



Department of Computer Science  
Winter 2020  
CS 890ES Data Science Fundamentals

## **Produce Item Recognition Application For Retail Stores Based on Machine Learning Project Setup Guide**

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### **1) Model Execution Steps**

This project can be executed on local system or on google colab. First, we will be talking about on how to execute on local system.

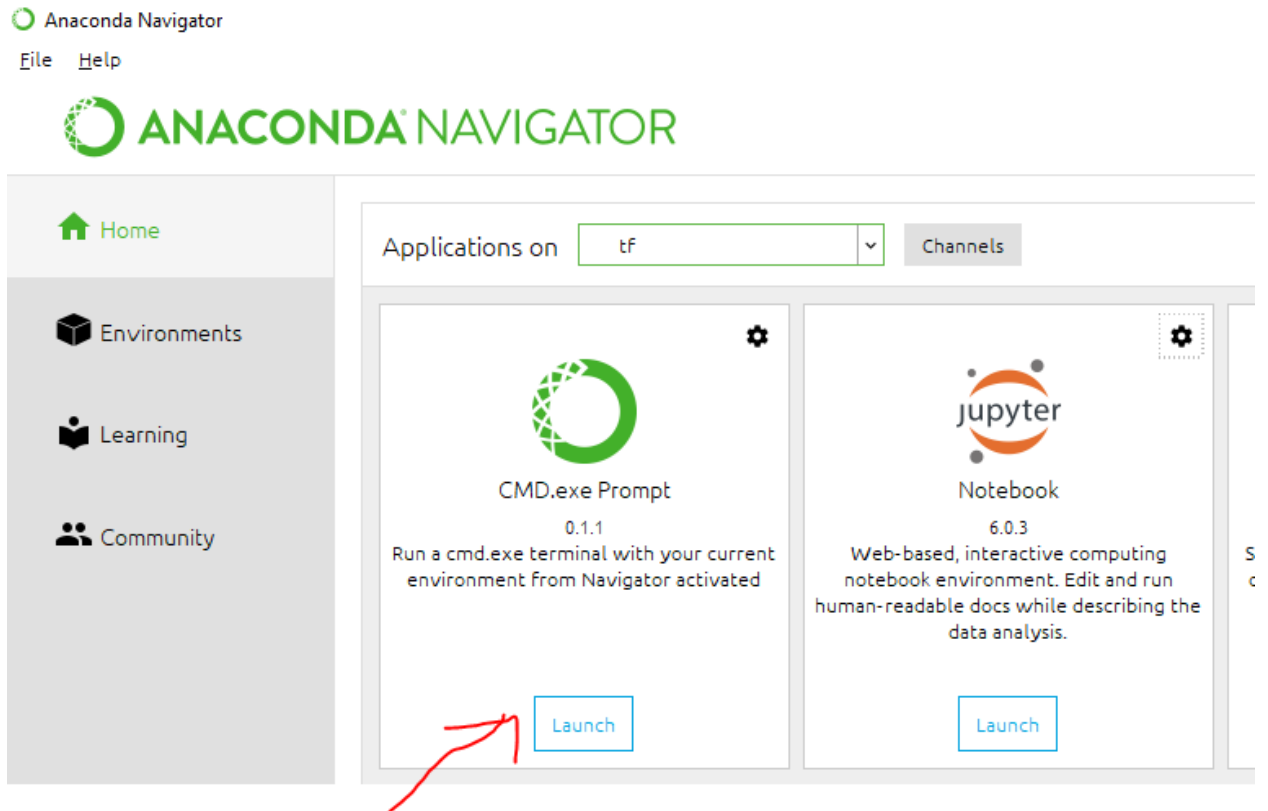
**1.1) To execute on local system-** Local Environment must be setup first. For this we must verify our hardware and software configuration.

**Required Hardware Configuration** - NVIDIA® GPU card with CUDA® Compute Capability 3.5 or higher

**Required Software Configuration** - NVIDIA® GPU drivers —CUDA 10.1 requires 418.x or higher. CUDA® Toolkit —TensorFlow supports CUDA 10.1 (TensorFlow >= 2.1.0) CUPTI ships with the CUDA Toolkit. cuDNN SDK (>= 7.6)














After making sure of hardware and software environment following steps must be performed-

- Install Anaconda from <https://www.anaconda.com/>
- Open Anaconda Navigator and click on console option



**Fig 1- Open conda console**

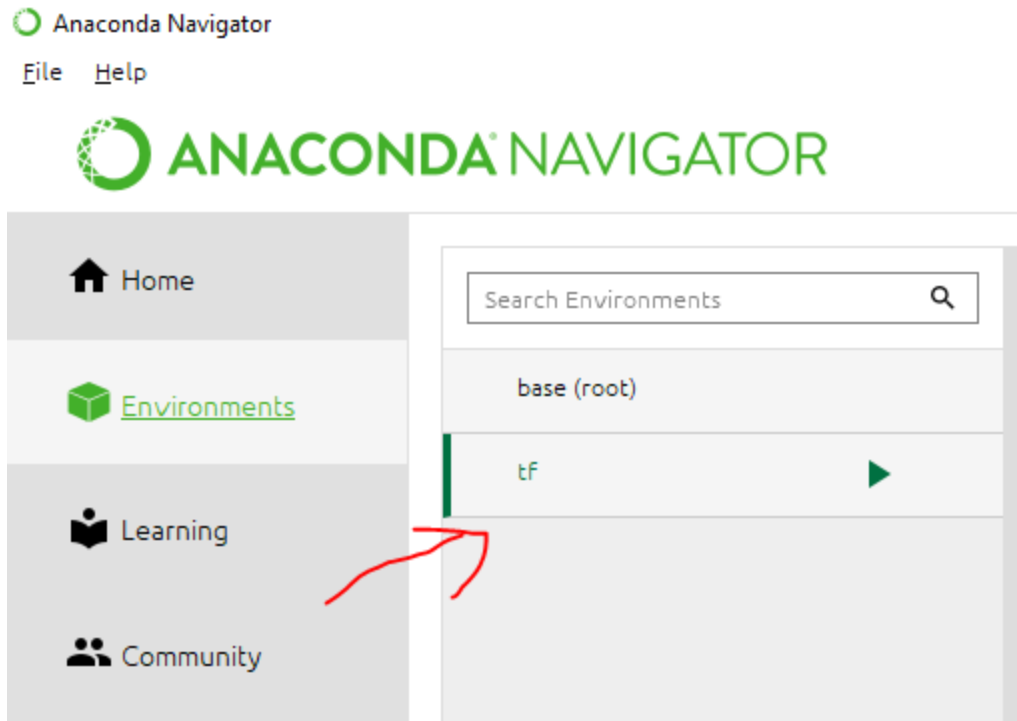
- Install TensorFlow in anaconda with the following commands  
conda create -n tf tensorflow  
conda activate tf
- Clone github repository from the command line  
git clone <https://github.com/AdarshKoppManjunath/ProduceItemRecognitionUsingCNN.git>

: > ProduceItemRecognitionUsingCNN				
Name	^	Date modified	Type	Size
 PIR- Kivy Application		4/16/2020 9:35 PM	File folder	
 PIR-DataSet		4/6/2020 1:25 PM	File folder	
 PIR-Images		4/16/2020 10:39 PM	File folder	
 PIR-Screenshots		4/16/2020 11:16 PM	File folder	
 PIR- Trial and Error of all 3 models		4/7/2020 10:20 AM	File folder	
 PIR- Conda Enviroment		4/16/2020 10:39 PM	Text Document	3 KB
 PIR- Kivy Application		4/9/2020 1:51 AM	WinZip File	88,432 KB
 PIR-CNN-rmsprop-bs16-ep10		4/6/2020 12:23 PM	IPYNB File	928 KB
 PIR-Create Dataset		4/6/2020 7:44 AM	IPYNB File	18 KB
 PIR-Resnet50-rmsprop-bs5-epoch5		4/6/2020 5:44 AM	IPYNB File	1,016 KB
 PIR-VGG16_sgd-bs32-epoch11		4/8/2020 2:06 AM	IPYNB File	4,249 KB
 README.md		4/16/2020 11:19 PM	MD File	6 KB
 Requirements		4/16/2020 10:39 PM	Text Document	1 KB

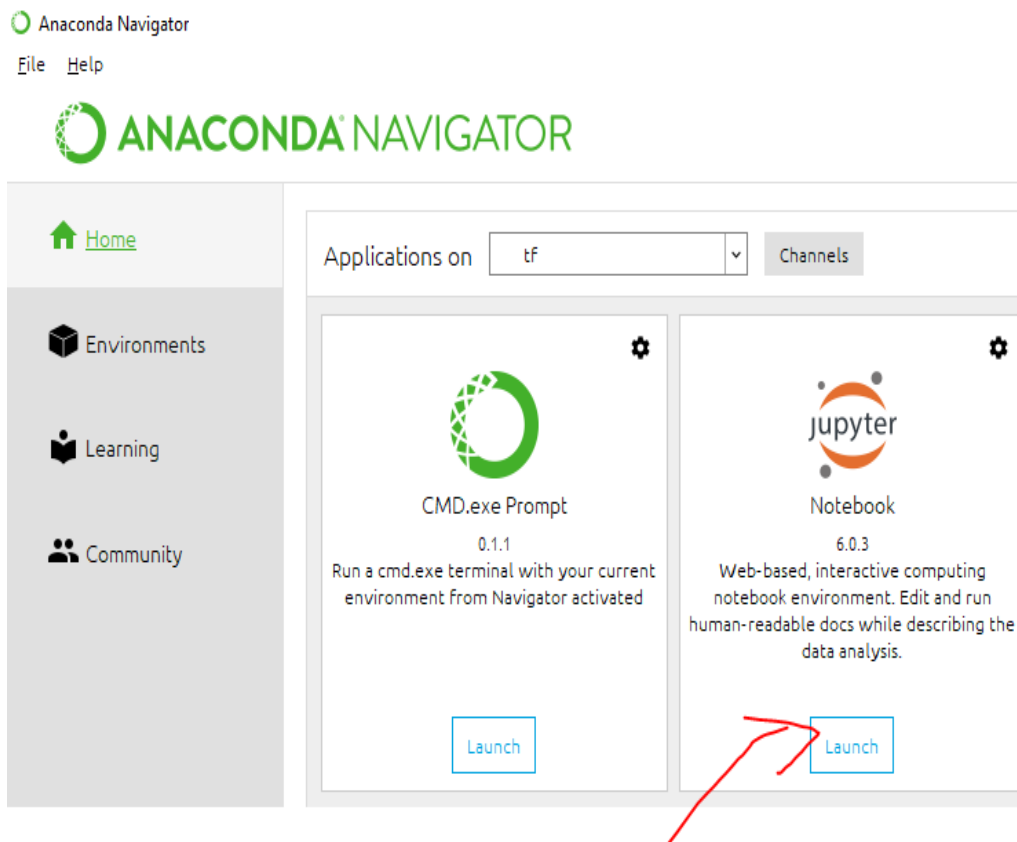
**Fig 2- ProduceItemRecognitionUsingCNN Repository**

- execute *cd ProduceItemRecognitionUsingCNN* to navigate to repository and install required libraries with the below command  

```
pip install -r requiremnets.txt
```
- Open Jupiter notebook with the tf environment and execute all the steps in all three model files. Model files listed below.



**Fig 3- tf environment**



**Fig 4- Jupyter Notebook**

(Change dataset path, and model save and load path in ipynb file according to your local system)

PIR-CNN-rmsprop-bs16-ep10.ipynb

PIR-Resnet50-rmsprop-bs5-epoch5.ipynb

PIR-VGG16\_sgd-bs32-epoch11.ipynb

- can see final results- classification report, confusion matrix and prediction for all the three models in your notebook.

## 1.2)To execute on google colab -

- we just need plotly library, remaining libraries comes with the google colab. We can install Plotly with the below command

!pip install plotly

- project can be extracted to your own drive with the below link.

<https://drive.google.com/open?id=1a9G7L8ztvcolDm6HJ9IDBAzveIQjIgU0>

- Open colab notebook and execute all the steps in all three model files. Model files listed below.

(Change dataset path, and model save and load path in ipynb file according to your drive location)

PIR-CNN-rmsprop-bs16-ep10.ipynb

PIR-Resnet50-rmsprop-bs5-epoch5.ipynb

PIR-VGG16\_sgd-bs32-epoch11.ipynb

- can see final result- classification report, confusion matrix and prediction for all the three models in your notebook.

## 2) Kivy Application

If you are executing only application and don't bother to run model, you might have to follow only below few steps and can ignore all above steps. If you have already installed all libraries mentioned in above steps, no need to follow below steps.

- Follow step a to c from the section 2.1
- Download kivy application code from the below command  
git clone <https://github.com/AdarshKoppManjunath/PIR--Kivy-Application.git>

KivyaApplication > PIR--Kivy-Application				
Name	Date modified	Type	Size	
image	4/16/2020 10:59 PM	File folder		
screenshots	4/16/2020 11:00 PM	File folder		
.DS_Store	4/16/2020 10:59 PM	DS_STORE File	9 KB	
labels	4/16/2020 10:59 PM	Text Document	1 KB	
main	4/16/2020 9:08 PM	PY File	5 KB	
Requirements	4/16/2020 10:59 PM	Text Document	3 KB	
vgg16_11.h5	4/16/2020 10:59 PM	H5 File	94,472 KB	

**Fig 5- Kivy Application Repository**

- Execute any of below command to install kivy

*conda install -c conda-forge kivy*

*conda install -c conda-forge/label/cf201901 kivy*

*conda install -c conda-forge/label/cf202003 kivy*

Navigate to ***cd PIR--Kivy-Application***

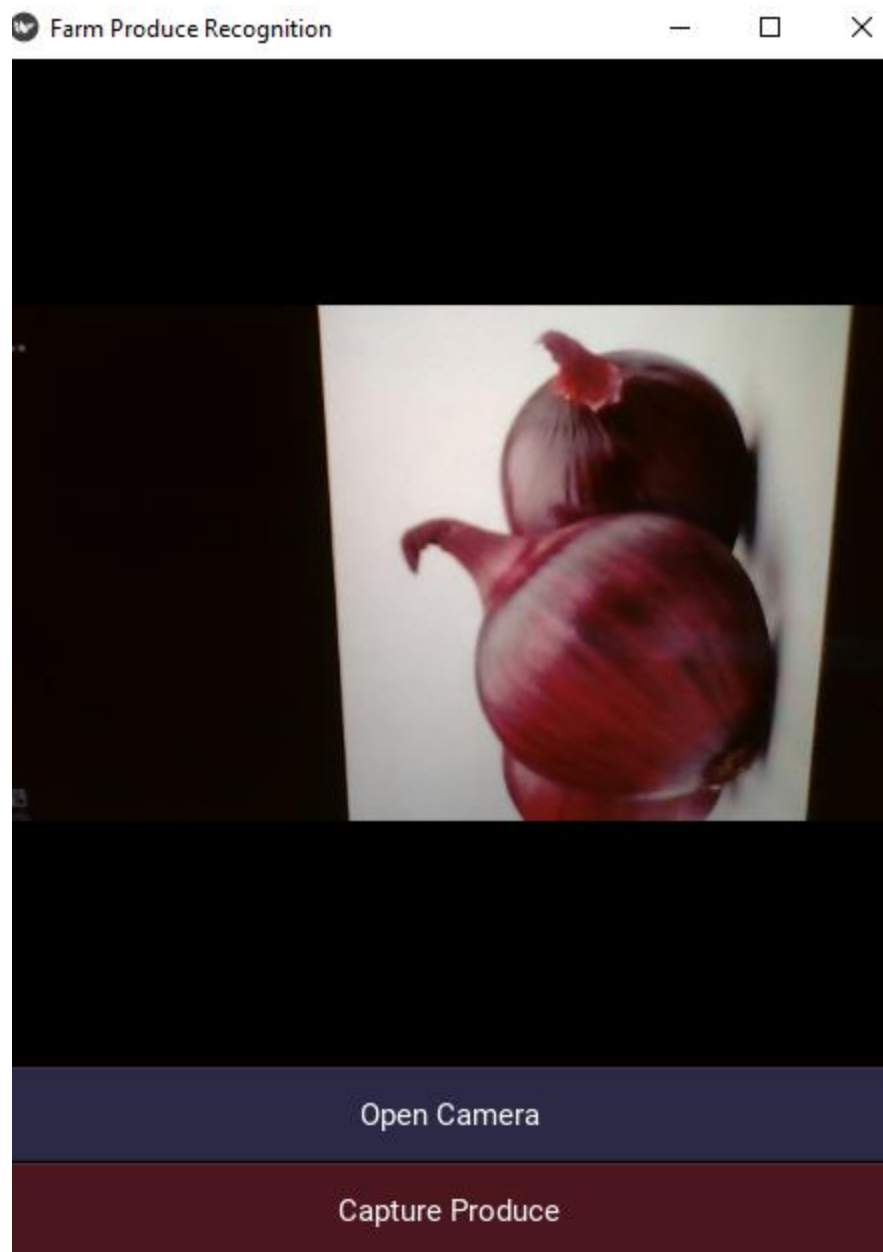
Execute ***python main.py***

**Open Camera-** On executing main.py, below we screen will be popped up .Click on open camera option.



**Fig 6- Open Camera**

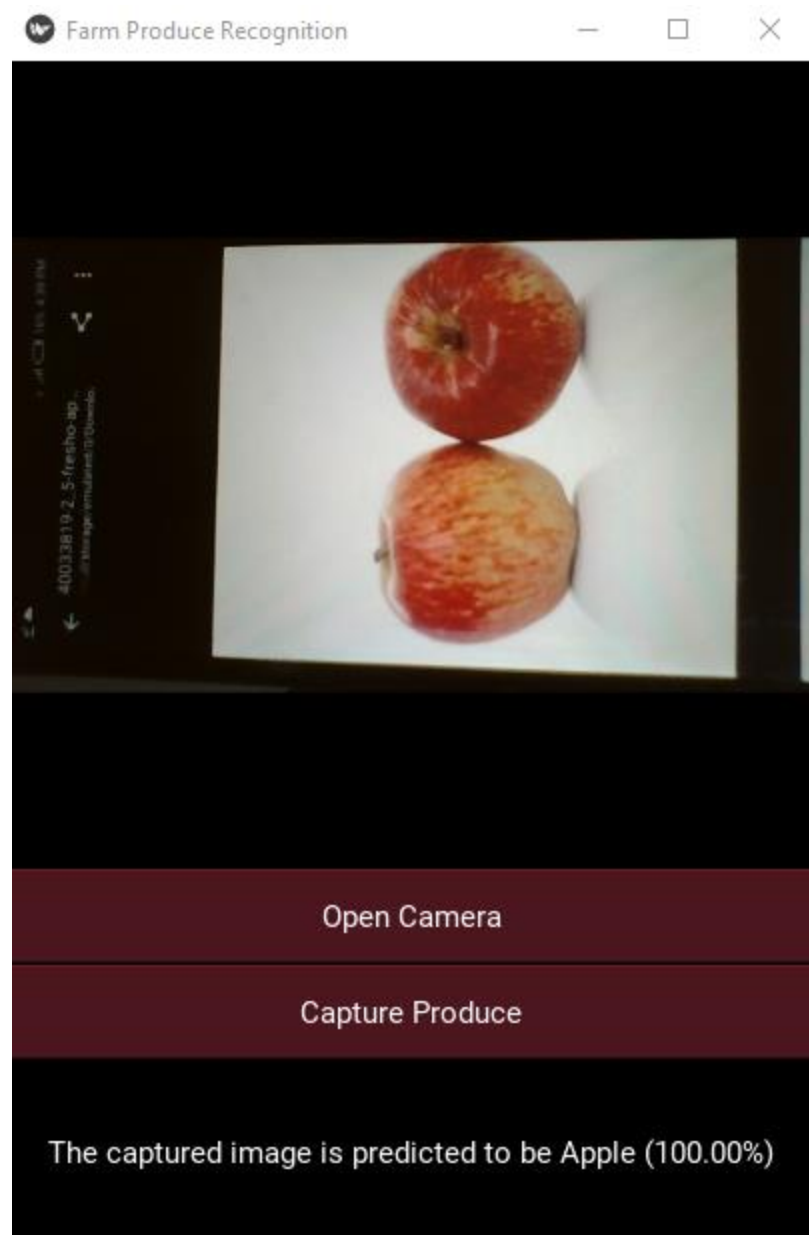
**Capture Image-** On clicking the open camera, camera will be on, click on capture whenever you want to capture image.



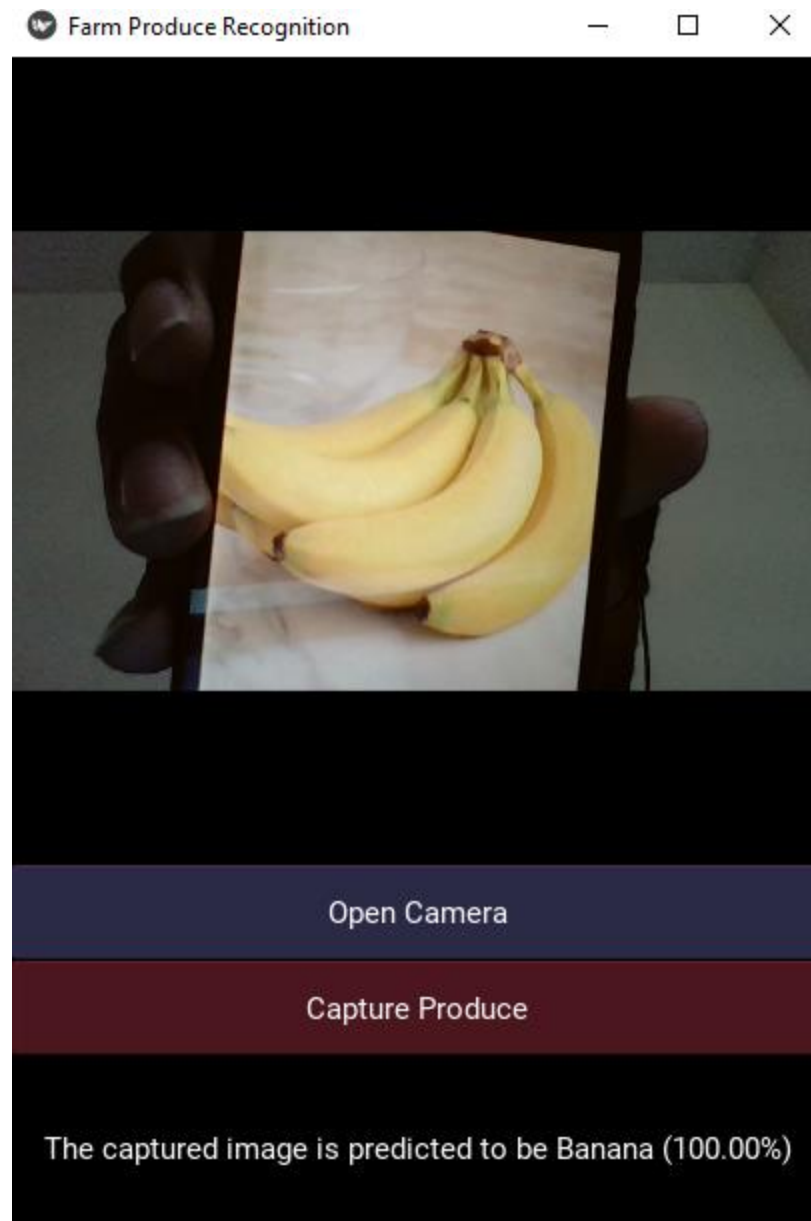
**Fig 7- Capture Produce**

**Results of different produce items-** Below are the results of some produce item prediction

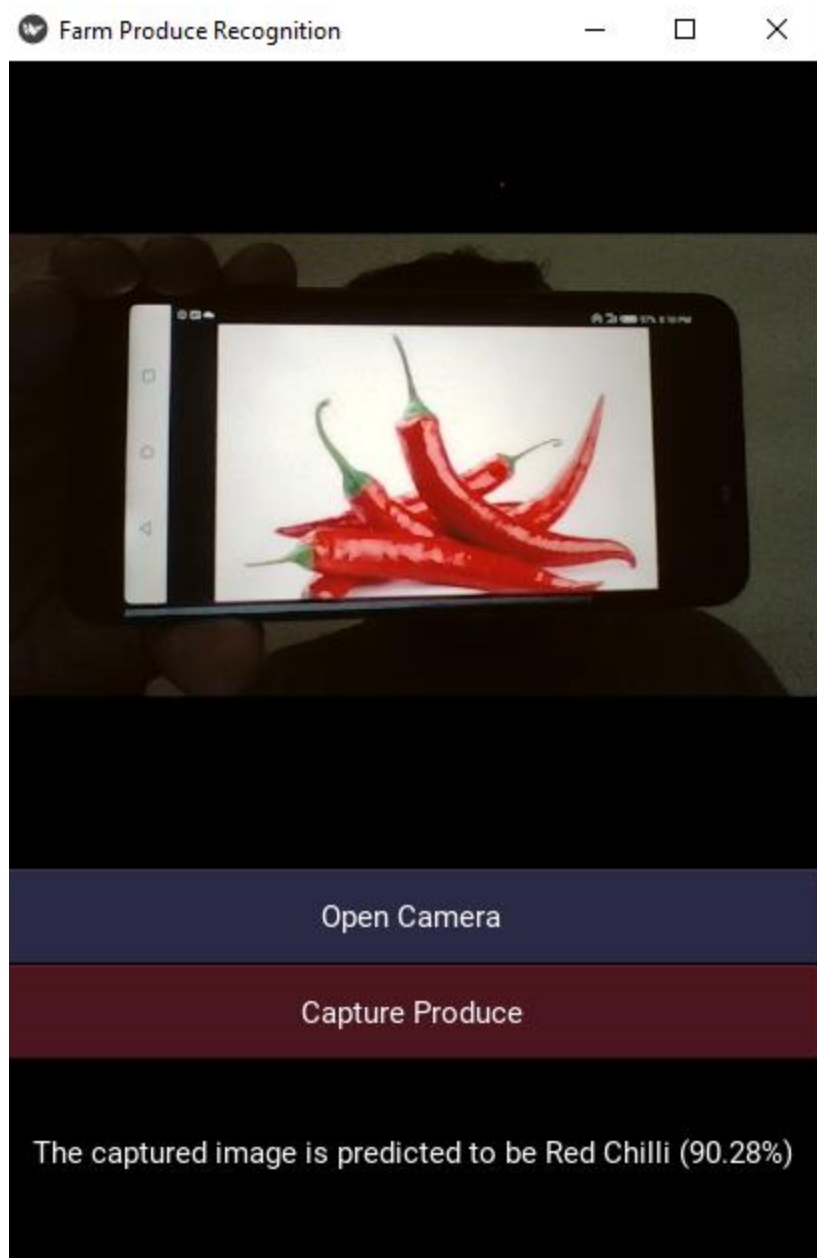




**Fig 8- Prediction Apple**



**Fig 9- Prediction Bannana**



**Fig 10- Prediction Red Chilli**