

CAPSTONE PROJECT – C241-PS370

PlantDoc (Doctor)

Early Detection of Plant
Diseases Through Leaf
Analysis

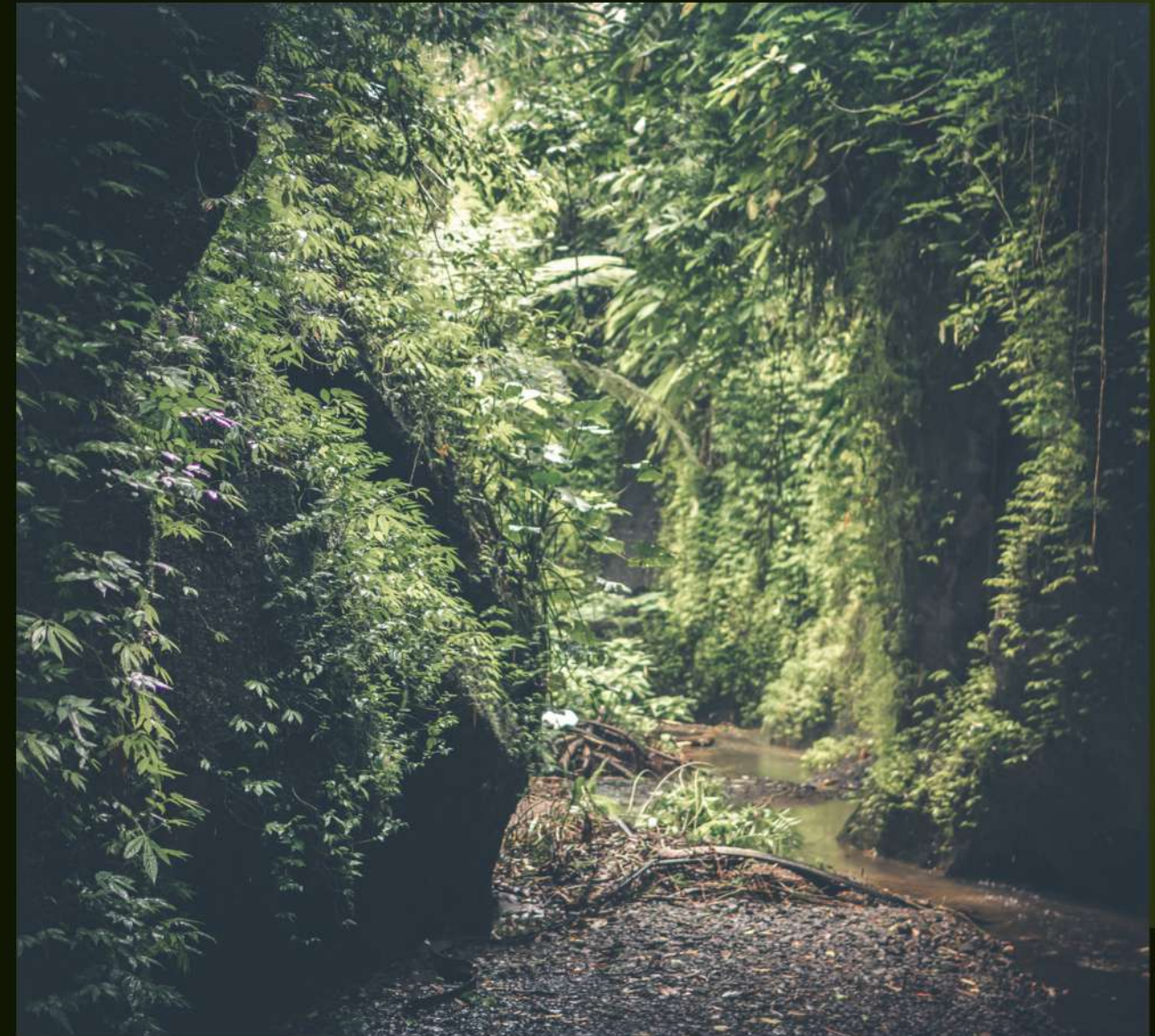


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Background

The creation of PlantDoc stems from the convergence of several factors; the increasing interest in gardening, the challenges faced by gardeners in maintaining plant health, and advancements in technology that provide new solutions for these challenges. Gardening has seen a significant resurgence in recent years, driven by multiple trends like Urbanization, Sustainability, Mental and Physical Health. Despite its many benefits, gardening comes with its own set of challenges; Plant Identification, Disease and Pest Management, Lack of Expertise



Reason

Problem Statement:

- Plant diseases severely impact vegetable harvest yield and quality.
- Significant financial losses

Solution:

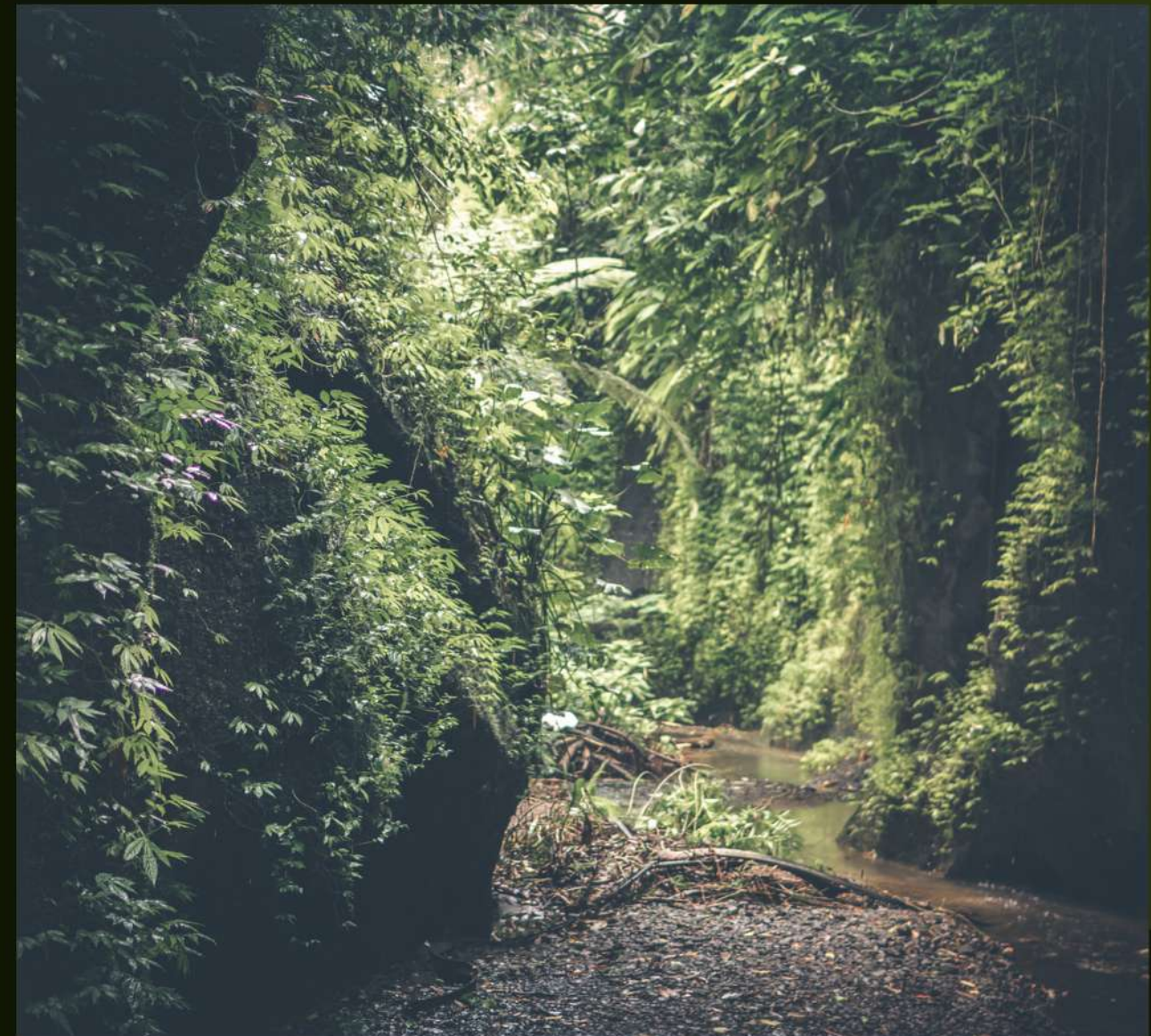
- PlantDoc provides early and accurate identification of plant diseases through leaf analysis.
- Reduces harvest losses through timely detection and intervention.

Technology:

- Utilizes machine learning and image processing to analyze leaf conditions.
- Rapid and efficient disease detection from leaf images.

Benefits:

- Enables prompt preventive or remedial actions.
- Maintains high crop quality and market prices.



Competitor



Comparison

Tumaina App

PlantDoc

Doesn't have news article feature

Having news article feature

Only focusing on one plant species (banana)


can identify 3 plants species
(pepperbell, tomato, potato)

Using AI to identify Diseases

Using machine learning model

Mockups and Design

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How To Get Started!!




Categories


Bell Pepper



Tomato

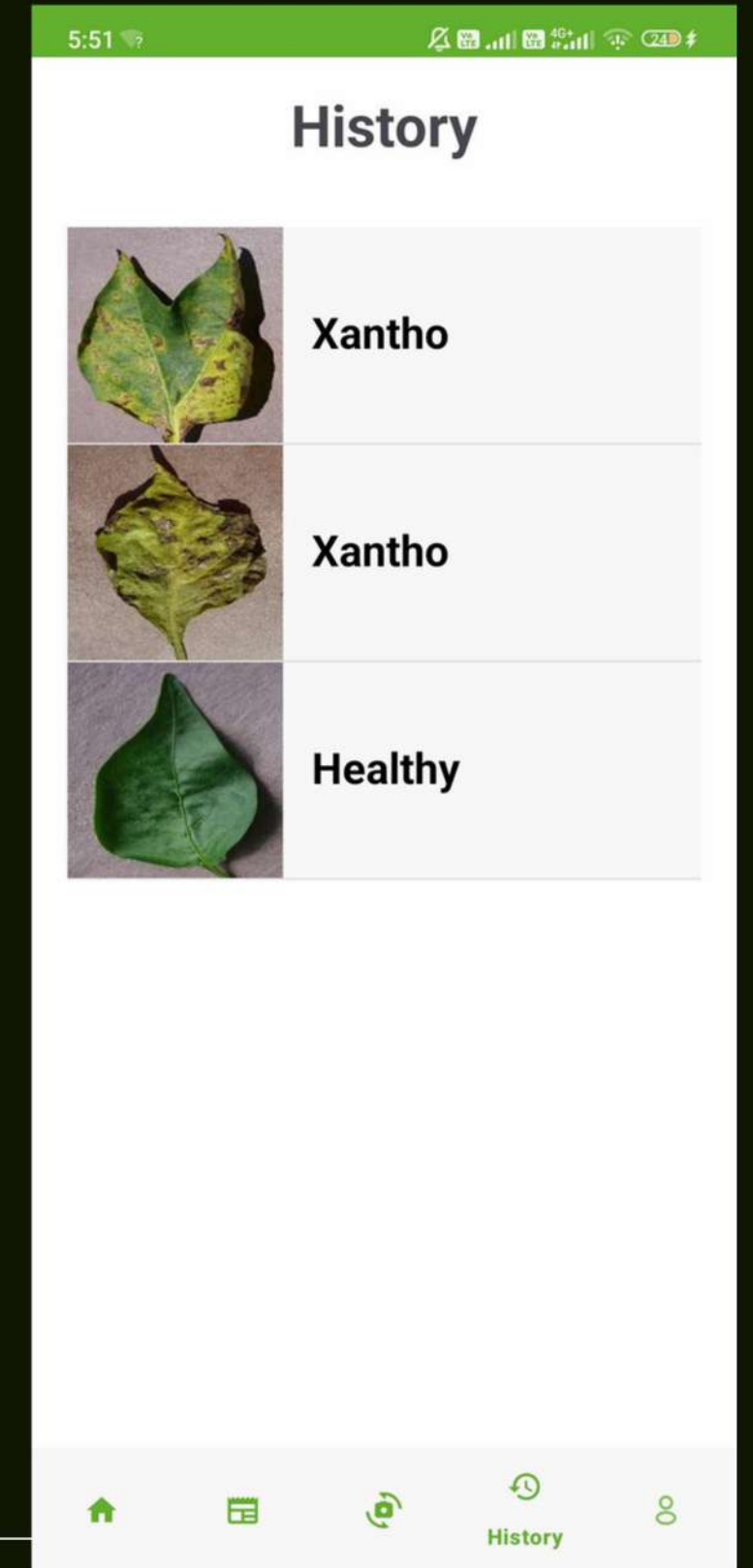
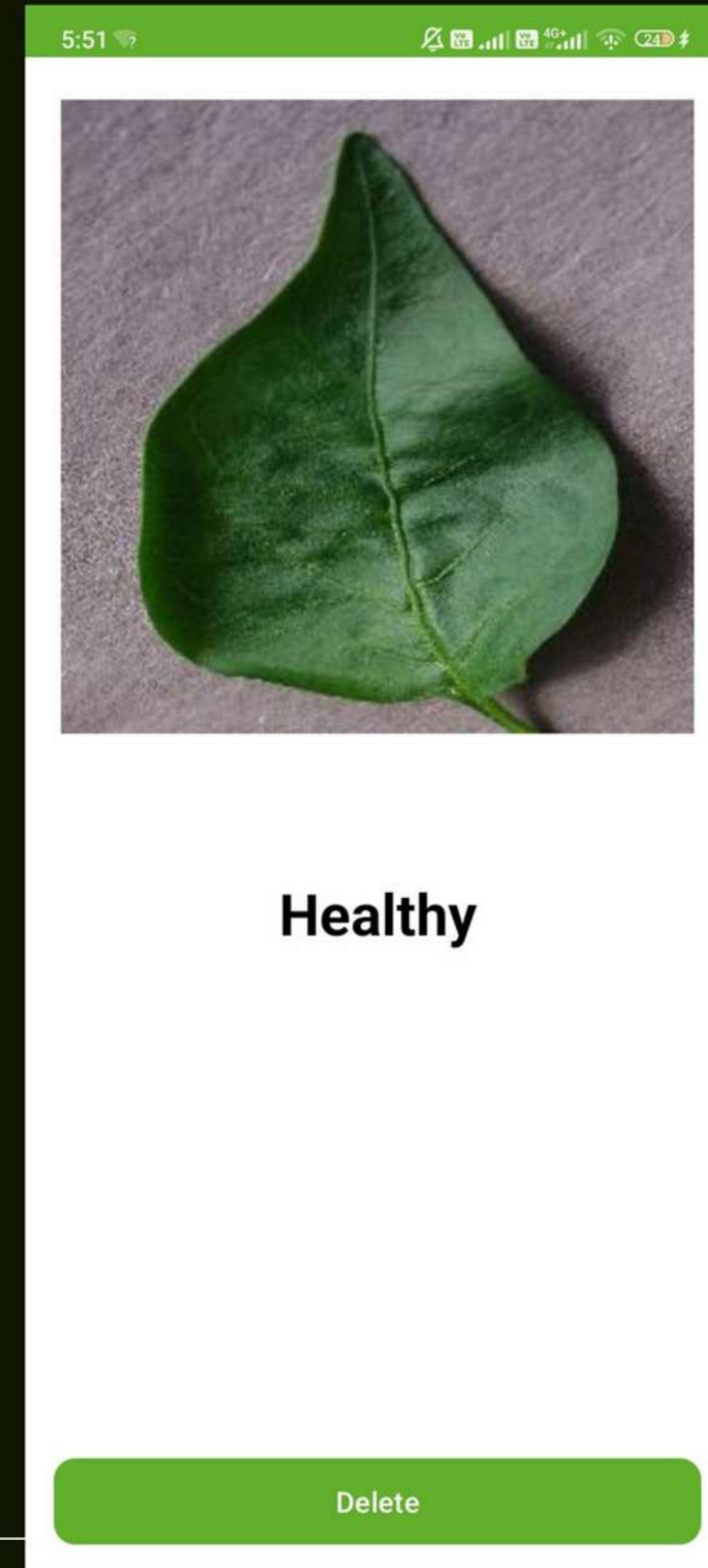
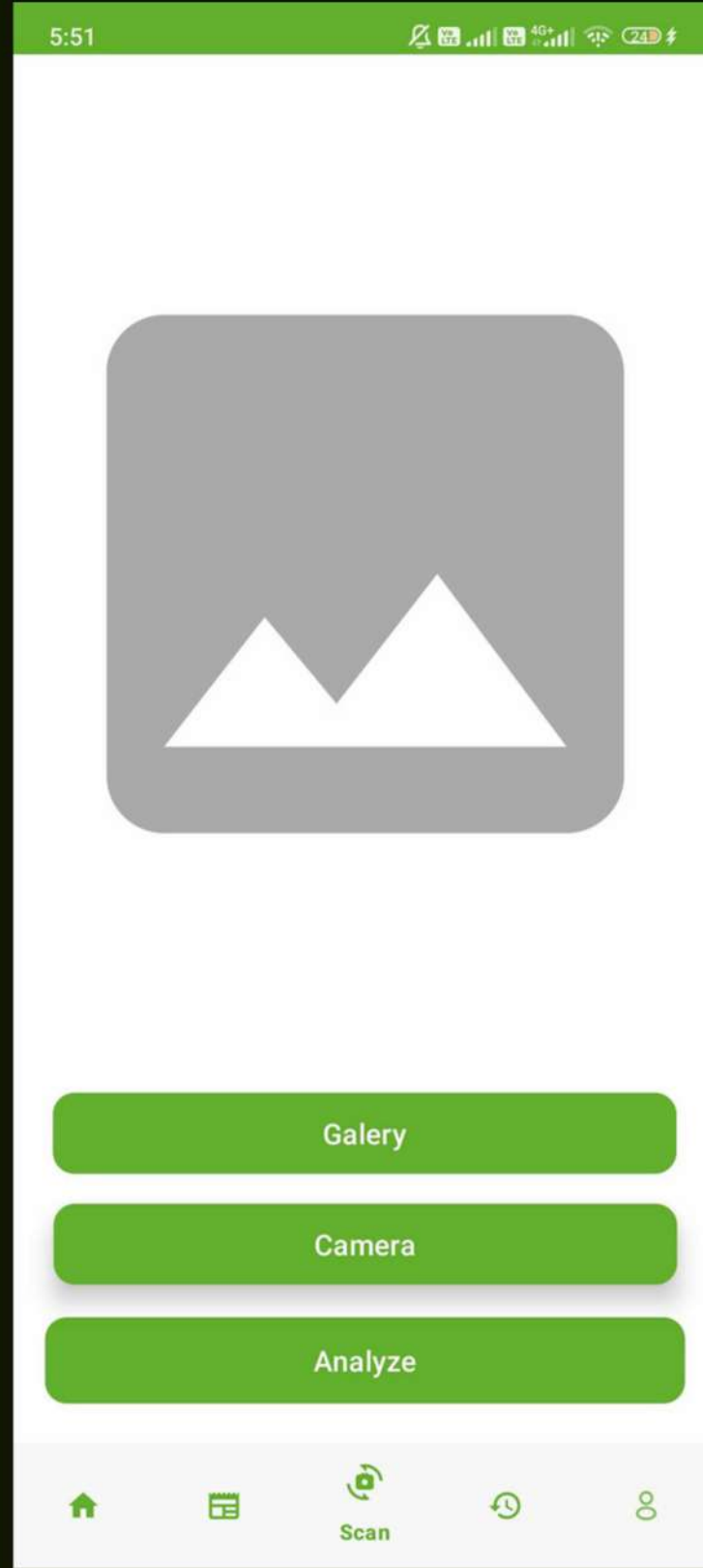


Potato

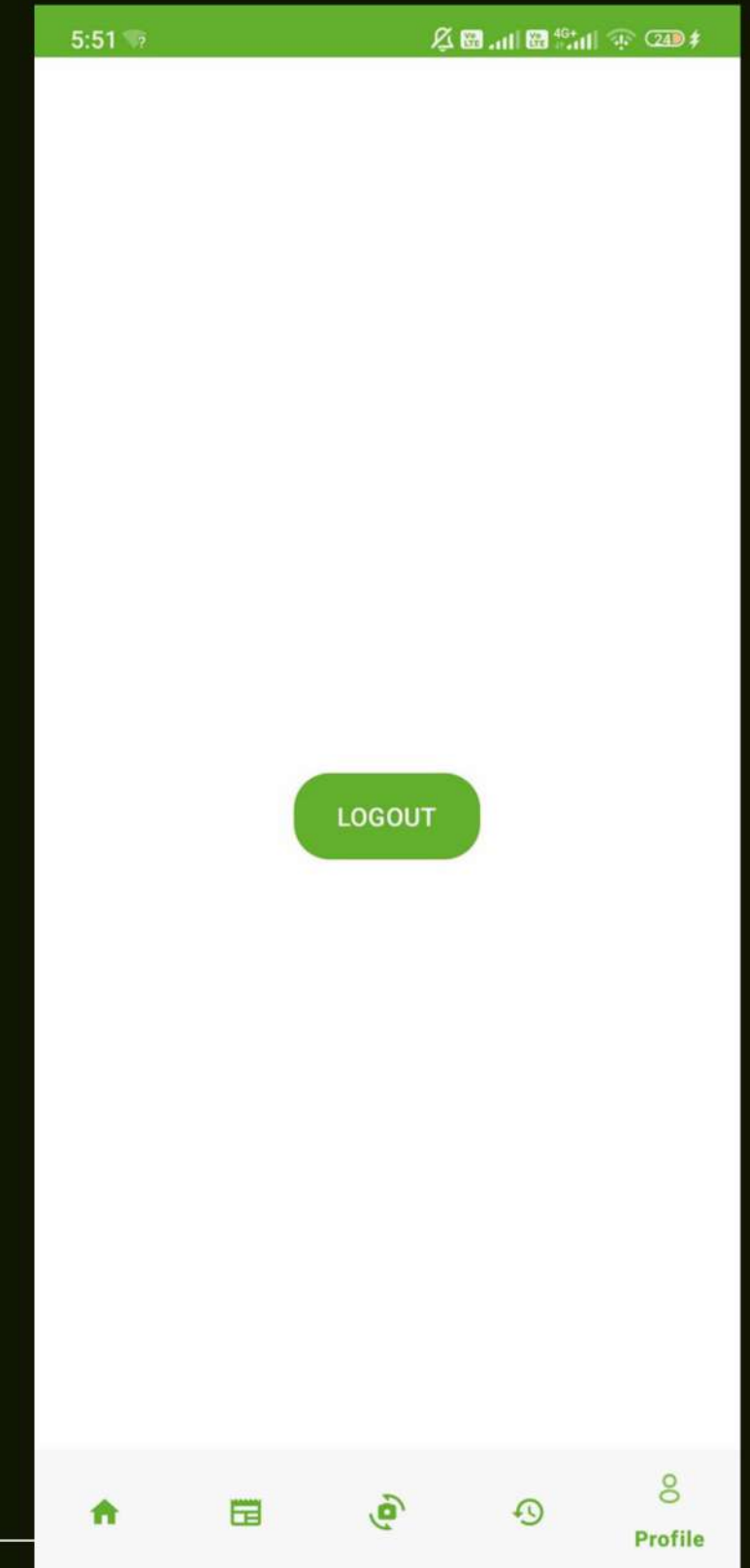
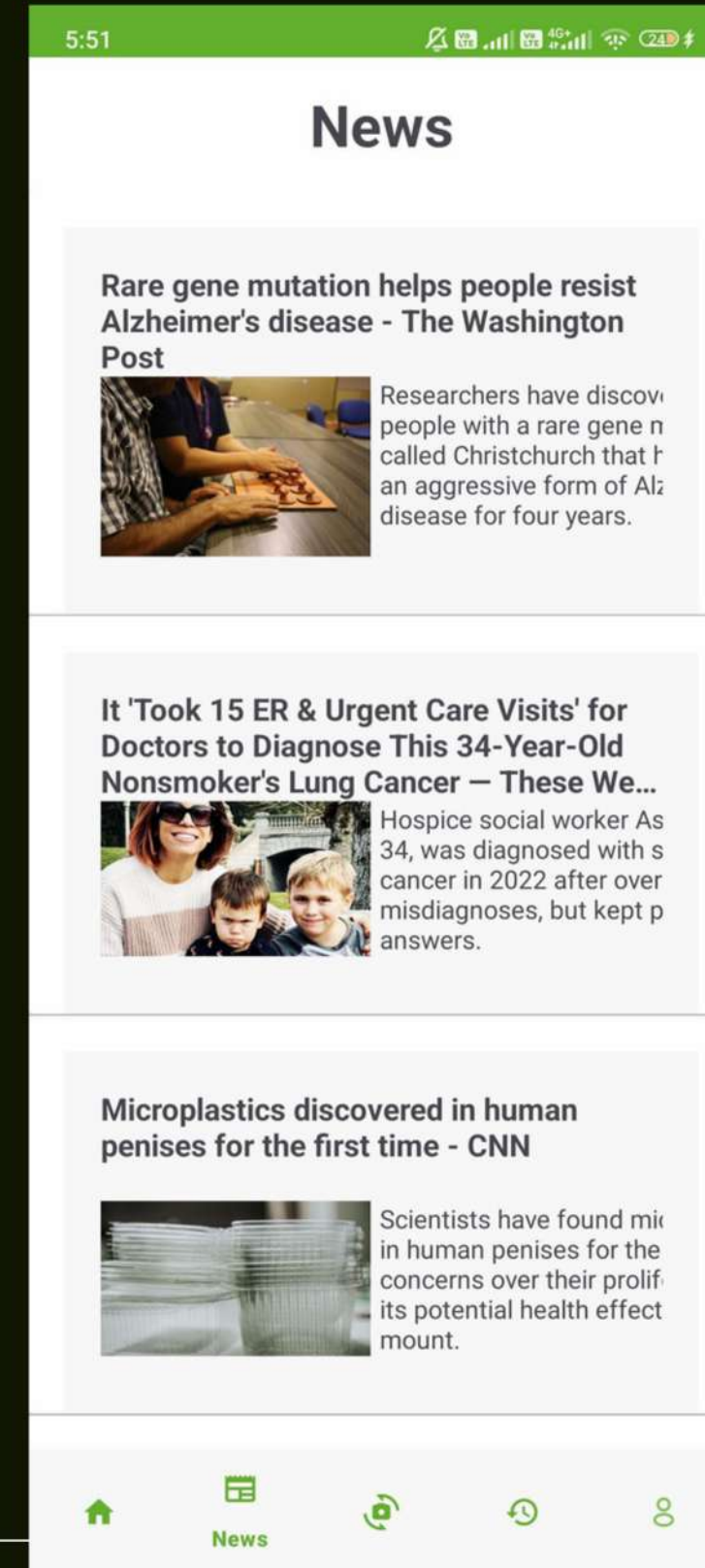
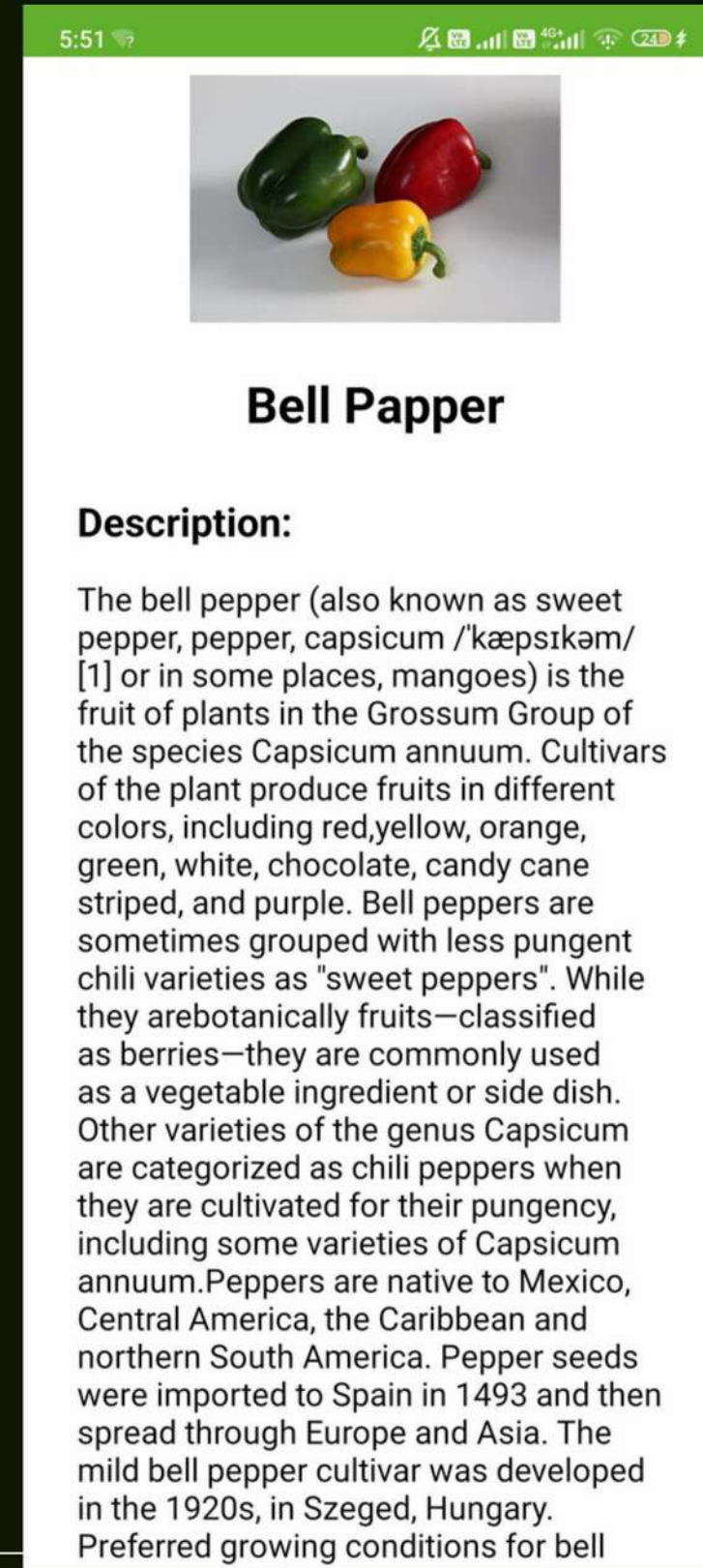
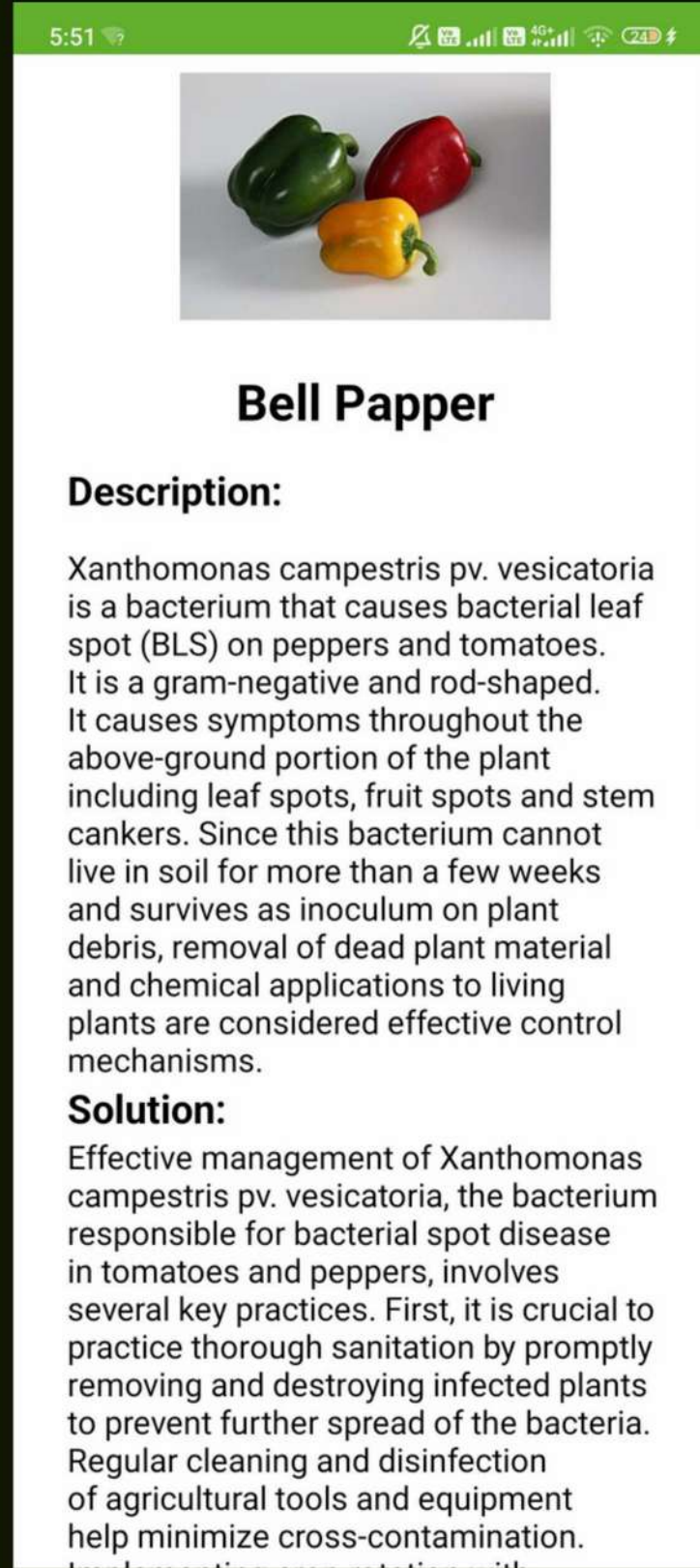


Home

Mockups and Design



Mockups and Design





Implementation

Machine Learning

- CNN to develop model for image recognition
- Using Callbacks function to determine how good accuracy

Mobile Development

- Designing the overall UI design then converting it into a wireframe
- Converting the wireframe into an xml layout in android studio
- Connecting the application to an API endpoint for plant disease detection

Cloud Computing

- Creating API for deploying machine model using python framework called fastAPI and deploy it on cloud run.
- Creating backend using Javascript framework called express.js.

Result

Machine Learning

- Created a three models of vegetables to identify the diseases using CNN
- Accuracy and validation accuracy for each models more than 0,9

Mobile Development

- The user-friendly UI design has been successfully implemented.
- The clear and structured wireframe facilitates usability and time efficiency
- The XML layout interface is easy to modify, and the API endpoint for accurate plant disease detection.

Cloud Computing

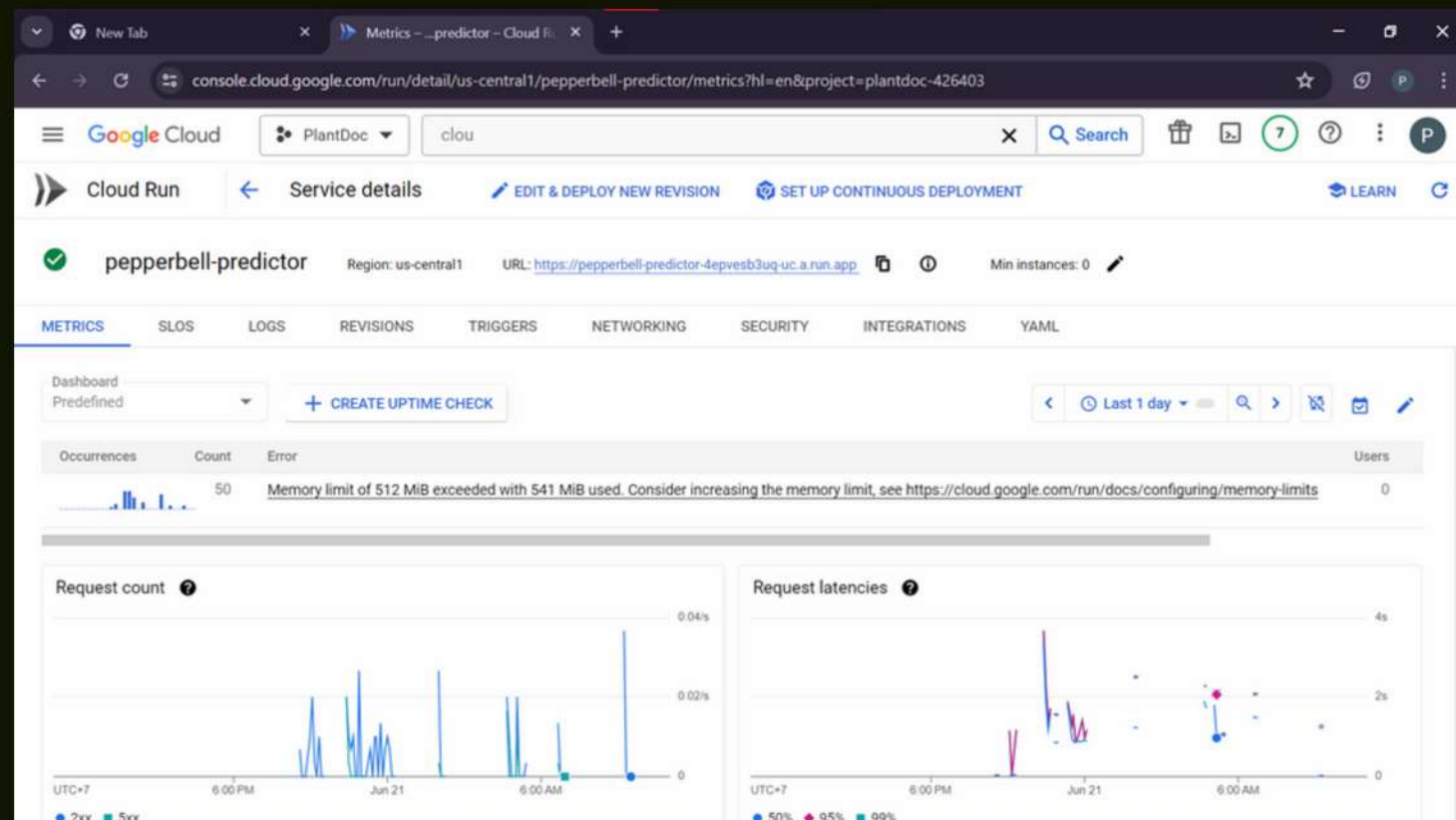
- Created API for machine learning and successfully deployed it on cloud run.
- Successfully created backend with javascript framework express.js.

Documentation

```
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# optimizer=tf.keras.optimizers.Adam(learning_rate=0.0001),
loss='sparse_categorical_crossentropy',
metrics=['accuracy']

history = model.fit(
    train_generator,
    batch_size=128,
    validation_data=validation_generator,
    verbose=1,
    epochs=50,
    callbacks=[customCallback])

epoch 22/50
2/12 [-----] - 28s 2s/step - loss: 0.2319 - accuracy: 0.9163 - val_loss: 0.4791 - val_accuracy: 0.8043
epoch 23/50
2/12 [-----] - 28s 2s/step - loss: 0.2213 - accuracy: 0.9223 - val_loss: 0.5206 - val_accuracy: 0.7640
epoch 24/50
2/12 [-----] - 28s 2s/step - loss: 0.2222 - accuracy: 0.9256 - val_loss: 0.3482 - val_accuracy: 0.8634
epoch 25/50
2/12 [-----] - 28s 2s/step - loss: 0.2302 - accuracy: 0.9117 - val_loss: 0.1900 - val_accuracy: 0.6739
epoch 26/50
2/12 [-----] - 28s 2s/step - loss: 0.2164 - accuracy: 0.9261 - val_loss: 0.4246 - val_accuracy: 0.8261
epoch 27/50
2/12 [=====] - 28s 2s/step - loss: 0.1932 - accuracy: 0.9323 - val_loss: 0.2995 - val_accuracy: 0.8882
epoch 28/50
2/12 [-----] - 28s 2s/step - loss: 0.2274 - accuracy: 0.9241 - val_loss: 0.4697 - val_accuracy: 0.7950
epoch 29/50
2/12 [-----] - 28s 2s/step - loss: 0.2274 - accuracy: 0.9241 - val_loss: 0.4697 - val_accuracy: 0.7950
```



- Github Link : <https://github.com/FauzanFP12/CS24-PS370.git>

Target Market

Age Range

25-60
years

Profession

- Gardener
- farmer
- agricultural worker

roles

- homeowners with garden
- community gardeners
- small-scale farmer

Hobbies

- Gardening
- Landscaping
- Plant Care

Plan a Local Deployment

- Deployment Strategy
to deploy the PlantDoc app locally.
- Implementation Steps
Setting up the local server
- Future Plan
Plans for wider deployment and user testing
Potential collaboration with local agricultural
bodies



Solutions: PlantDoc

PlantDoc will assist you in identifying diseases in your plants. Simply take a photo or upload an image, let the machine do its work, and boom! You can find out what disease is affecting your plants. You can also learn about handling methods or medicines available by reading the articles we provide.



Xanthomonas campestris* pv. *vesicatoria

Delete



Bell Papper

Description:

The bell pepper (also known as sweet pepper, pepper, capsicum /'kæpsɪkəm/ [1] or in some places, mangoes) is the fruit of plants in the Grossum Group of the species *Capsicum annuum*. Cultivars of the plant produce fruits in different colors, including red, yellow, orange, green, white, chocolate, candy cane striped, and purple. Bell peppers are sometimes grouped with less pungent chili varieties as "sweet peppers". While they are botanically fruits—classified as berries—they are commonly used as a vegetable ingredient or side dish. Other varieties of the genus *Capsicum* are categorized as chili peppers when they are cultivated for their pungency, including some varieties of *Capsicum annuum*. Peppers are native to Mexico, Central America, the Caribbean and northern South America. Pepper seeds were imported to Spain in 1493 and then spread through Europe and Asia. The mild bell pepper cultivar was developed in the 1920s, in Szeged, Hungary. Preferred growing conditions for bell

Thank You!