DSAIL Camera Trap

Realization and Deployment

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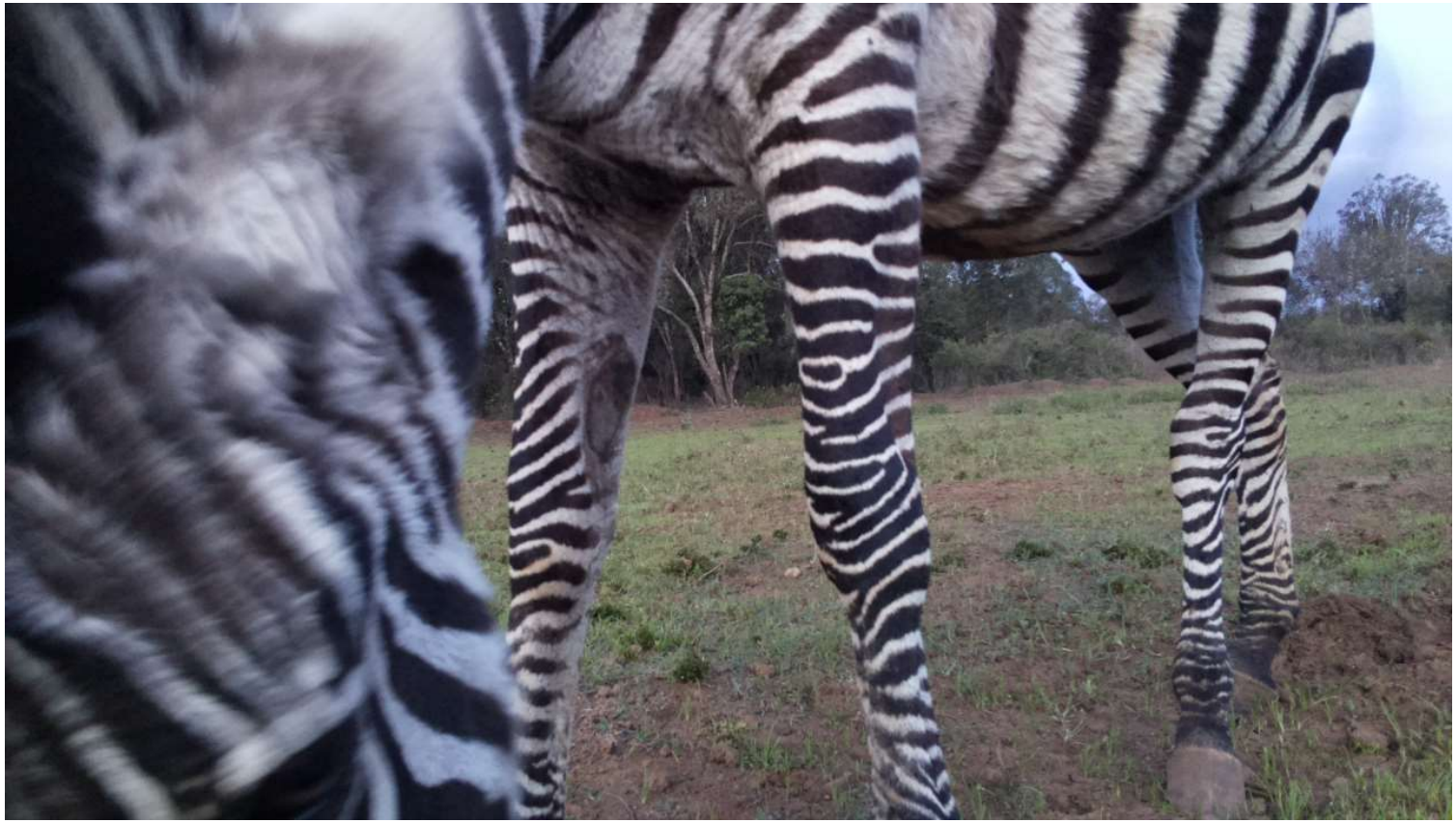
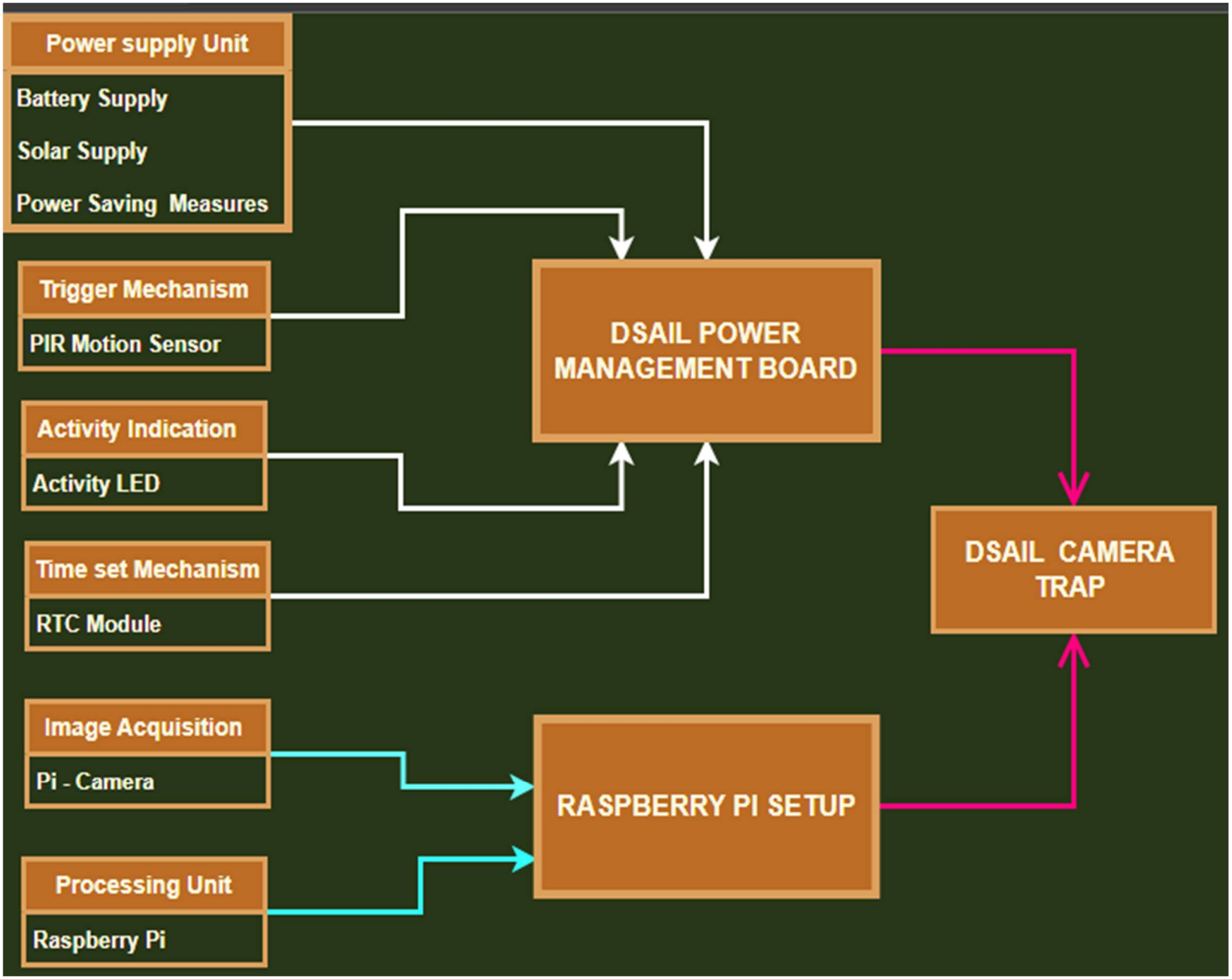
DSAIL
SOLVING REAL WOLRD PROBLEMS

Realization

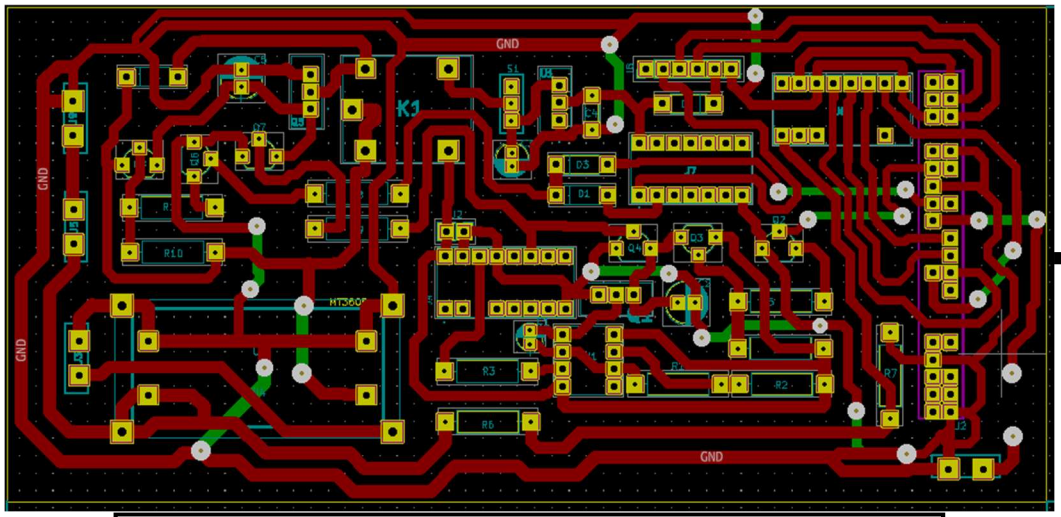
Task : Wildlife image data acquisition



Hardware Components Needed

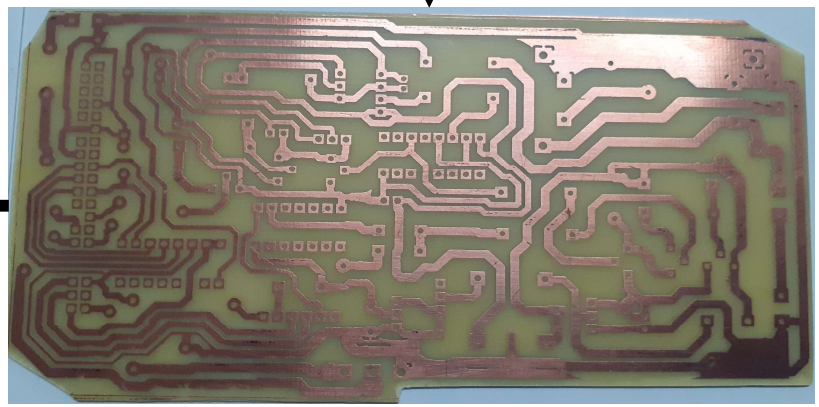


DSAIL Power Management Board – development steps

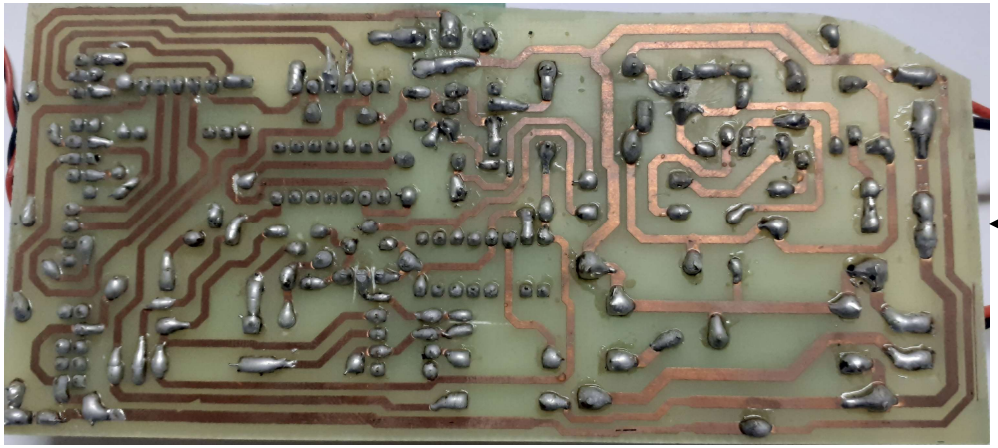


CAD Design

Etching Process



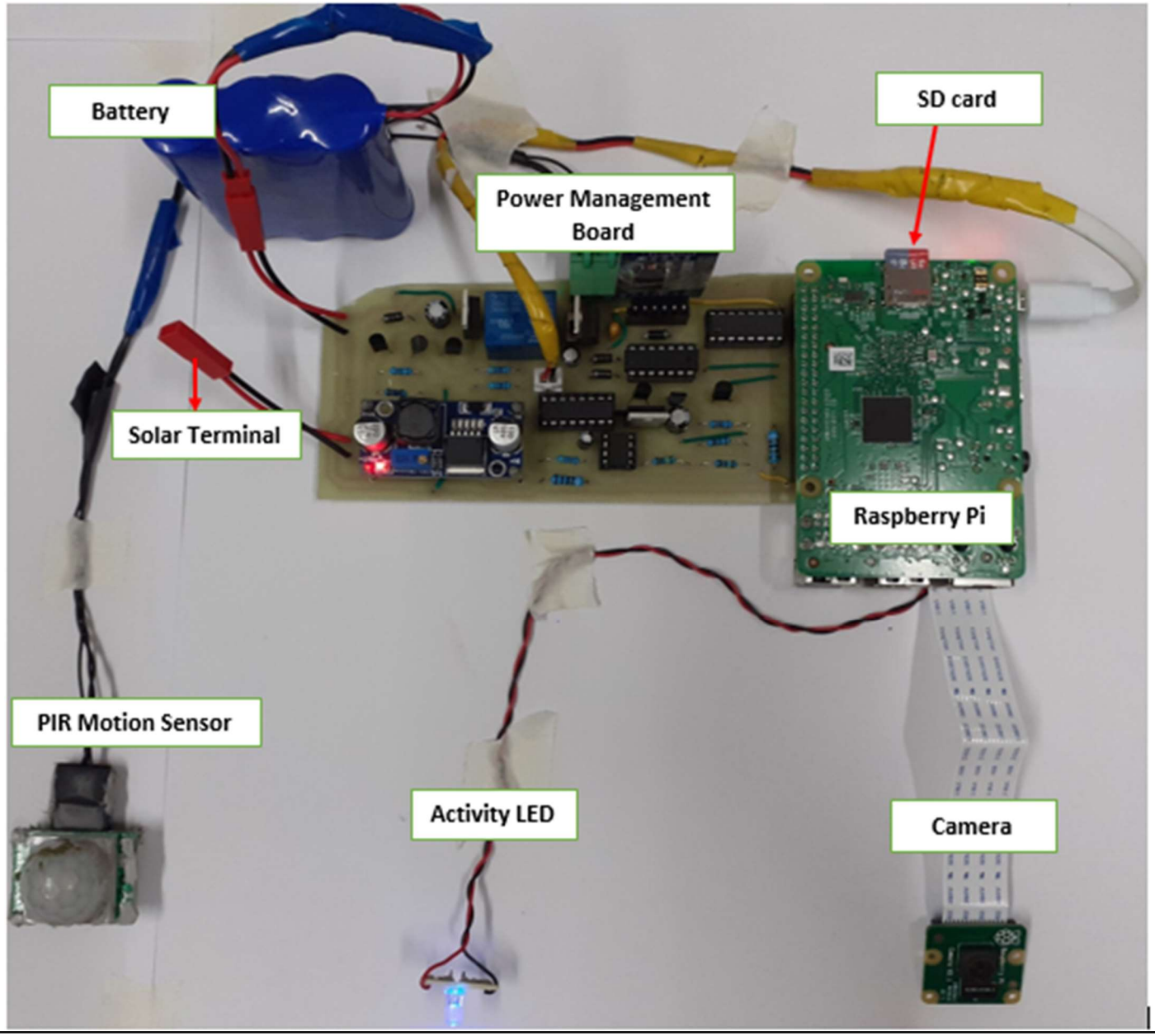
Etched power board



Final Product

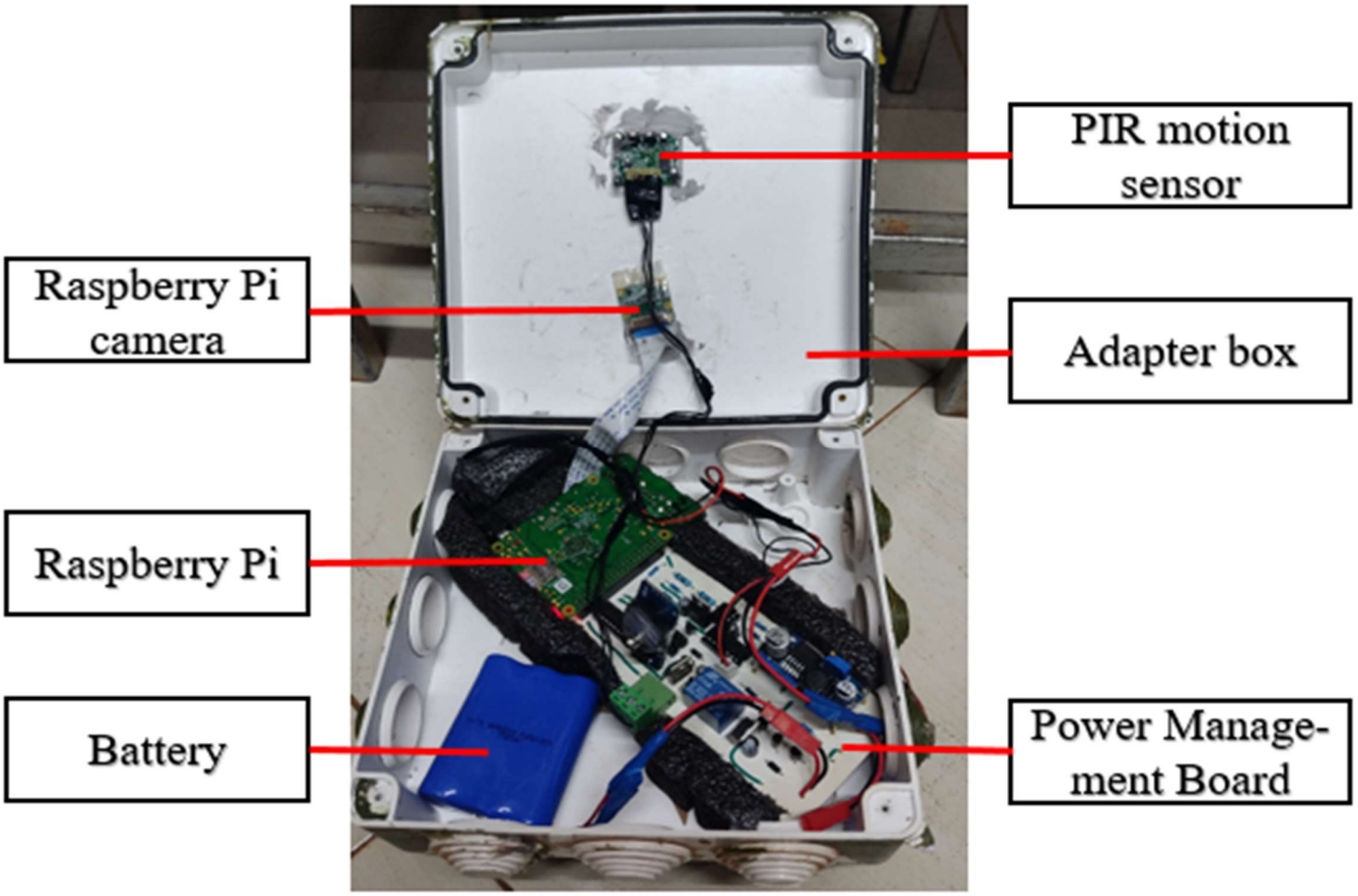
Cont'd – Full Setup

- Full camera trap setup consisting of the sections mentioned



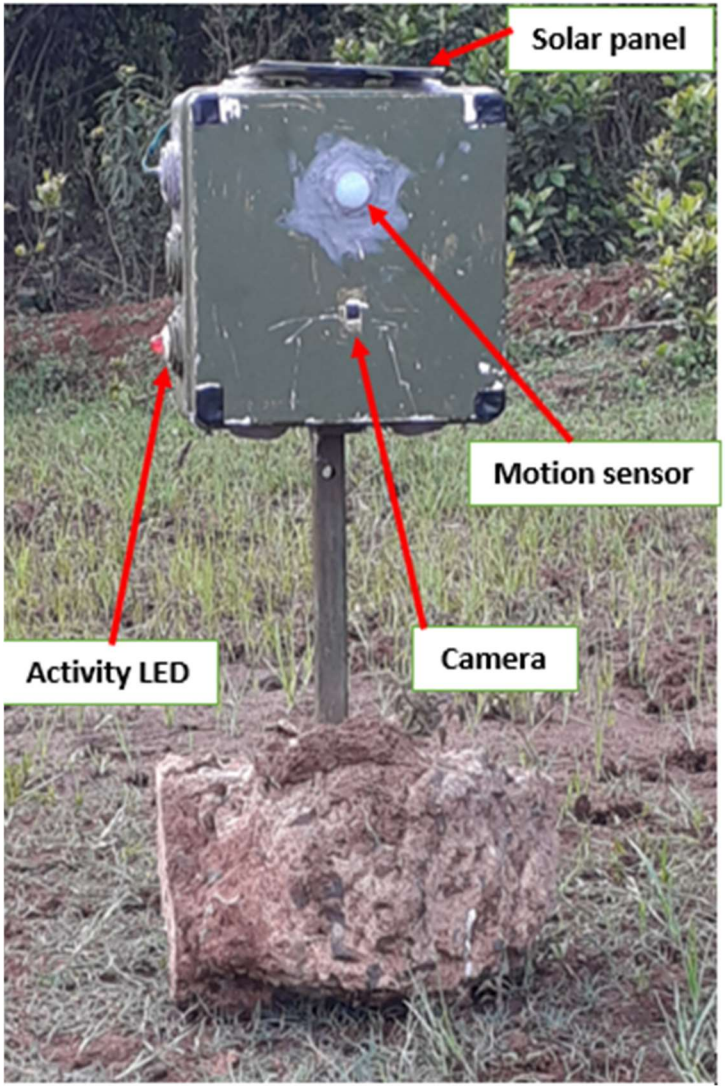
Deployment-ready Setup.

The setup shown on the previous slide was fitted into a plastic enclosure to make it ready for deployment.



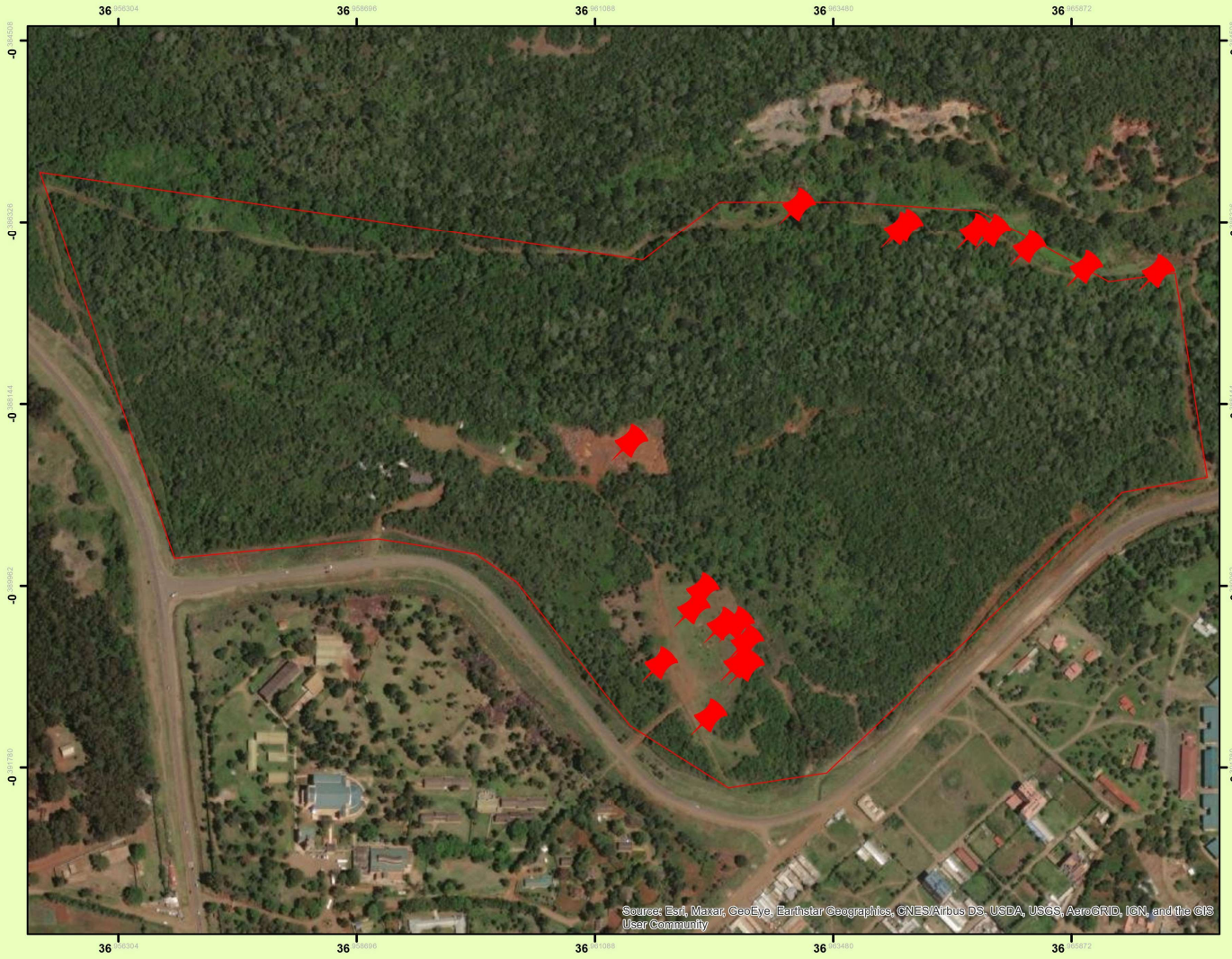
Deployment

- Setups in the field. Three deployed camera traps.

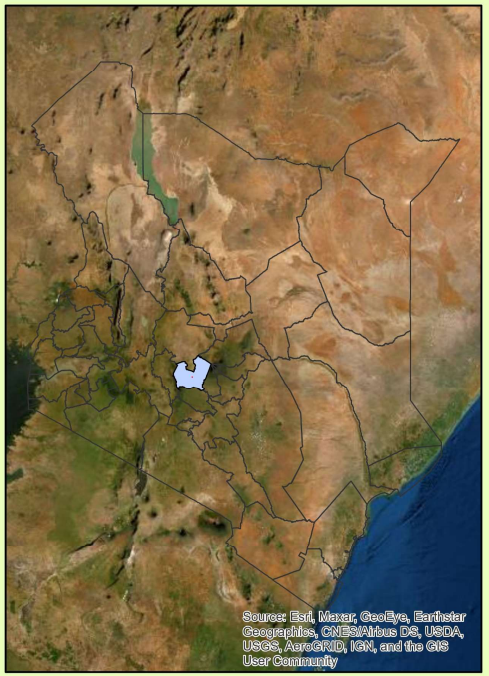


Deployment Location

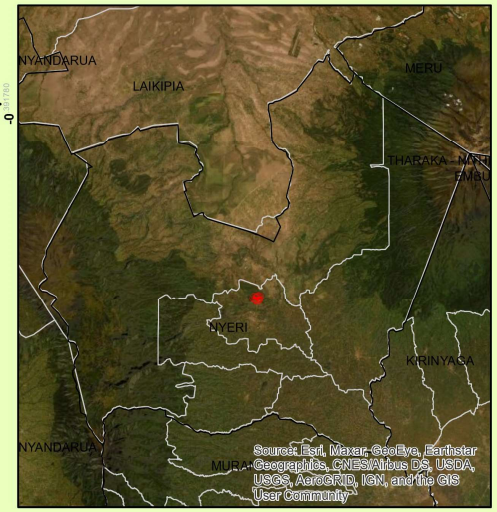
DEDAN KIMATHI UNIVERSITY CONSERVANCY



KENYAN CONTEXT



NYERI COUNTY



LEGEND

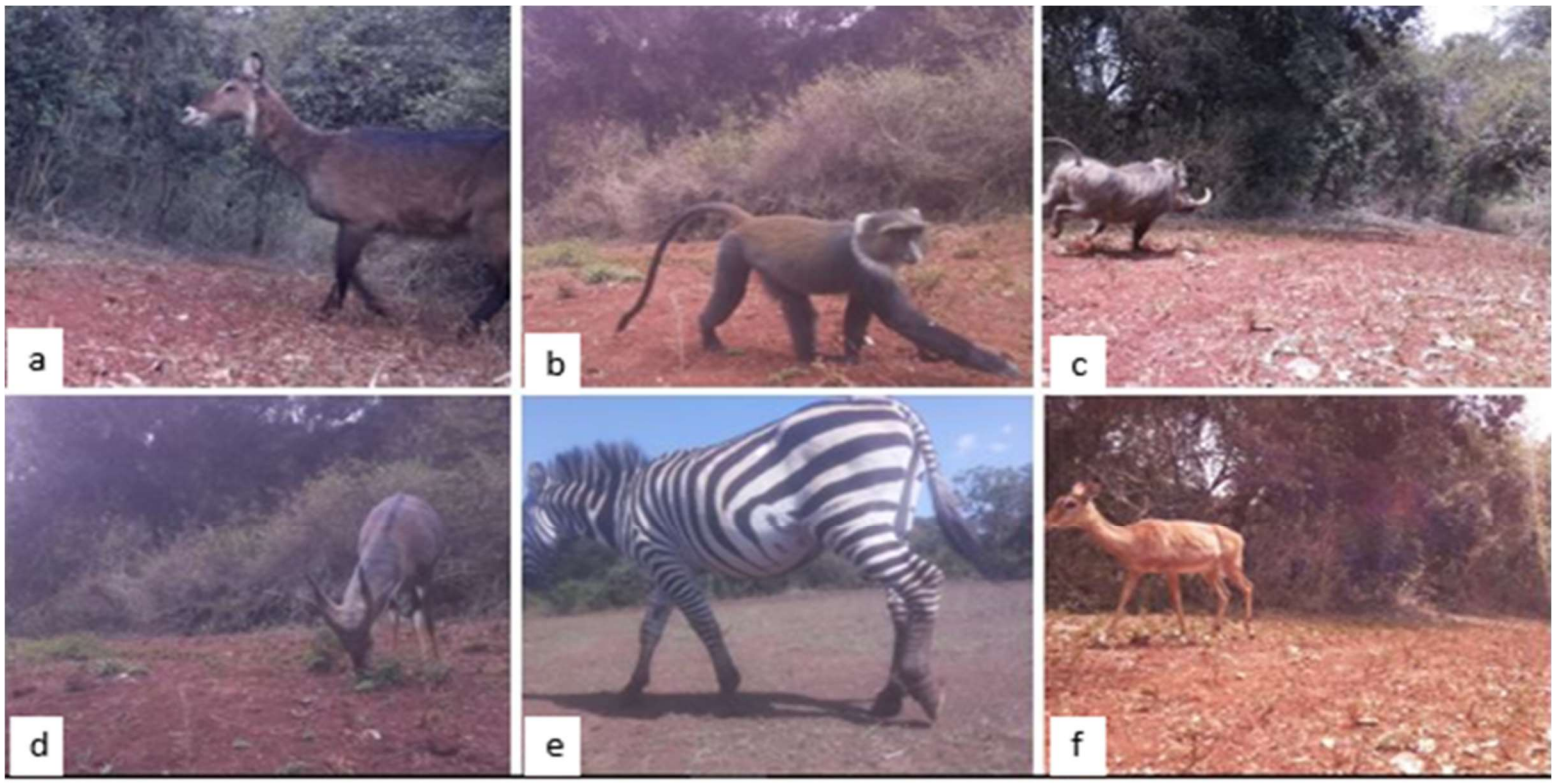
- counties
- Deployment Locations
- Conservancy Boundary

0 5 10 20 30 40 Kilometers

N W E S

DSAIL Porini dataset

- From the 4 camera traps deployed we have about 8524 annotated images of animals. The dataset has 6 categories; impalas, warthogs, zebras, monkeys, waterbucks, bushbucks, tortoise.
- Deployed from JUNE 2021 to December 2021 and we are back in the field.
- Annotation was done manually with help from the ranger at the conservancy.



Other shots.. Bush buck

Other shots.. Tortoise

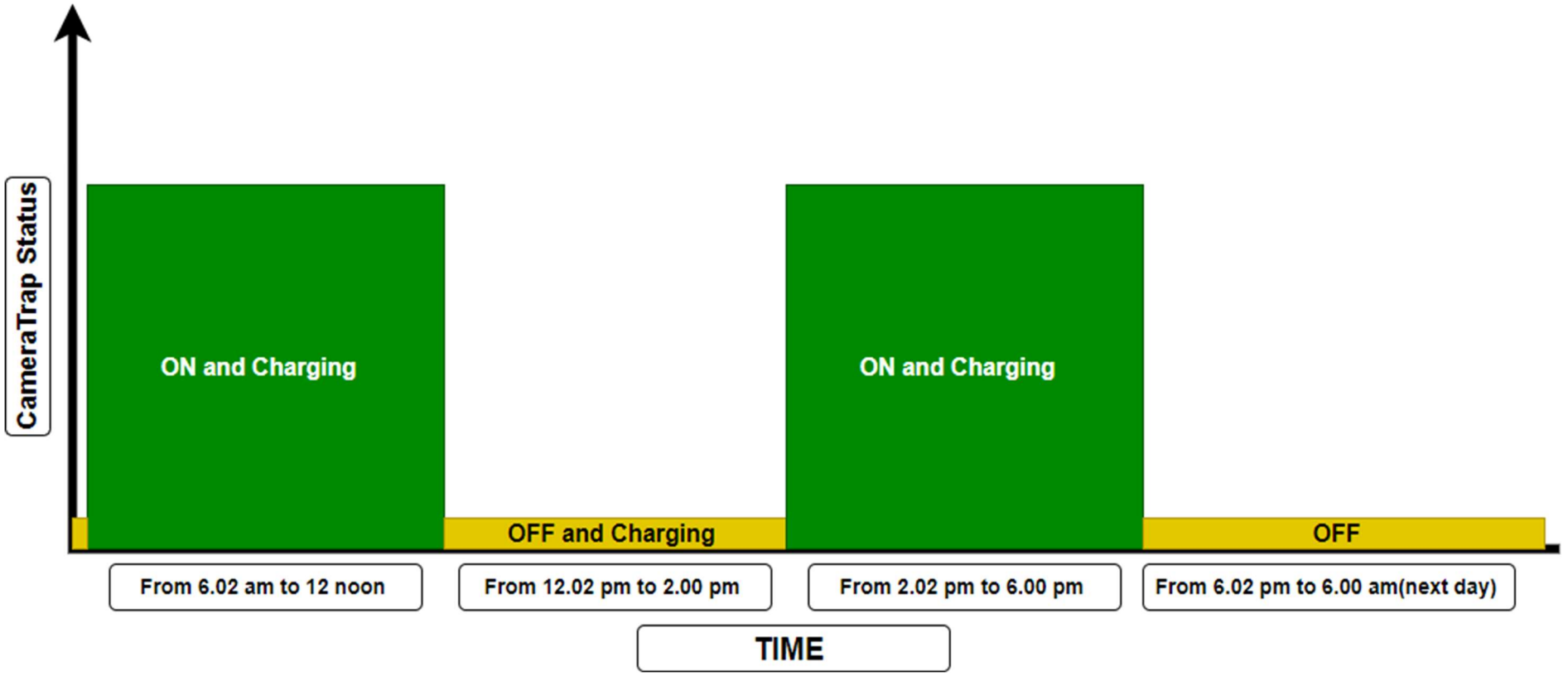
Other shots… Warthog

Other shots… Impala

Camera Trap Operation Window

- We noted that most of the image containing animals were being captured in the morning hours and in the evening hours, hence we decided to come up with the operation routine shown below.

Operation window



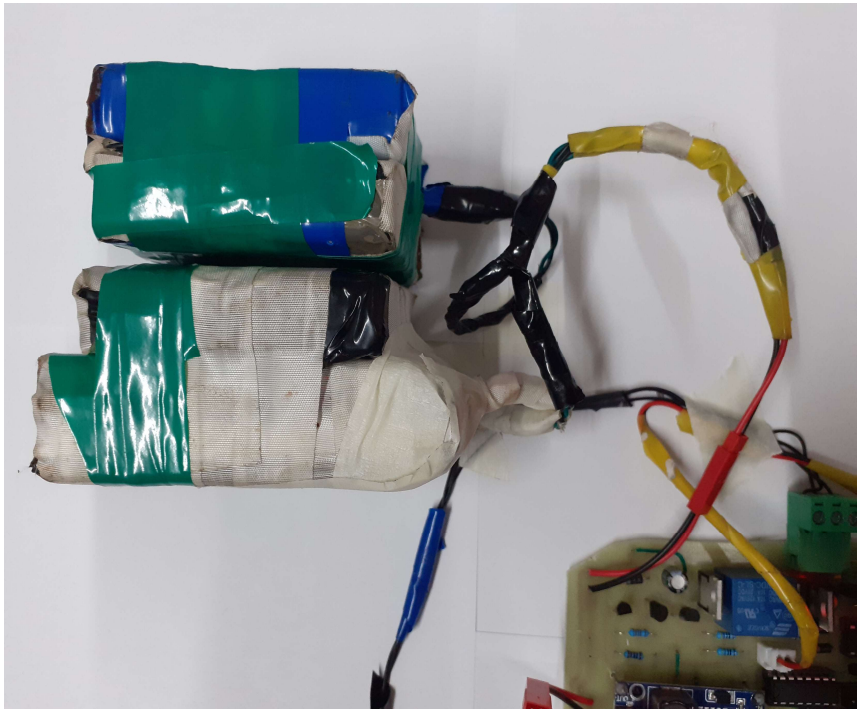
Deployment-Location Choice Influences

1. Water points in the conservancy and the paths leading to the water points
2. Grazing fields to capture some grazers
3. Supplement supply points
4. Paths leading to sleeping points

Deployment Challenges.

1. Lens Flare
2. Very few cases of vandalism by animals
3. False triggers – less than 30 percent of images achieved have animals in them.

Power Analysis



Power Supply Specifics

- 60,000mAh lithium ion battery (big battery)
- 12V, 450mA solar panel (little output solar panel)

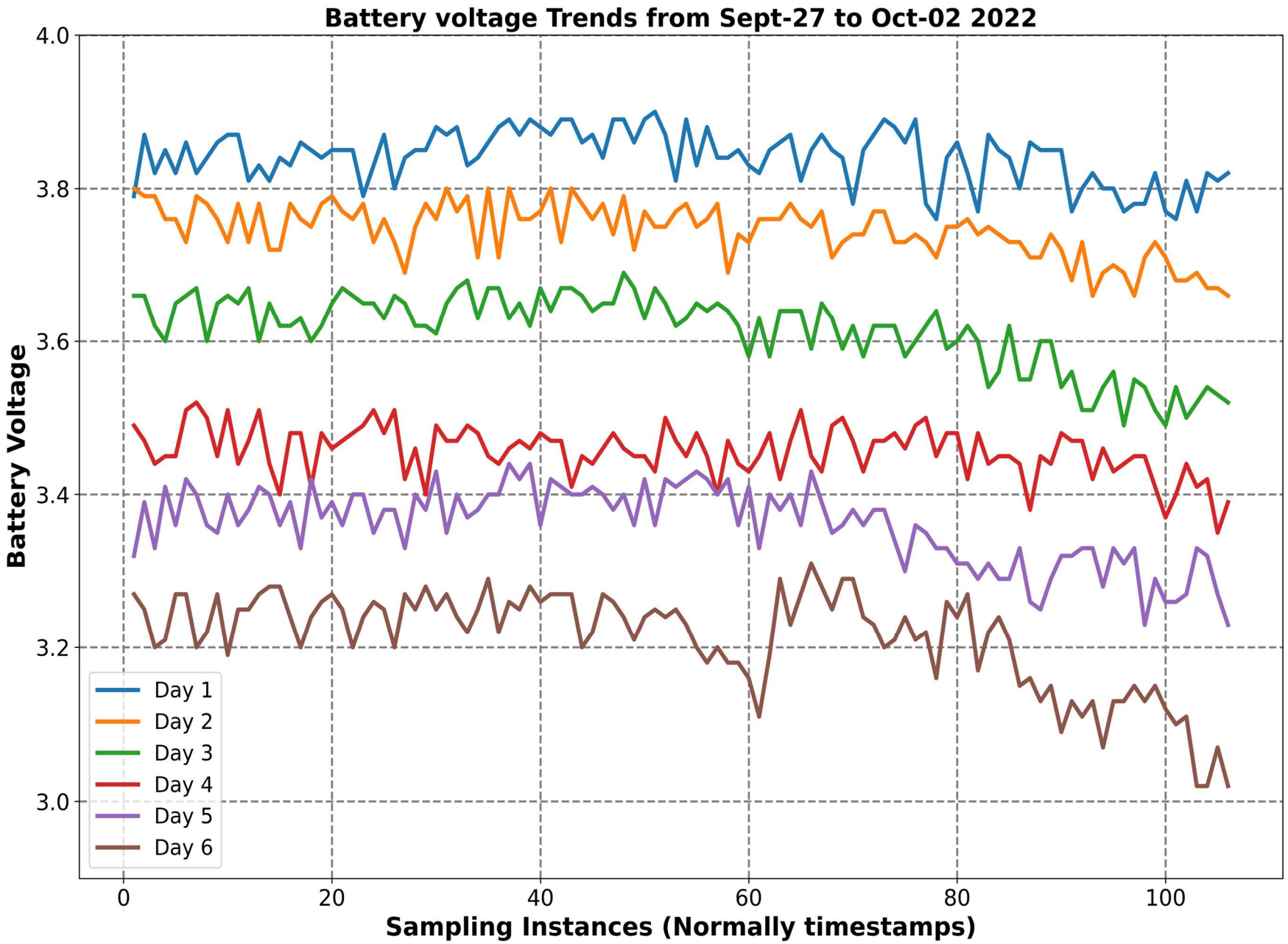
Operation window: 7 days max

Challenge: Mismatch between the battery and the solar panel.

Monitoring Of Power Analysis Data- Battery Voltage

- Apart from collecting image data, we also collect the battery voltage data during a deployment window.
- This data helps us in knowing:
    1. How many days the camera trap was operational
    2. Power consumption
    3. Evidence of charging
    4. Is the on and off routine being followed.
- On slide 16 is a plot showing the battery voltage trend over one of the deployment window.
- Battery voltage sampling interval – 5 minutes.

Battery Voltage Trends



Design Improvements

Listed are some of the design improvements that will help us to prolong the operating time/deployment window.

- Large battery pack
- Matching the large battery pack with a high output and more efficient solar panel. But the size of the solar panel has to be considered.
- Alternative hardware: we have developed and deployed an Open-MV based camera trap.
- Reducing the number of false triggers that consume a lot of power: we are looking into other trigger mechanisms.
- Lower power requirement Raspberry pi for the current design: we are currently working with the raspberry pi zero.

END

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Up Next

Machine Learning analysis involving the DSAIL Porini Dataset

By

Yuri and Lorna