# Forest Frames

## Design Review II

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# Problem Statement

Rural and more isolated parts of the world are more likely to experience degradation of its biodiversity due to a lack of conservation efforts.

- Less reported on areas due to a lack of funding or resources
  - Malaysia, Kenya, Colombia

- Citizens are not incentivized or lack resources to be collecting data themselves

Dr. Camille Gaillard

Dr. Chris Doughty

# Solution Overview

Our solution is a mobile app that is easily available to citizens in these areas.

- Our app will allow users to upload gathered data to our server, where it will be verified through existing methods and stored in our database

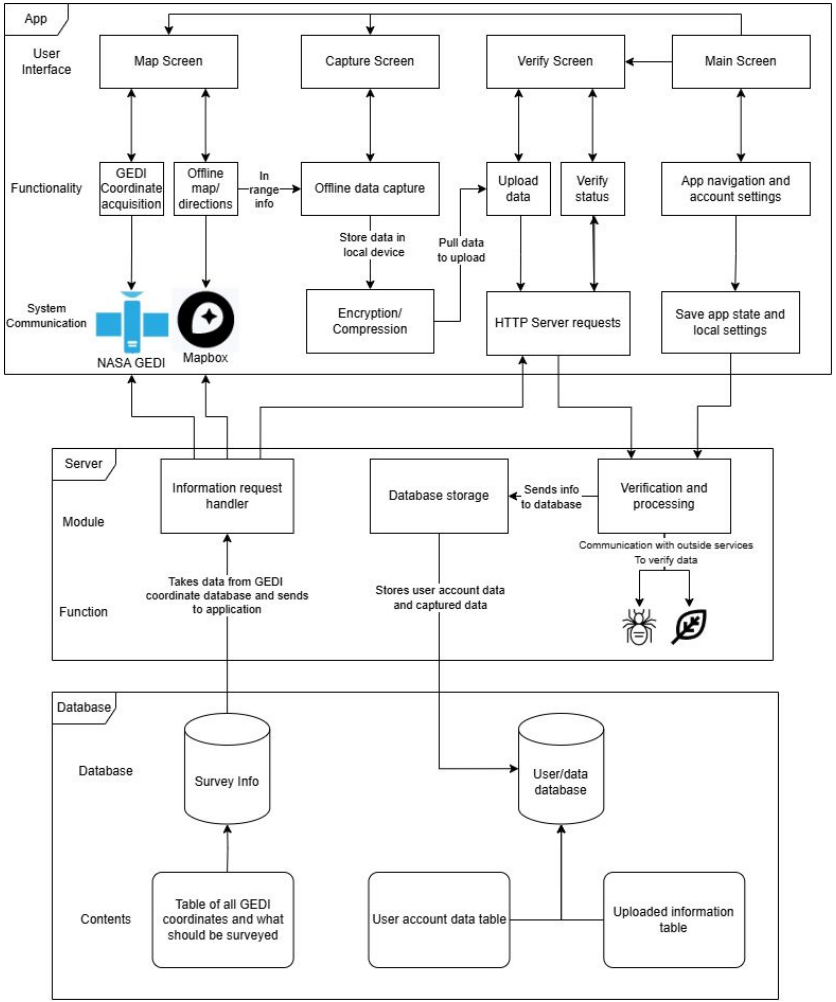
- The app collects coordinates from the NASA GEDI Satellite to show acceptable areas for users to collect data. Users are guided to data collection sites using a built in map interface.

Dr. Duan Biggs

Dr. Jenna Keany

# Implementation Overview

- App - Frontend
  - Collecting visual data natively
  - Offline mapping functionality
  - User authentication
  - Simple and accessible UI
- Server and database - Backend
  - Verification of image data
  - Storing user data in database
  - Storing and searching GEDI coordinates



# Implementation Details - App

- Offline Map Functionality
  - After downloading GEDI coordinates and related map data, the user will be able to use an offline map that will guide them using the mapbox API
  - The user will be able to download navigation to coordinates for offline use.
- Native data collection
  - Data will be collected through the app itself and stored locally on the phone. This will use built in Android Jetpack libraries.
- Verification status
  - Using HTTPS GET and POST requests to send data (images, video, etc.) and retrieve data from server (JSON of data status)

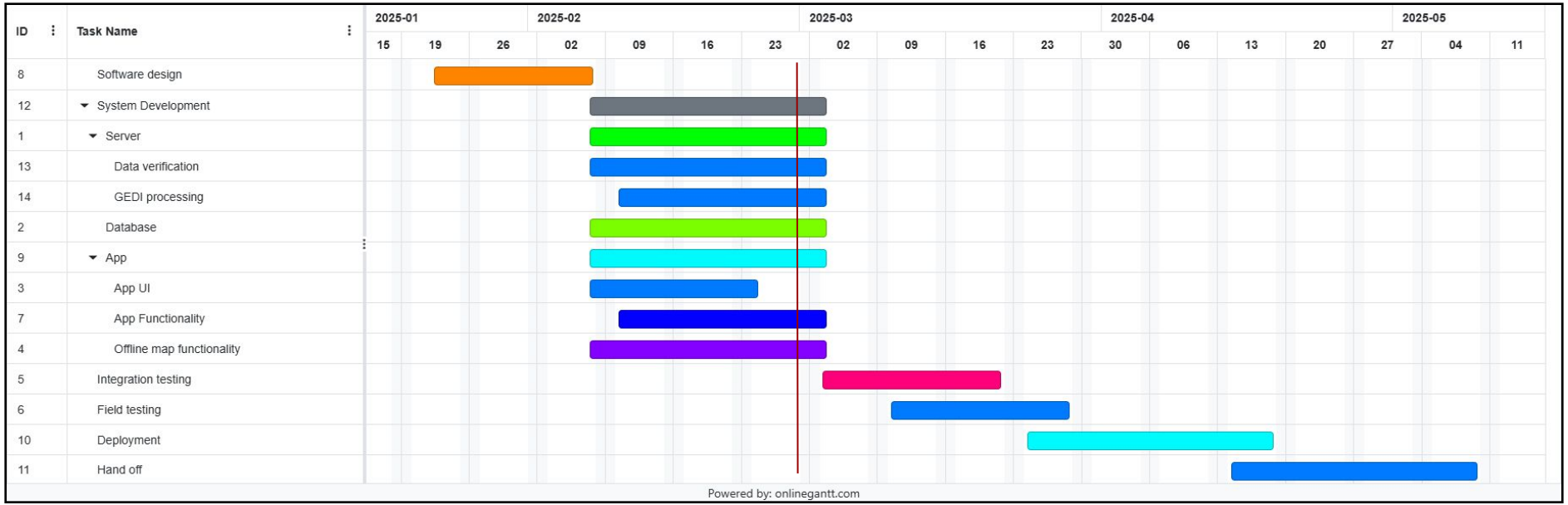
# Implementation Details - Server & Database

- Image Verification
  - HTTP Response to handle received images and updates on verification
  - PyTorch Wildlife API calls, pretrained models for detection/classification of animals
  - Config file containing threshold acceptance
- Storing User Data
  - MySql scripts on the server to store/query to the RDS database
  - Additional python scripts used for compression of user content
  - AWS RDS/S3 database to store user data as well as metadata for content
- Coordinate Storage and Retrieval
  - Google Earth Engine for retrieving and updating coordinates
  - AWS RDS/S3 database for storing coordinates
  - AWS SDK to retrieve coordinates using our app

# Challenges and Resolution

- Code Collaboration
  - GitHub: Version History & Issue Tracking
  - Determined Code Stylings & Tool Dependencies
- Coordinate Extraction
  - Downloading predetermined regions
  - Store coordinates ourselves not from NASA
- Location Permissions
  - Ensuring user privacy is obeyed and no background location used
  - Prompt for precise location and provide explanation

# Schedule




- Basic functionality for each individual component soon
- Integration of individual components is the next task

# Closing

- Our app will improve the accessibility of ecological citizen science to many areas unable to participate in it previously
- Our full stack will handle in the gathering, verification, and storage of the ecological data gained from the user in their area
- We have basic functionality for most modules, advanced functionality and integration between modules is in-progress

Thank you