

WELCOME

FERTILIZER RECOMMENDATION SYSTEM **FOR DISEASE PREDICTION**

NALAIYA THIRAN PROJECT REPORT

IBM-Project-10083-1668681292

TEAM ID: PNT2022TMID32003

Presented by

RAKKESH S	(731619104048)
ARUNPRAKASH C	(731619104006)
PRASANTH S	(731619104043)
ABINANTHAN R	(731619104001)

Guided by

KARTHIKEYAN C AP/CSE
KSRIET

PROBLEM STATEMENT

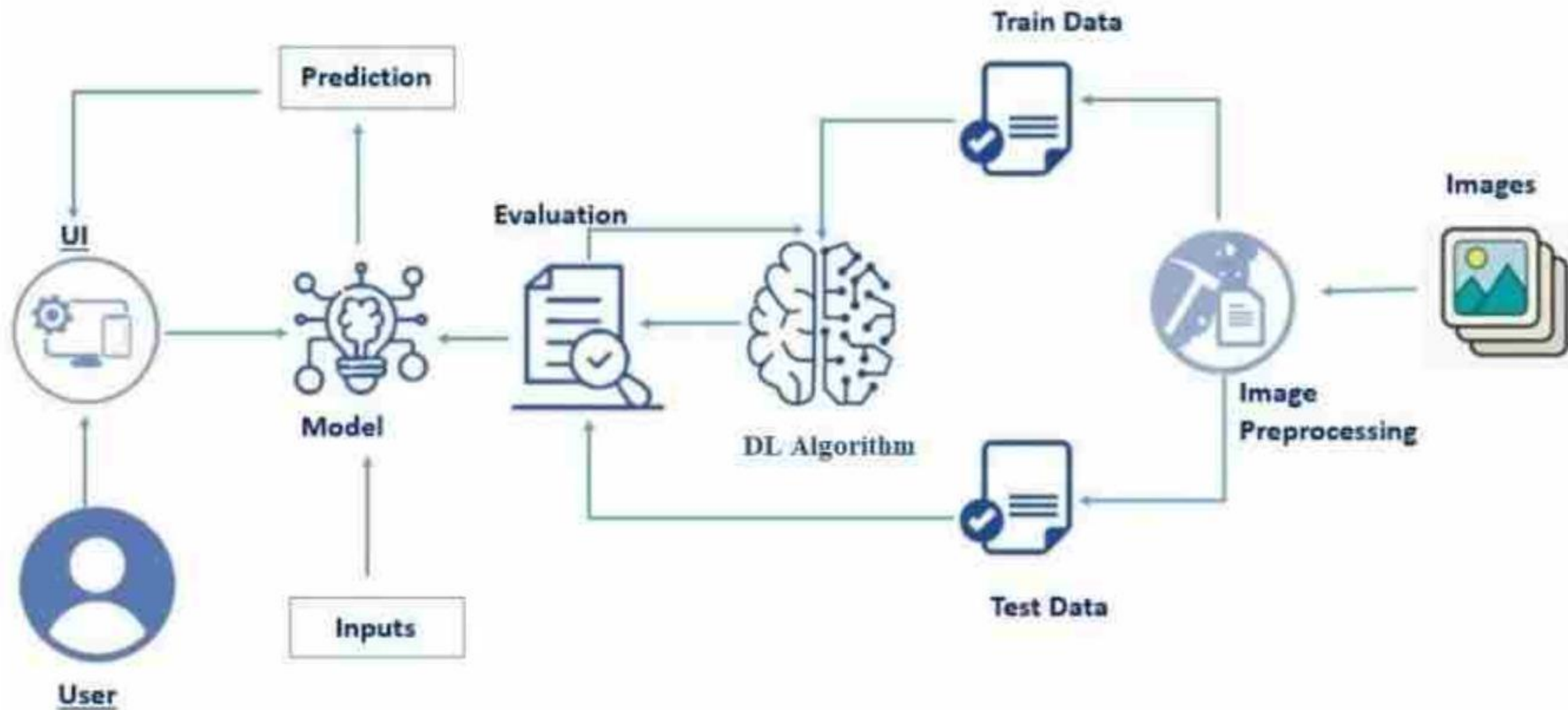
Mr. Narasimma Rao is a 65-year-old man. He had an own farming land and do Agriculture for past 30 Years, in this 30 Years he Faced a problem in Choosing Fertilizers and Controlling of Plant Disease.

- Narasimma Rao wants to know the better recommendation for fertilizers for plants with the disease.
- He has faced huge losses for a long time.
- This problem is usually faced by most farmers.
- Mr. Narasimma Rao needs to know the result immediately.

PROPOSED SOLUTION

- The solution to the problem is machine learning which is one of the applications of Artificial Intelligence, is being used to implement the proposed system. Crop recommendation is going to recommend you the best crop you can grow in your land as per the soil nutrition value and along with as per the climate in that region. And recommending the best fertilizer for every particular crop is also a challenging task.
- The other and most important issue is when a plant gets caught by heterogeneous diseases that effect on less amount of agriculture production and compromises with quality as well. To overcome all these issues this recommendation has been proposed .
- Nowadays a lot of research and work is being implemented in the smart and modern agriculture domain. Crop recommendation is characterized by a soil database comprised of Nitrogen, Phosphorus, potassium.

TECHNICAL ARCHITECTURE



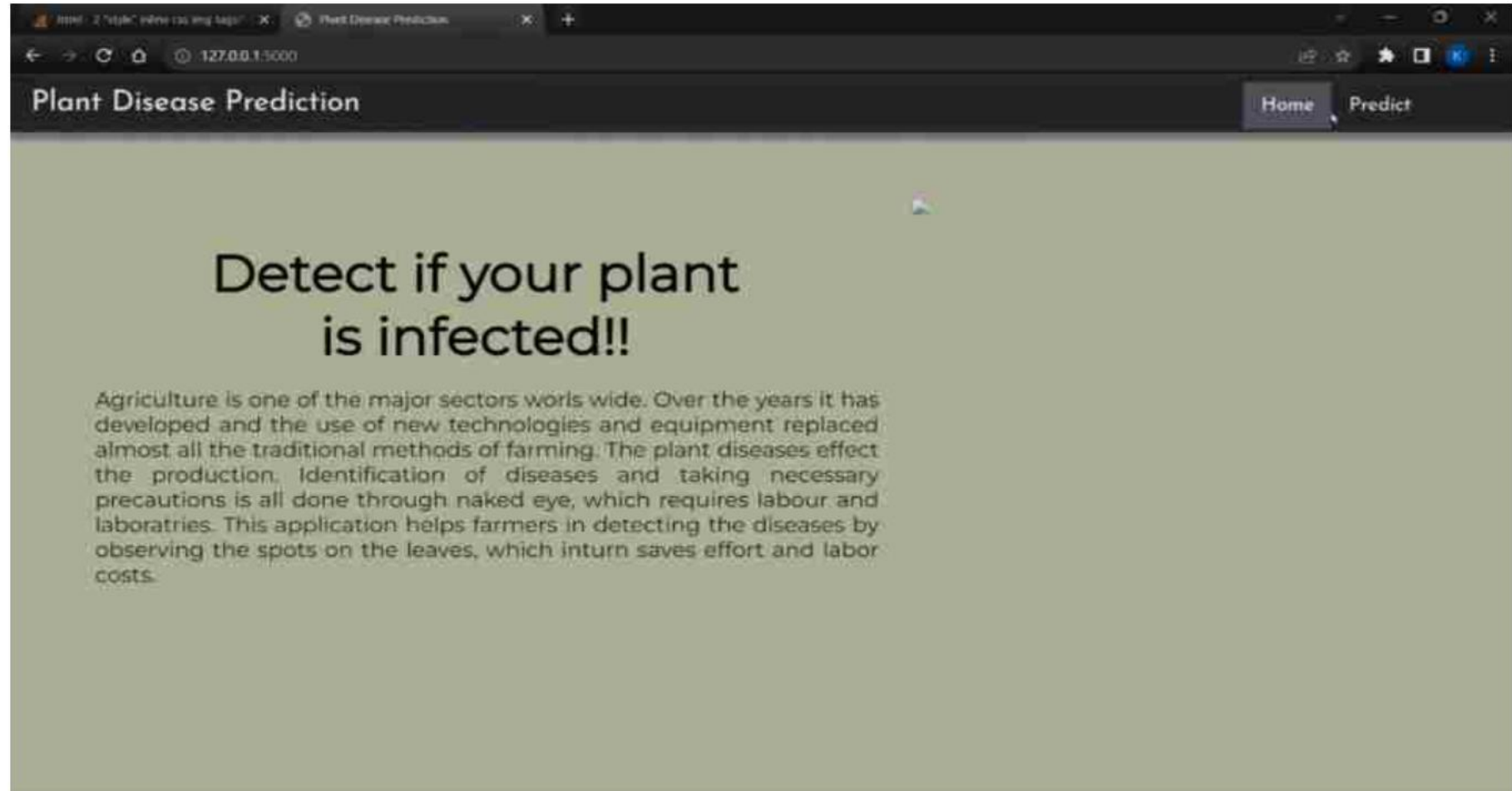
PROJECT DEMO VIDEO

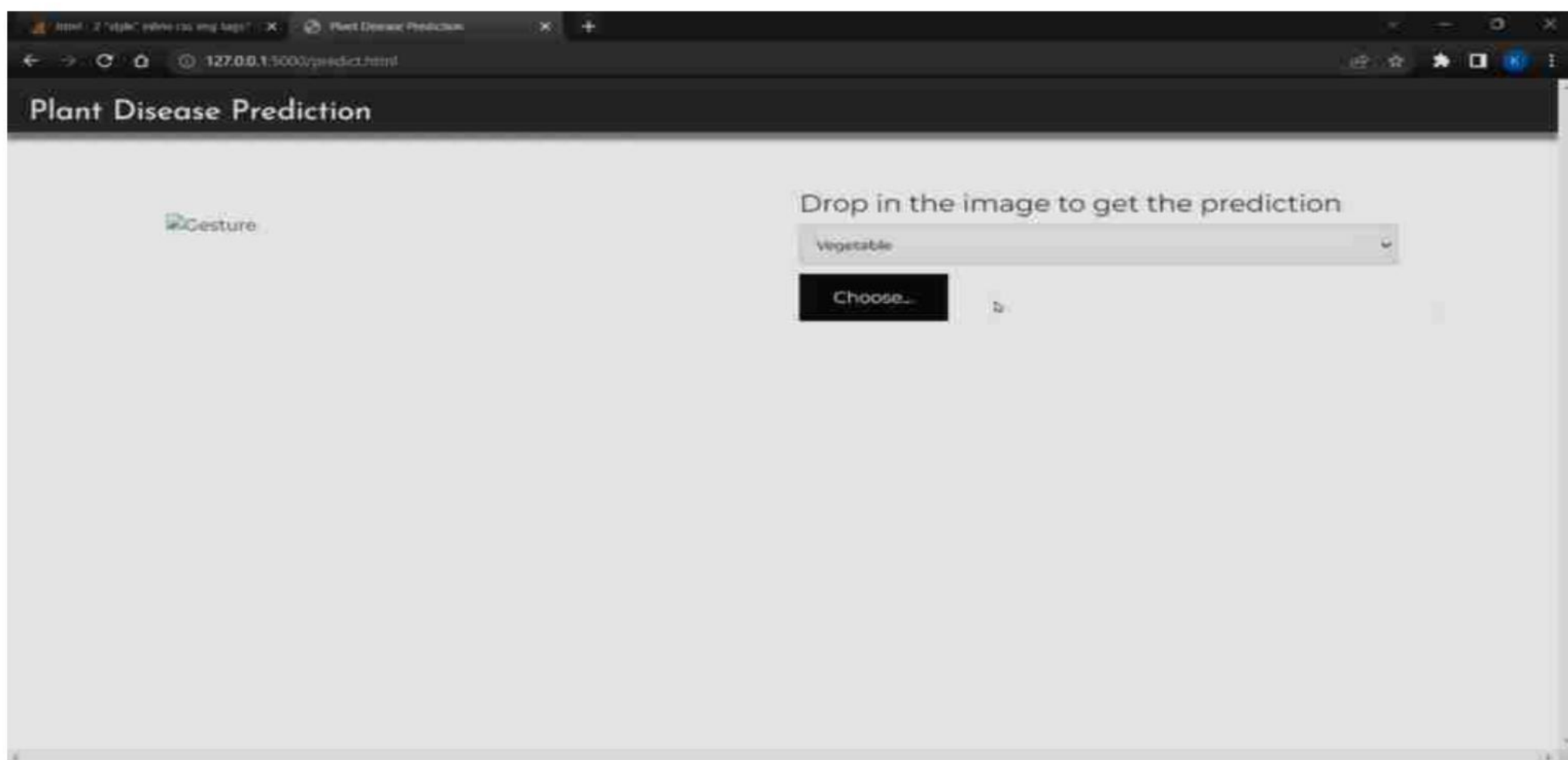


**fertilizer
recommendation
system for disease
prediction**

PERFORMANCE METRICES(RESULTS)

SCREENSHOT





MODEL SUMMARY OF FRUITS

```
Model: "sequential"
```

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 52, 52, 32)	896
max_pooling2d (MaxPooling2D)	(None, 31, 31, 32)	0
flatten (Flatten)	(None, 30752)	0
dense (Dense)	(None, 388)	5225988
dense_1 (Dense)	(None, 158)	45158
dense_2 (Dense)	(None, 5)	305

Total params: 9,272,852
Trainable params: 9,272,852
Non-trainable params: 0

MODEL SUMMARY OF VEGITABLES

```
Model: "sequential"
```

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 126, 126, 32)	896
max_pooling2d (MaxPooling2D)	(None, 63, 63, 32)	0
flatten (Flatten)	(None, 127088)	0
dense (Dense)	(None, 388)	38182788
dense_1 (Dense)	(None, 158)	45158
dense_2 (Dense)	(None, 5)	1159

Total params: 38,188,185
Trainable params: 38,188,185
Non-trainable params: 0

ACCURACY FOR FRUITS

```
Epoch 2/10
225/225 [=====] - 64s 285ms/step - loss: 0.2341 - accuracy: 0.9162 - val_loss: 0.2199 - val_accuracy: 0.9193
Epoch 3/10
225/225 [=====] - 61s 272ms/step - loss: 0.1870 - accuracy: 0.9359 - val_loss: 0.2585 - val_accuracy: 0.9181
Epoch 4/10
225/225 [=====] - 65s 288ms/step - loss: 0.1815 - accuracy: 0.9359 - val_loss: 0.1348 - val_accuracy: 0.9537
Epoch 5/10
225/225 [=====] - 60s 266ms/step - loss: 0.1518 - accuracy: 0.9482 - val_loss: 0.2241 - val_accuracy: 0.9324
Epoch 6/10
225/225 [=====] - 60s 267ms/step - loss: 0.1615 - accuracy: 0.9459 - val_loss: 0.1474 - val_accuracy: 0.9460
Epoch 7/10
225/225 [=====] - 61s 272ms/step - loss: 0.1280 - accuracy: 0.9545 - val_loss: 0.1212 - val_accuracy: 0.9543
Epoch 8/10
225/225 [=====] - 61s 271ms/step - loss: 0.1270 - accuracy: 0.9580 - val_loss: 0.1192 - val_accuracy: 0.9626
Epoch 9/10
225/225 [=====] - 63s 282ms/step - loss: 0.1115 - accuracy: 0.9614 - val_loss: 0.1335 - val_accuracy: 0.9567
Epoch 10/10
225/225 [=====] - 64s 286ms/step - loss: 0.0866 - accuracy: 0.9734 - val_loss: 0.1248 - val_accuracy: 0.9638
<keras.callbacks.History at 0x7fd679c5d858>
```

ACCURACY FOR VEGITABLES

```
--- Epoch 1/10
89/89 [=====] - 8502s 97s/step - loss: 3.3788 - accuracy: 0.9939 - val_loss: 1.4283 - val_accuracy: 0.4766
Epoch 2/10
89/89 [=====] - 262s 3s/step - loss: 0.9996 - accuracy: 0.6653 - val_loss: 1.1423 - val_accuracy: 0.6121
Epoch 3/10
89/89 [=====] - 295s 3s/step - loss: 0.7310 - accuracy: 0.7498 - val_loss: 0.9455 - val_accuracy: 0.6966
Epoch 4/10
89/89 [=====] - 280s 3s/step - loss: 0.6035 - accuracy: 0.7908 - val_loss: 0.9577 - val_accuracy: 0.8088
Epoch 5/10
89/89 [=====] - 277s 3s/step - loss: 0.5238 - accuracy: 0.8182 - val_loss: 0.7798 - val_accuracy: 0.7327
Epoch 6/10
89/89 [=====] - 291s 3s/step - loss: 0.4680 - accuracy: 0.8348 - val_loss: 0.6384 - val_accuracy: 0.7631
Epoch 7/10
89/89 [=====] - 269s 3s/step - loss: 0.4069 - accuracy: 0.8604 - val_loss: 0.4164 - val_accuracy: 0.8513
Epoch 8/10
89/89 [=====] - 264s 3s/step - loss: 0.3752 - accuracy: 0.8696 - val_loss: 0.5069 - val_accuracy: 0.8249
Epoch 9/10
89/89 [=====] - 266s 3s/step - loss: 0.3534 - accuracy: 0.8801 - val_loss: 0.6009 - val_accuracy: 0.7863
Epoch 10/10
89/89 [=====] - 275s 3s/step - loss: 0.3374 - accuracy: 0.8835 - val_loss: 0.4508 - val_accuracy: 0.8448
<keras.callbacks.History at 0x7f7e67584950>
```

SCALABILITY AND FEATURES SCOPE

The system successfully interprets various Diseases and is also capable of providing fertilizers suggestion for the respective disease. Furthermore, this system can be made more robust by incorporating more image dataset with wider variations like more than one leaf in a single image. An App could also be developed for the project which could make the work of the farmers easier. They could directly upload image on the app and it would tell the disease and the cure then and there. This would reduce the time and efforts. This project is limited to just one crop for now but in the future more crops and even flowers dataset can be added so that it is helpful for every agricultural need. Newer models can also be added and tried with time which may result in better accuracy and would make the model even faster.

THANK YOU