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Tiny technology for the world's biggest challenges

ACOUSTIC MONITORING OF ECOSYSTEMS

Using bird sounds to monitor changes in the ecosystem

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PROBLEM STATEMENT

- There is increased degradation of ecosystem due to human expansion and climate change.
- Periodic physical surveys of the ecosystem is disadvantageous.
- There is need of an inexpensive and non-invasive tool for ecosystem monitoring.





IMPACT

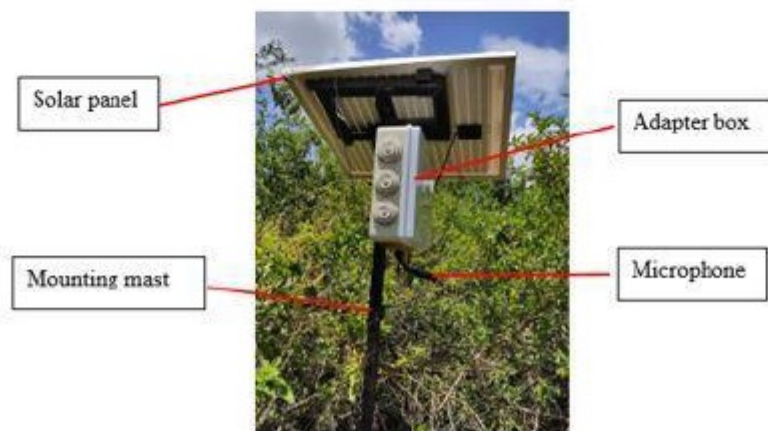
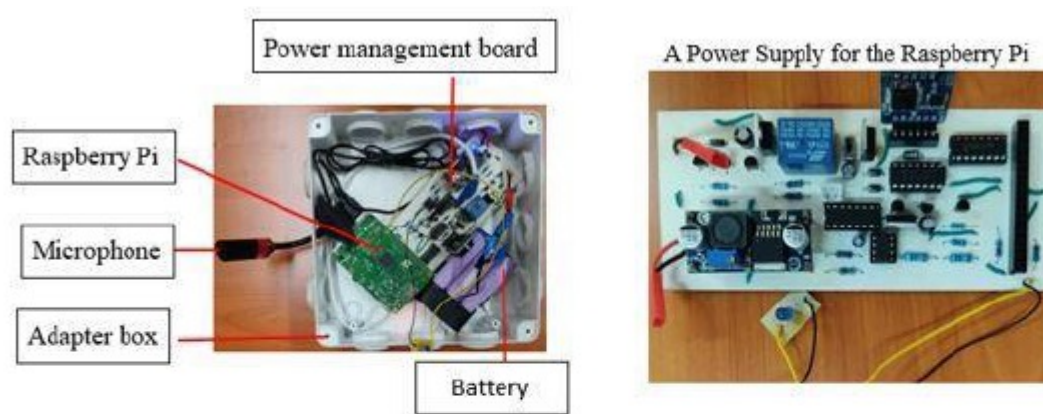
- The environment contains a lot of acoustic data that tells a lot about what is happening around.
- By deploying acoustic sensors, it is possible to monitor animals in their habitats remotely.
- We propose to use birds as our species of interest



BIRD AUDIO DETECTION (BAD) ON RASPBERRY PI PICO

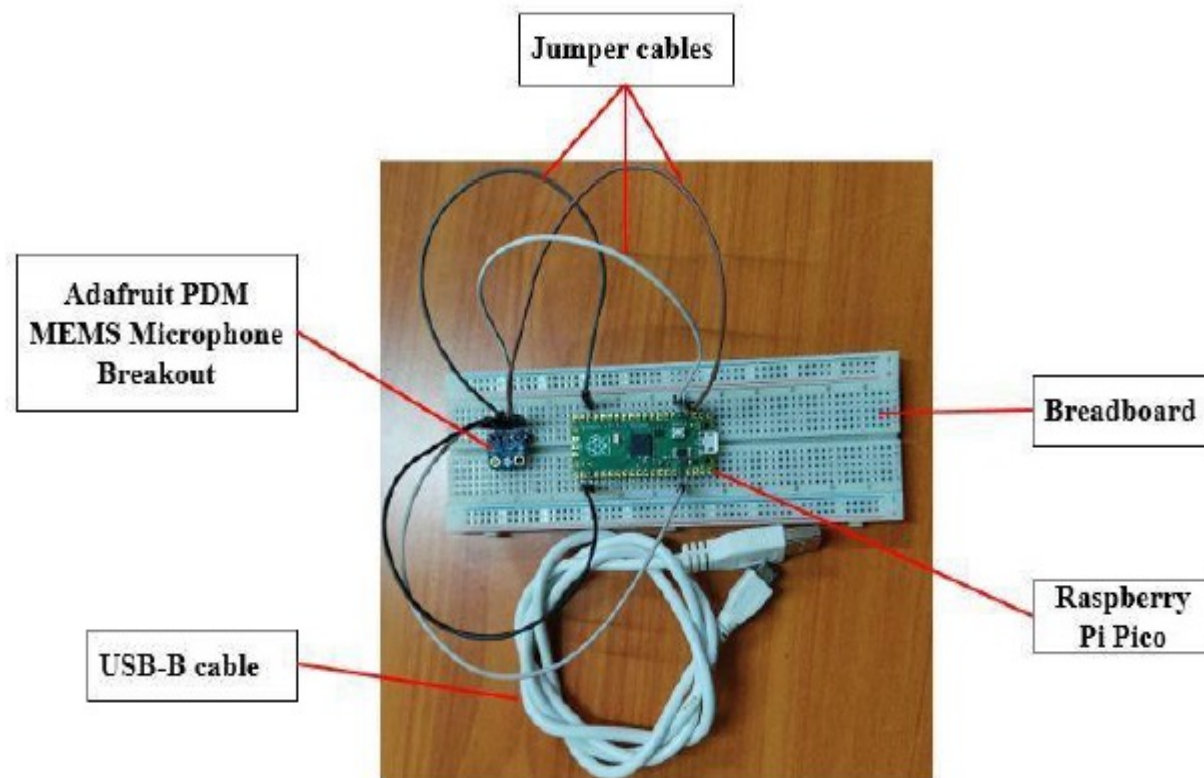
- In our system we would need a sensor to collect the bird sounds and a ML base to do the classification.
- At DSAIL, we have developed the “DSAIL Acoustic Sensor” which is based on the raspberry pi. It is powered by a solar panel and a battery.
- We have deployed the sensor in the DeKUT Conservancy.
- The AudioMoth is an existing technology that can be used for the same purpose.

BIRD AUDIO DETECTION (BAD) ON RASPBERRY PI PICO



BIRD AUDIO DETECTION (BAD) ON RASPBERRY PI PICO

- BAD involves distinguishing birds sounds from non-bird sounds.
- This plays a critical role during data collection and also in acoustic classification of birds by sensors deployed in the field.
- We will demonstrate how BAD can be achieved using Raspberry Pi Pico and an Adafruit PDM MEMS microphone





CALL TO ACTION

- We have collected several hundreds hours of recording from the system deployment. The next step is cleaning and labeling the data.
- Currently our acoustic sensor operates for a given number of hours in a day due to power constraint.
- High quality microphones are also needed to collect high quality sound. The Global TinyML community can help by providing us with hardware and high quality microphones to develop more acoustic sensors for deployment in our vast ecosystem.

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THANK YOU ALL FOR LISTENING!

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