

AI on Low-Cost Camera For Counting and Classification of Microbes In Nature Water

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Problem

There are many different types of algae in the ocean, and collecting samples for specific ones can be challenging due to the tedious process of manual identification. By utilizing artificial intelligence and machine learning, an alternative approach can be adopted to classify the algae, making the process simpler and more reliable.

CURRENT SYSTEM

The goal of this project is to develop an AI model for the real-time detection and classification of microbes in natural water using a low-cost camera. This was accomplished by employing a neural network developed on Edge Impulse, along with a chipset and an ESP32-CAM development board.

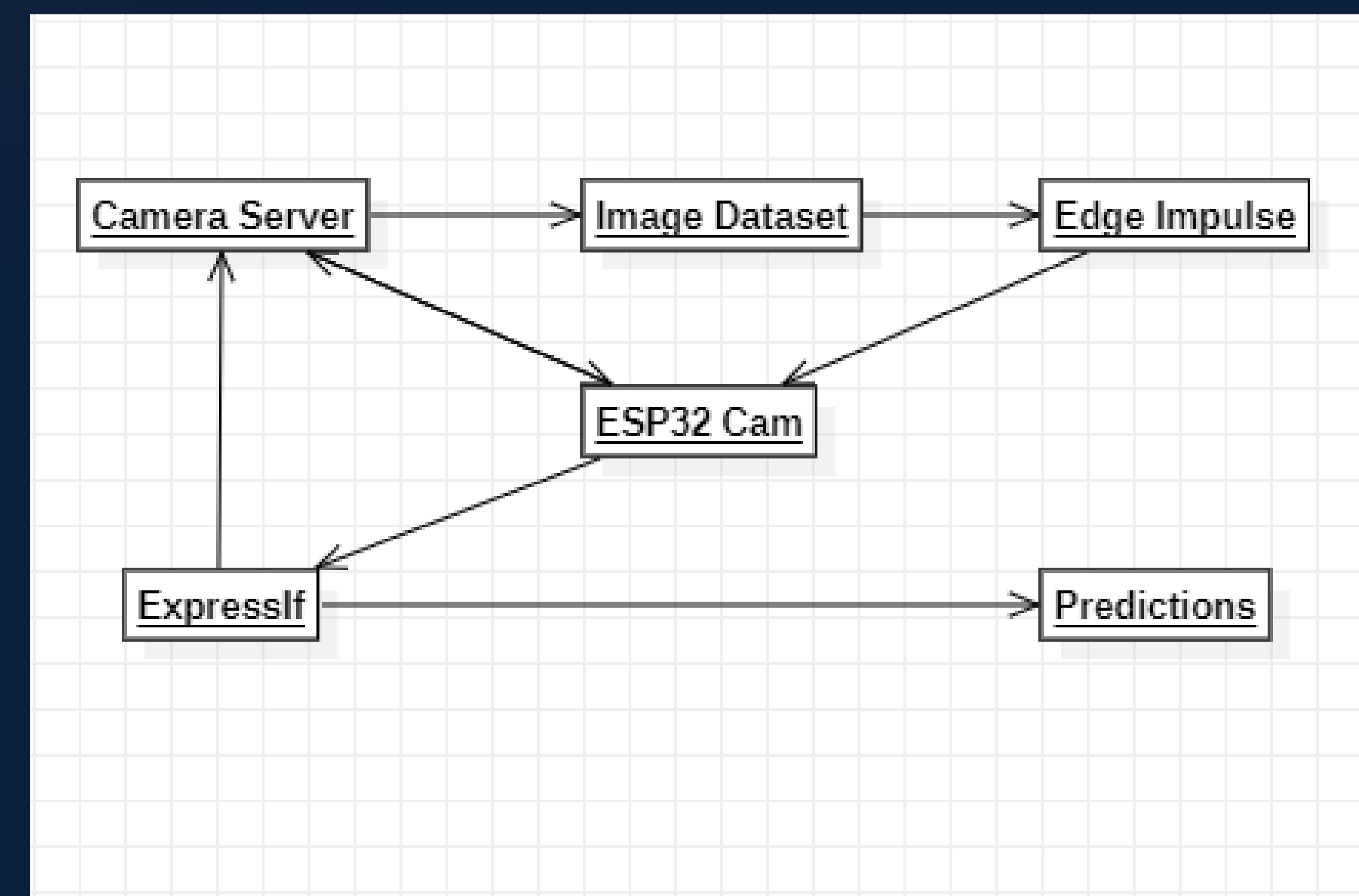
REQUIREMENTS

- Arduino IDE environment
- ESP32-CAM Development board
- Edge Impulse
- ExpressIf library
- Microscope

SYSTEM DESIGN

The system uses an ESP32-Cam attached to a microscope to read live images and videos of different water samples. The pictures and videos are collected using a camera web server and are stored in a dataset that is used for training the inference model. This model is created and trained using the Edge Impulse platform with the correct settings and images. Once the model is deployed and loaded onto the chipset it will output a prediction on the type of algae detected from the live feed.

OBJECT DESIGN



IMPLEMENTATION

- ESP-32CAM and ESP-32 Development Board
- A windows laptop computer 64-bit operating system, 256 GB Storage, 12G Memory, Processor – Intel® Core™ i5-10210U CPU @ 1.60GHz 2.11 GHz
- Arduino IDE
- Nikon Light Microscope

VERIFICATION

Output

SUMMARY

The project was designed to simplify and speed up identifying algae, assisting researchers in the field studying these microbes. The model utilizes a neural network on Edge Impulse for classifying the algae. All of this is accomplished using the ESP32-CAM and the chipset.

REFERENCES

<https://edgeimpulse.com/>
<https://github.com/CIS495algaeAI>