard let image = info["UIImagePickerControllerOriginalImage"] as? UIImage else {
            return
        } //1

        imageView.contentMode = .scaleAspectFit
        imageView.image = image
```

January 29 - February 3, 2025

I finished my programing and made a conclusion statment:

In conclusion, the prototypes I created for detecting microplastics in food is a very useful tool. It helps us find tiny plastic particles in the open. This is important because we can redvce eating contaminated foods and stay healthy. This technology gaords your daily use of food.

February 4 - February 10, 2025

I added an extra few slides to my presentation for my slideshow.

- Future Improvements

AI POWERED SPECTROSCOPY

- hand held scanner changes the microplastic detection world. It uses near-infrared (NIR) to find plastics with their unique light reflection patterns.

- paired with a mobile app, AI instanly analyzes results in real time. Just scan and get instant results.

- an attachment to clip on; no internet needed. You can scan anywhere in the world.

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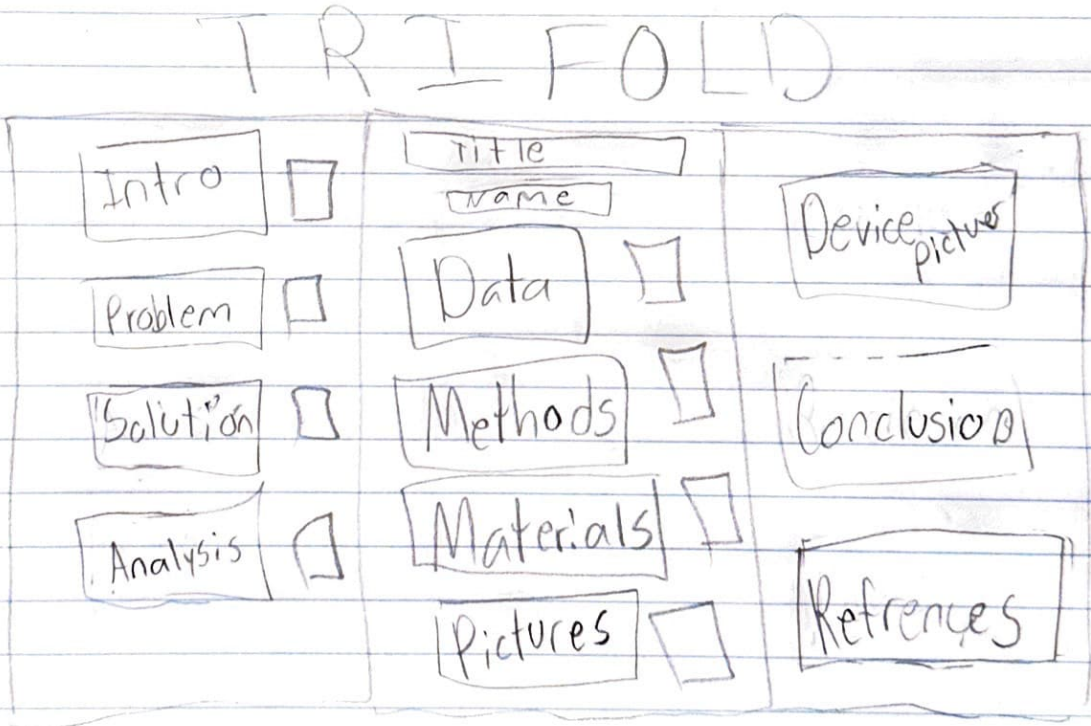
February 11 - February 20, 2025

I recieved my trifold and laid out my finished presentation on.

With the extra time I had, I got to design my trifold better.

Looked at the rubric and had a dry-run with my family on what the Science fair might look like.

Handed in my finished trifold.



Fun Facts

Microplastics are mainly made from:

Polyethylene (PE) is used in plastic bags, food wrap and some types of piping.

Polypropylene (PP) found in food containers and reuseable water bottles.

Polymethyl methacrylate (PMMA) made for eyeglasses, decorative plastic parts and display screens.

February 21 - 28, 2025

I participated in the school science fair, and won the top award for grade 7. Next, I will move on to the CYSF.

I noticed that the CYSF platform had some requirements.

March 1 - 21, 2025

I worked on the CYSF platform. I made edits to my trifold, and overall presentation.

I finished all requirements needed for the CYSF and handed in my problem, analysis, declaration and presentation.