

PROJECT FILE

OPERATING SYSTEMS



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ECAM-2



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Introduction

AIM

To create an Android app that uses a TFlite model to classify the type of crop preferred by a farmer by providing information about his or her farm and its environment.

SOFTWARE AND PLATFORMS USED

Python 3.10, Tensorflow <2.0 and SKLearn for deep learning models and Android Studio Electric Eel used to make and Android app using jetpack compose and Material Design 2.0 also used Figma for app design.

◀◀◀ INTRODUCTION TO DL MODELS AND DATA ▶▶▶

We had worked on 3 different DL models namely, ANN, logistic regression and Random Forest Algorithms.

And we get our training data from information in the dataset that is provided to the best of ICAR's knowledge. The below data can be used publicly in all public and private undertakings.

Accuracies of all DL models:

Random Forest: 99%

ANN: 96%

logistic regression: 98%

Data Features:

N - ratio of Nitrogen content in soil

P - ratio of Phosphorous content in soil

K - ratio of Potassium content in soil

temperature - temperature in degree Celsius

humidity - relative humidity in %

ph - ph value of the soil

rainfall - rainfall in mm

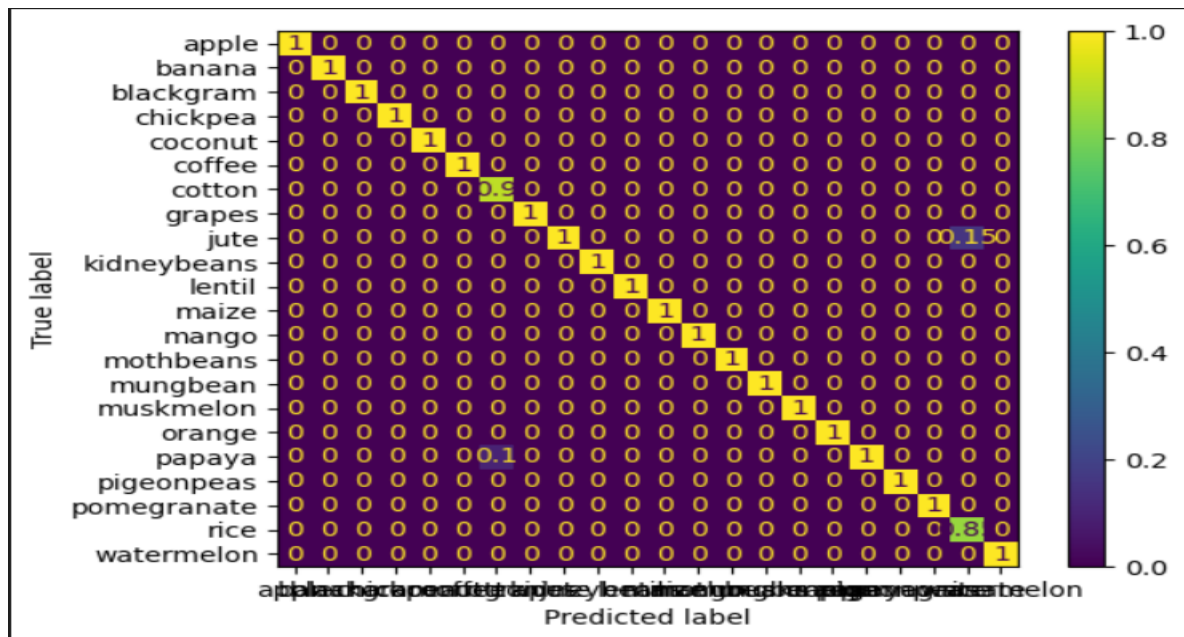
The Advantage of using An android app is that the DL model can be accessed easily by the farmers.

But it also have a Disadvantage that we have to convert Model into TFLite model which effects its accuracy.

DL MODELS

ANN

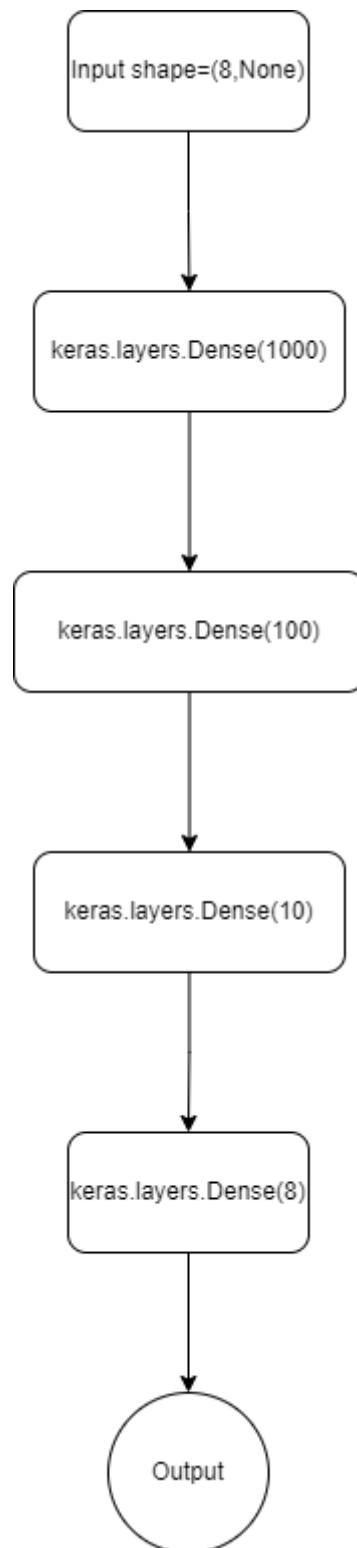
CONFUSION MATRIX



Classification report of ANN

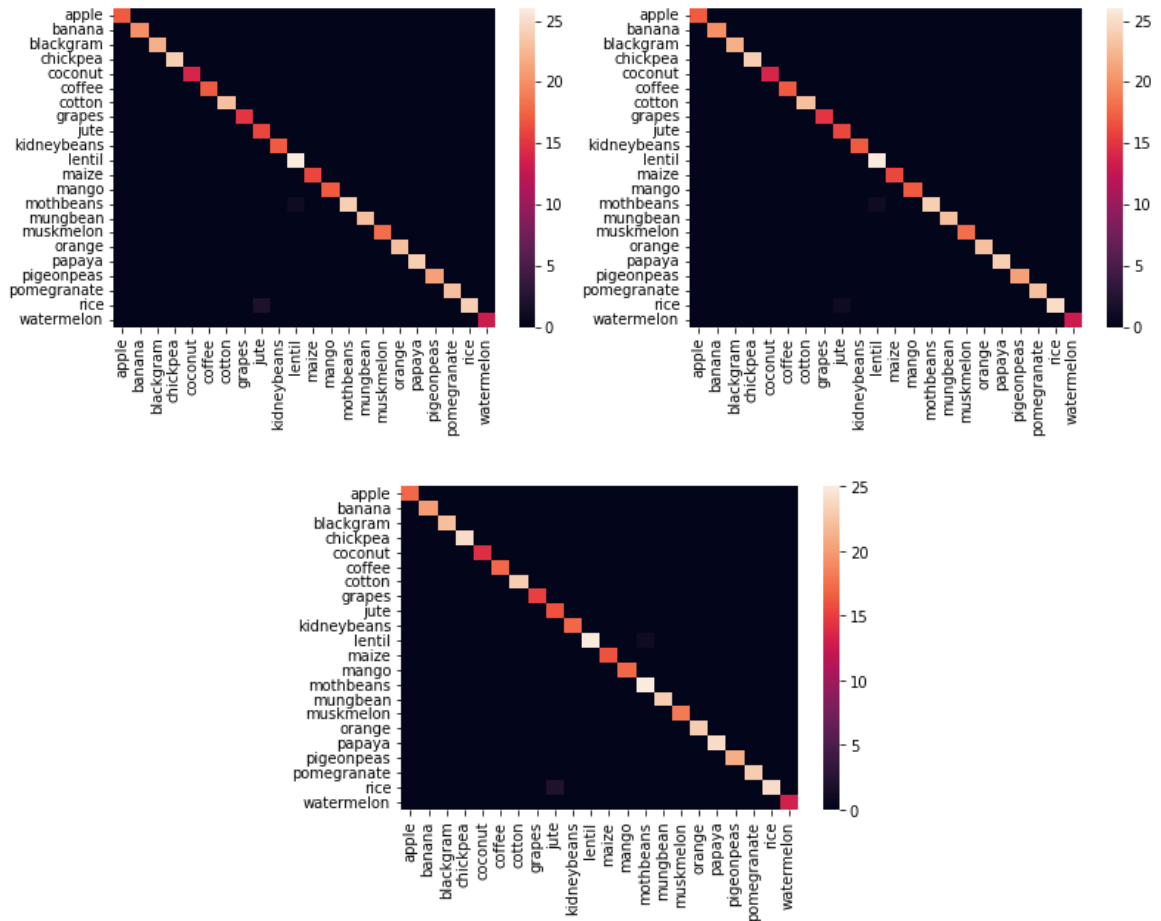
	precision	recall	f1-score	support
0	1.00	1.00	1.00	7
1	1.00	1.00	1.00	10
2	1.00	1.00	1.00	12
3	1.00	1.00	1.00	15
4	1.00	1.00	1.00	10
5	1.00	1.00	1.00	7
6	0.90	1.00	0.95	9
7	1.00	1.00	1.00	10
8	1.00	0.71	0.83	7
9	1.00	1.00	1.00	15
10	1.00	1.00	1.00	16
11	1.00	1.00	1.00	10
12	1.00	1.00	1.00	7
13	1.00	1.00	1.00	12
14	1.00	1.00	1.00	7
15	1.00	1.00	1.00	9
16	1.00	1.00	1.00	12
17	1.00	0.93	0.96	14
18	1.00	1.00	1.00	11
19	1.00	1.00	1.00	5
20	0.85	1.00	0.92	11
21	1.00	1.00	1.00	4
accuracy			0.99	220
macro avg	0.99	0.98	0.98	220
weighted avg	0.99	0.99	0.99	220

Structure of ANN model



RANDOM FOREST

CONFUSION MATRIX

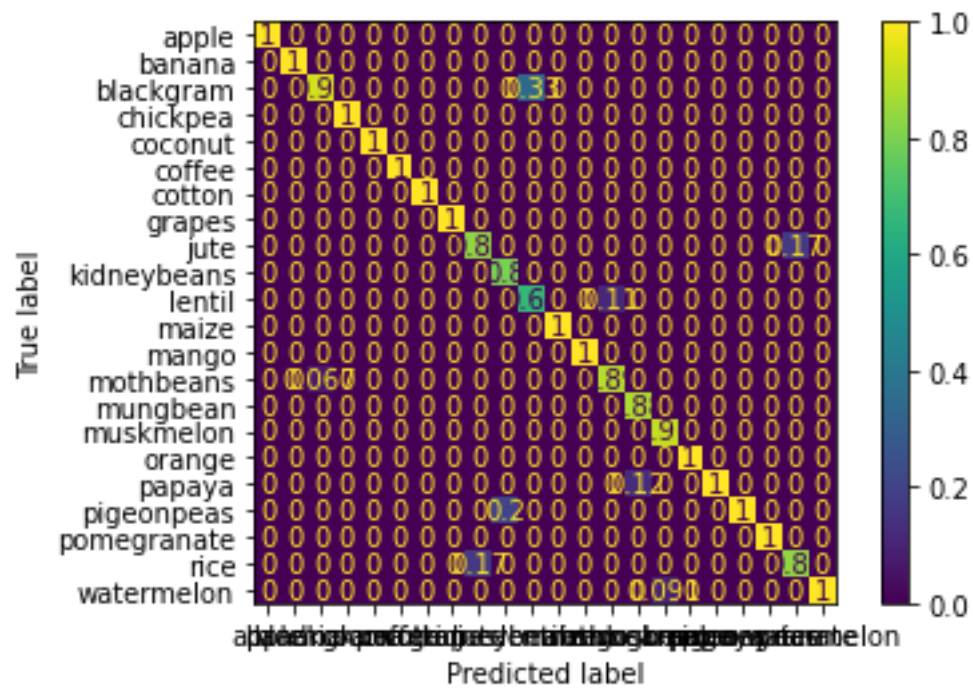


Classification report

	precision	recall	f1-score	support		precision	recall	f1-score	support
0	1.00	1.00	1.00	17	0	1.00	1.00	1.00	17
1	1.00	1.00	1.00	20	1	1.00	1.00	1.00	20
2	1.00	1.00	1.00	22	2	1.00	1.00	1.00	22
3	1.00	1.00	1.00	24	3	1.00	1.00	1.00	24
4	1.00	1.00	1.00	14	4	1.00	1.00	1.00	14
5	1.00	1.00	1.00	17	5	1.00	1.00	1.00	17
6	1.00	1.00	1.00	23	6	1.00	1.00	1.00	23
7	1.00	1.00	1.00	15	7	1.00	1.00	1.00	15
8	0.89	1.00	0.94	16	8	0.94	1.00	0.97	16
9	1.00	1.00	1.00	17	9	1.00	1.00	1.00	17
10	1.00	0.96	0.98	26	10	0.96	1.00	0.98	26
11	1.00	1.00	1.00	16	11	1.00	1.00	1.00	16
12	1.00	1.00	1.00	17	12	1.00	1.00	1.00	17
13	0.96	1.00	0.98	25	13	1.00	0.96	0.98	25
14	1.00	1.00	1.00	23	14	1.00	1.00	1.00	23
15	1.00	1.00	1.00	18	15	1.00	1.00	1.00	18
16	1.00	1.00	1.00	23	16	1.00	1.00	1.00	23
17	1.00	1.00	1.00	24	17	1.00	1.00	1.00	24
18	1.00	1.00	1.00	21	18	1.00	1.00	1.00	21
19	1.00	1.00	1.00	23	19	1.00	1.00	1.00	23
20	1.00	0.92	0.96	26	20	1.00	0.96	0.98	26
21	1.00	1.00	1.00	13	21	1.00	1.00	1.00	13
accuracy			0.99	440	accuracy			1.00	440
macro avg	0.99	0.99	0.99	440	macro avg	1.00	1.00	1.00	440
weighted avg	0.99	0.99	0.99	440	weighted avg	1.00	1.00	1.00	440

Logistic Regression

CONFUSION MATRIX

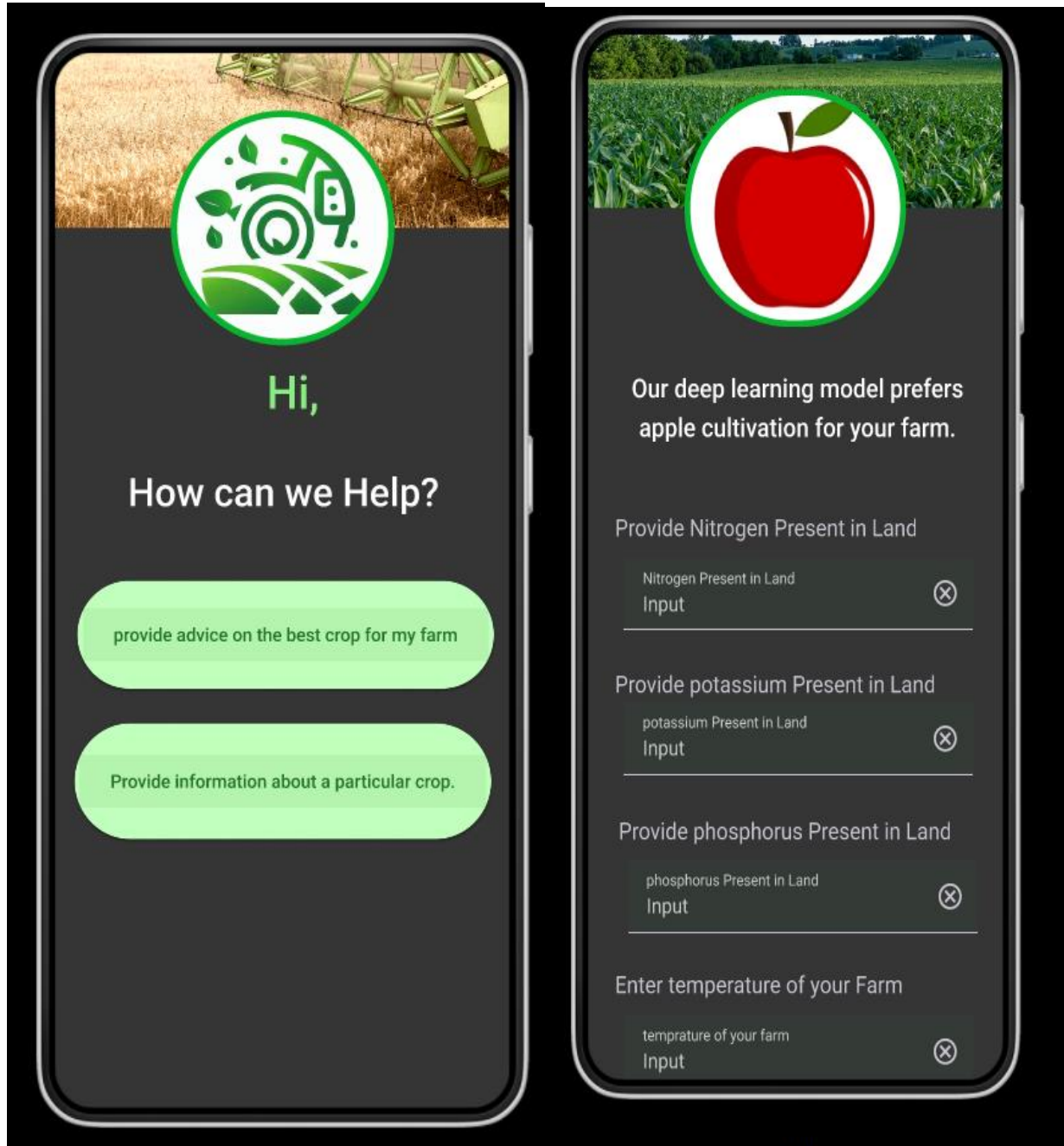


Classification report

	precision	recall	f1-score	support
0	1.00	1.00	1.00	8
1	1.00	1.00	1.00	9
2	0.88	1.00	0.93	7
3	1.00	1.00	1.00	12
4	1.00	1.00	1.00	12
5	1.00	1.00	1.00	13
6	1.00	1.00	1.00	14
7	1.00	1.00	1.00	9
8	0.71	0.83	0.77	6
9	0.78	1.00	0.88	7
10	0.92	0.85	0.88	13
11	1.00	1.00	1.00	12
12	1.00	1.00	1.00	11
13	0.89	0.89	0.89	9
14	0.90	1.00	0.95	9
15	1.00	1.00	1.00	9
16	1.00	0.90	0.95	10
17	1.00	0.75	0.86	8
18	1.00	0.82	0.90	11
19	0.92	1.00	0.96	12
20	0.91	0.91	0.91	11
21	1.00	1.00	1.00	8
accuracy			0.95	220
macro avg	0.95	0.95	0.95	220
weighted avg	0.96	0.95	0.95	220

ANDROID APP

APP DESIGN



APP FEATURES

- REAL TIME PREDICTION
- PROVIDES INFORMATION ABOUT FARM AND CROP
 - EASY TO USE
- CONSUME VERY LESS MOBILE MEMORY

Bibliography

Github Repo link: TODO

Dataset link: <https://www.kaggle.com/code/hannals/crop-recommendation-dataset>

ANN: <https://www.javatpoint.com/artificial-neural-network>

Random Forest: <https://www.ibm.com/in-en/topics/random-forest#:~:text=Random%20forest%20is%20a%20commonly,both%20classification%20and%20regression%20problems>.

Android App development:

<https://developer.android.com/courses/android-basics-compose/course?authuser=2>