# Songbird Identification

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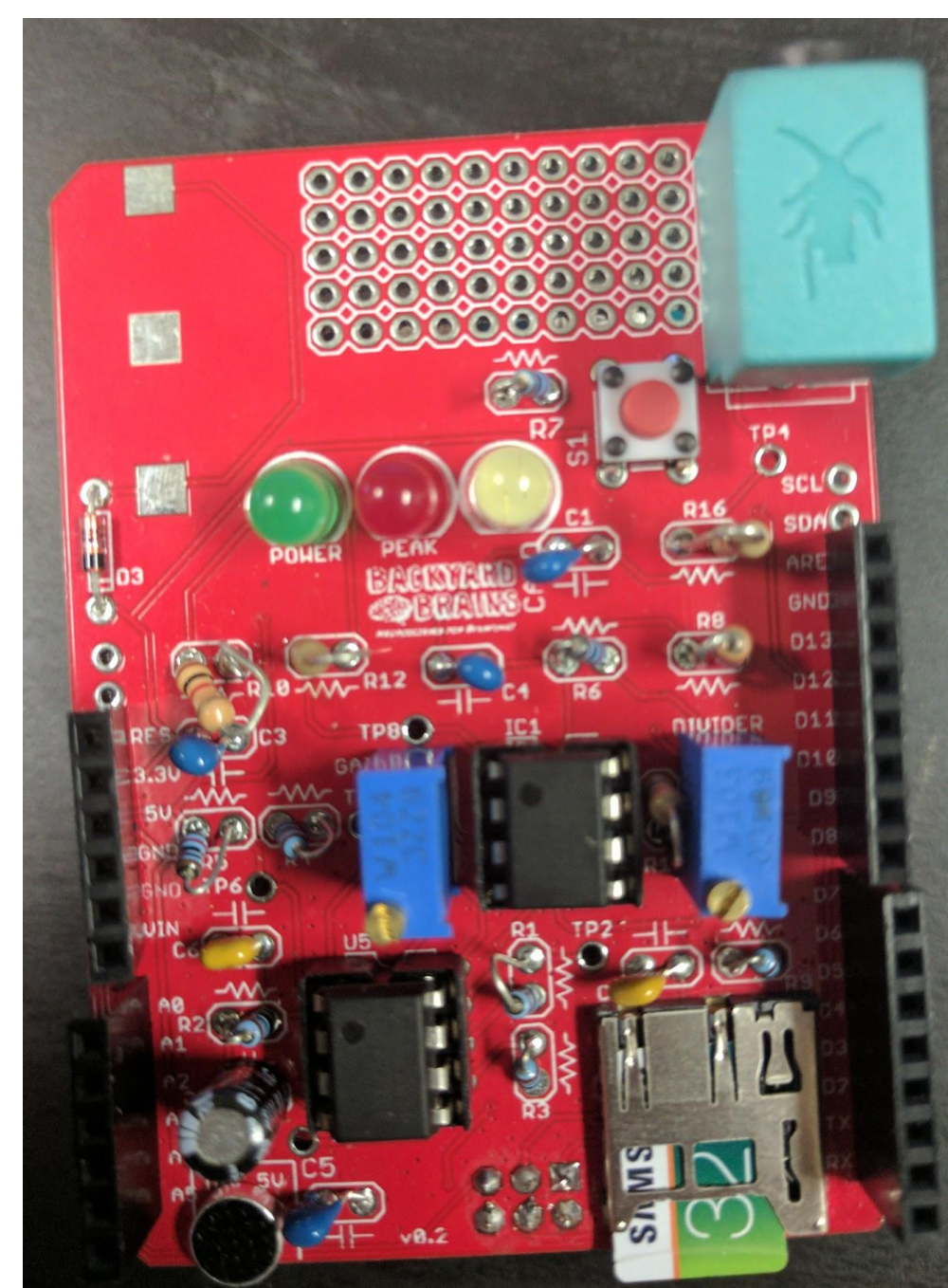
Background

The goal of this project is to create a device that can be deployed in the wilderness for at least a week at a time on its own that would record the songs of birds as they pass by, automatically identify the species based on its song using machine learning and then upload the results to a remote database, so it can later be accessed by researchers.
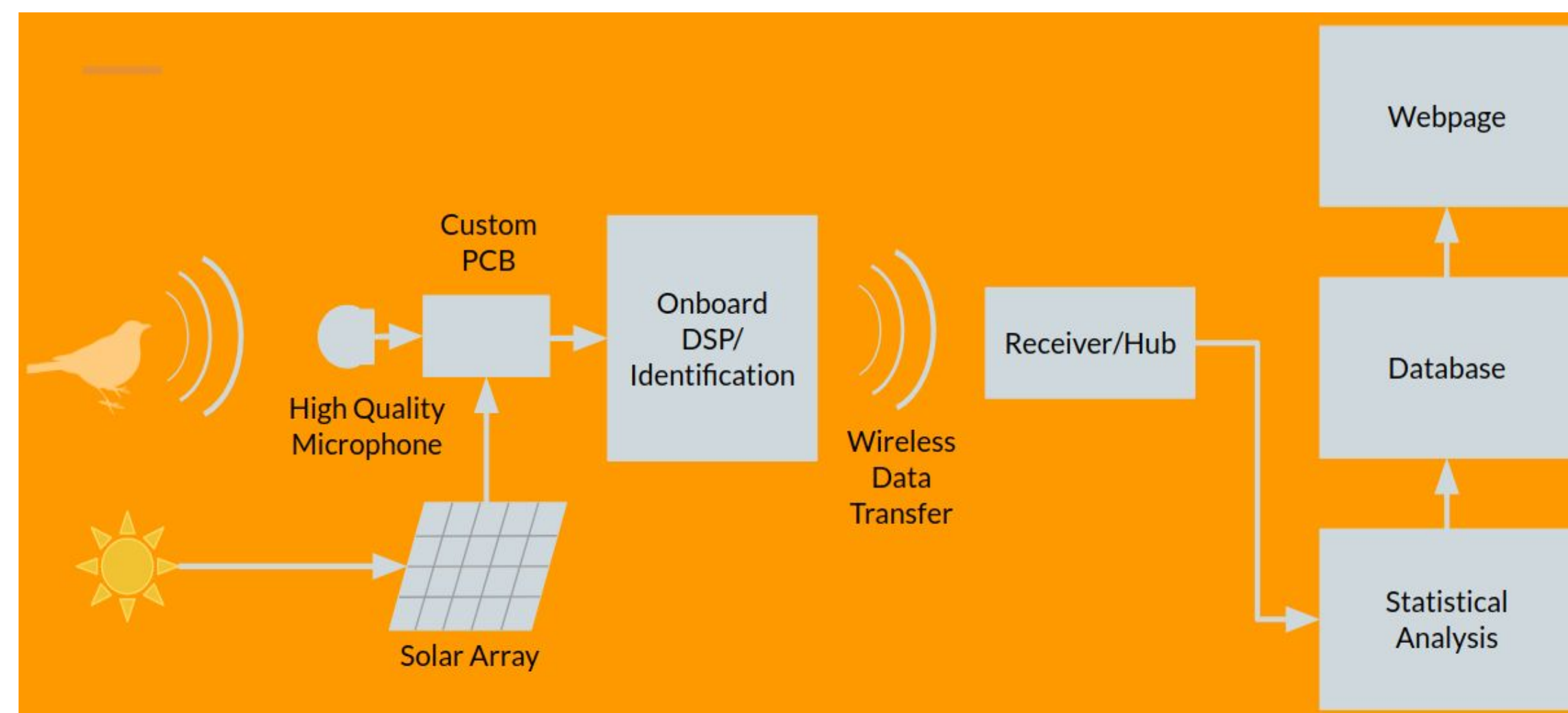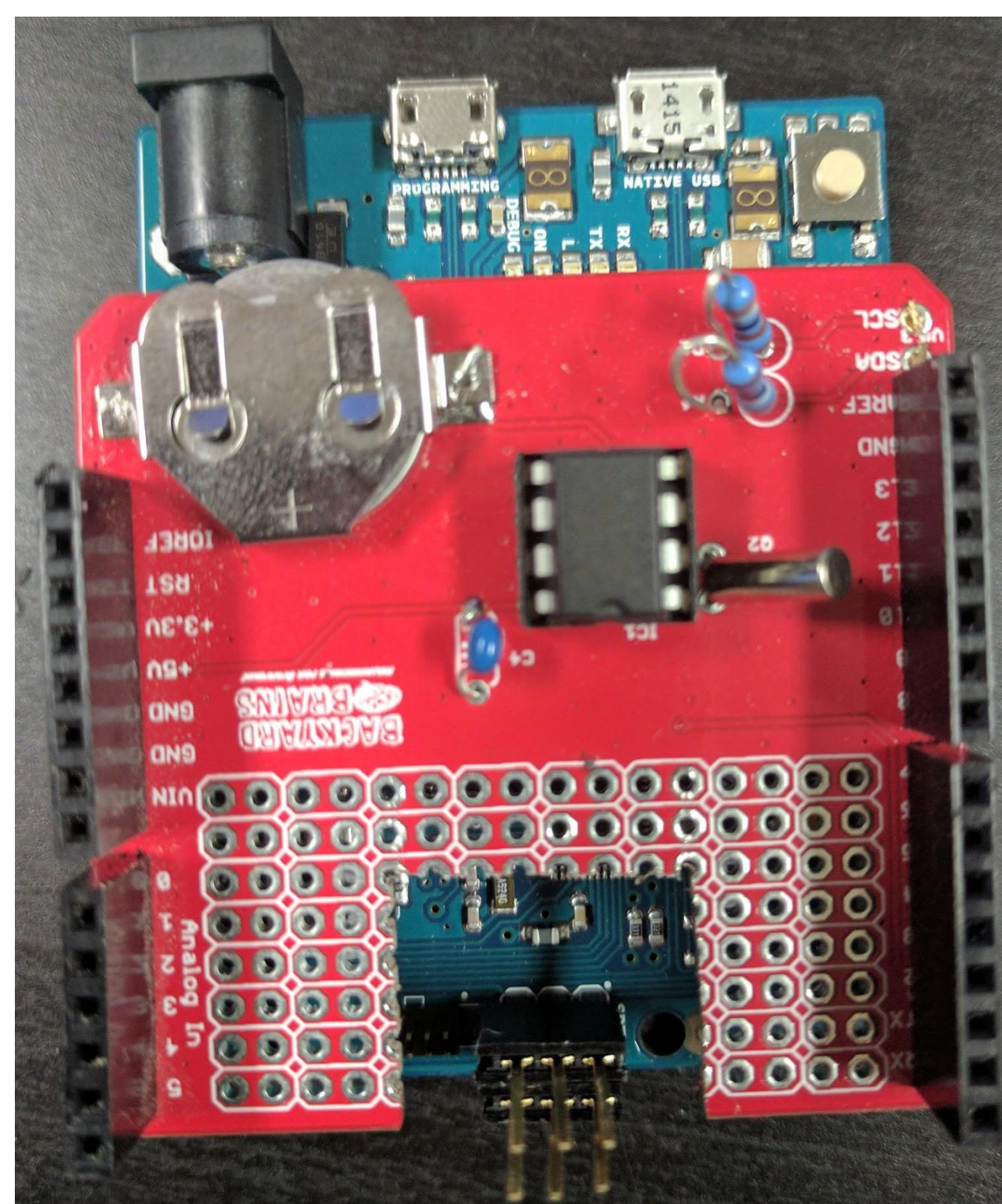

Credit: Abhinav Reddy

Hardware

The current prototype uses an Arduino M0 Pro along with a custom PCB to automatically record audio when it is detected above a certain threshold which can be adjusted at will. The audio is then recorded to an SD card as wav files.
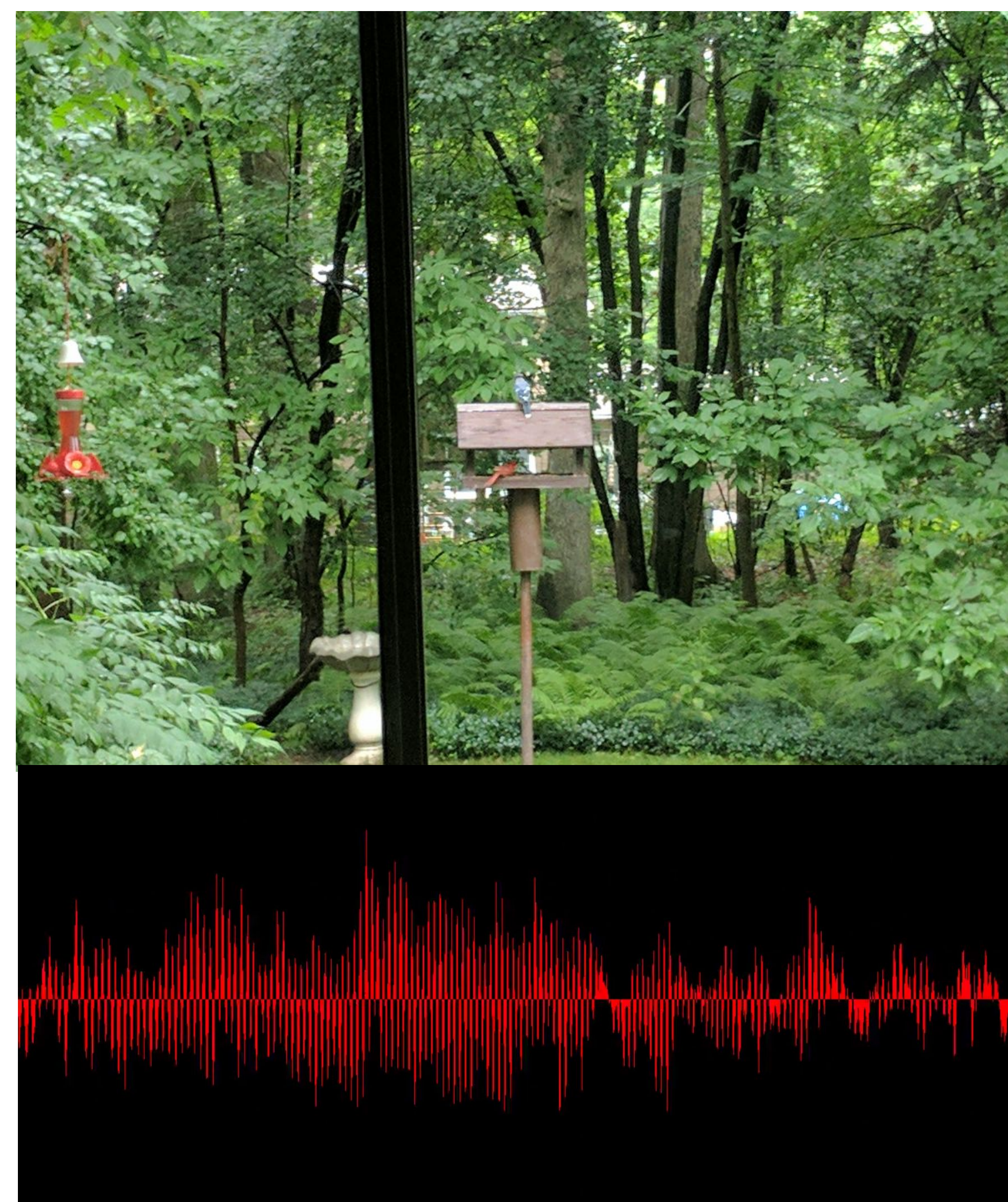

Mic   SD Card Reader

Real-Time Clock
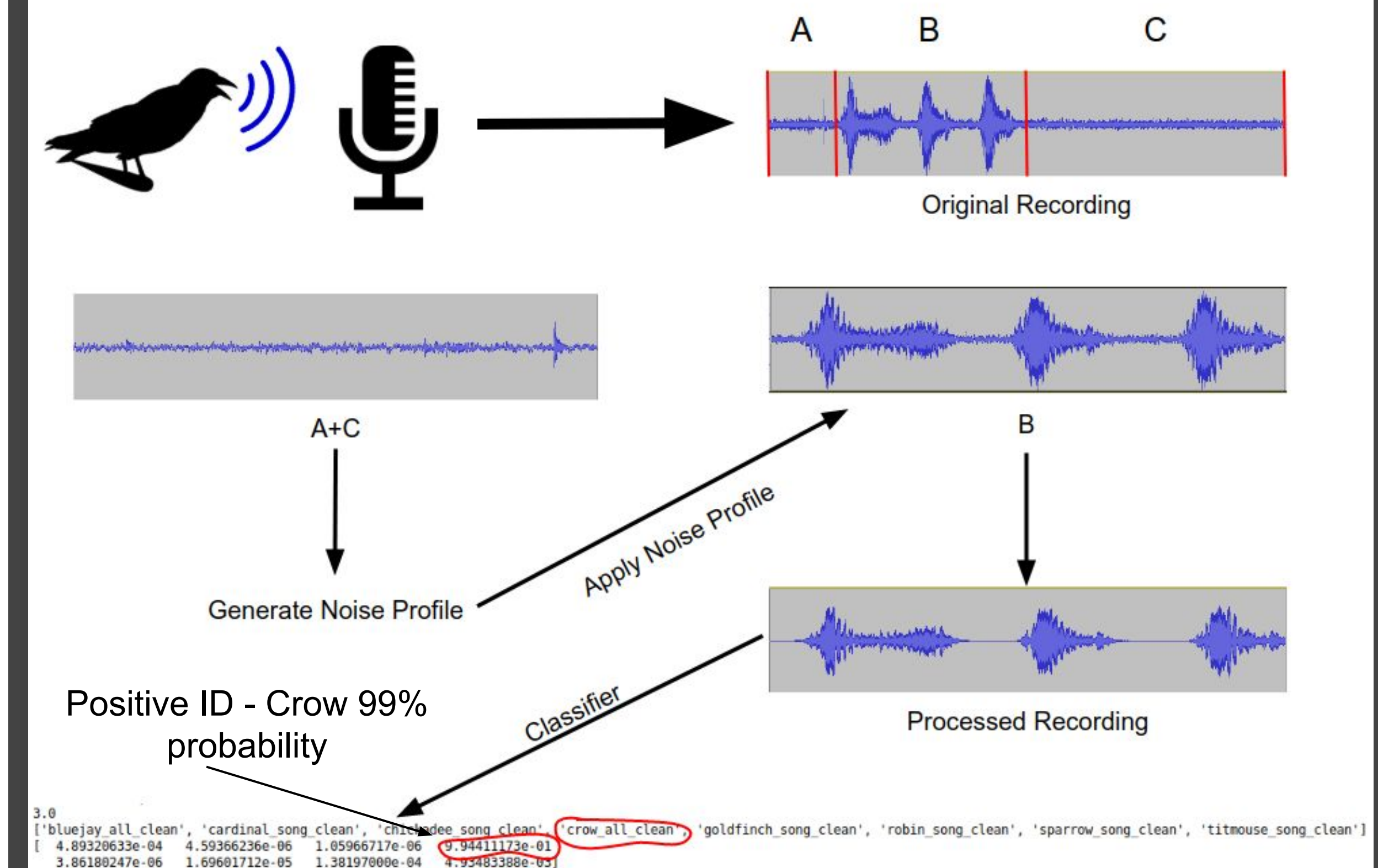
Recording Procedure

The current recording setup simply involves powering on the device and adjusting the noise level using a screwdriver until it is just above the background noise. The device will then automatically record each instance of activity as an individual time-stamped file to be processed later on.

The waveform of a recording from the prototype device

Processing and Classifier

Our classifier primarily takes advantage of an open-source library called PyAudioAnalysis which uses supervised learning algorithms to perform classification of audio samples. Through the use of noise reduction techniques, our current classifier can distinguish between 14 birds common to Washtenaw county with an accuracy and F1 of about 70%.

Positive ID - Crow 99% probability

Original Recording

A+C

Generate Noise Profile

Apply Noise Profile

B

Classifier

Processed Recording

Pictured: analog to digital audio sampling in blue and sd-card write cycles in yellow

Acknowlegments