ANIMAL DETECTION USING IMAGE PROCESSING(FAUNETA)

JCS1621 - MINI PROJECT

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BONAFIDE CERTIFICATE

Certified that this project report "**ANIMAL DETECTION USING IMAGE PROCESSING (FAUNETA)"** is the bonafide work of **GAUTHAM GD (130171904026), GOKUL SELVEN S (10719104028), and GOPIKRISHNAN A (130719104029).**

Signature of Project in-charge Signature of Head of the Dept.

Submitted for the University examination held on _____.

INTERNAL EXAMINER

ABSTRACT

The state-of-the-art technique for animal detection and alerting for crop protection with the goal of achieving high precision with a real-time performance in addition to overcome the disadvantages of the traditional system this computer vision-based system will add more efficiency. In earlier, traditional system consist sensors and registers to identify the movement of object. Some human interventions are required to handle the traditional system, overcome those problems this Image processing-based system will work efficiently. The resulting system is fast and accurate, thus aiding those applications which require animal detection.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Objective

To Detect the Animals and their count in the given Farming Area.

1.2 Scope

Farm animals such as Cow, Pig, Goat etc. are usually raised in large numbers. It’s hard to keep track of every animal manually. So, people turn the technology for a solution. Sensor chips are widely used for keeping track of farm animals now-a-days. While these sensor chips do the work, it also comes with various disadvantages such as high initial cost and maintenance of the sensor chips and also the animals tend to get infections and various diseases because of the implantation of the sensor chips in their bodies. In order to avoid this painful process, we have proposed this system by using the Convolutional Neural Network (CNN).

CHAPTER 2

LITERATURE SURVEY

SI.NO.	REFERENCE PAPER	WORK DONE IN REFERENCE PAPER	LIMITATIONS / DRAWBACKS
1.	An Automated Mammals Detection Based on SSD-Mobile Net	Detecting the animals(mammals)	Only Mammals are detected
2.	Spotting east African mammals in open savannah from space	Detecting of large fauna in the open savannah of "Maasai Mara National Reserve, Kenya from very altitude resolution GeoEye-1 satellite" images.	Image classification is not clear for current version of system
3.	Automatically identifying, counting, and describing wild animals in camera-trap images with deep learning	Detecting animals in images, identifying species, and counting them	Not accurate for current version
4.	Animal recognition and identification with deep convolutional neural networks for automated wildlife monitoring	Identifying, and recognizing the animal images for Monitoring of Automated Wildlife" Bird, Rat, Bandicoot, Rabbit, Mouse,cat.	Using Deep Convolution Neural Network(CNN). Wildlife" Bird, Rat, Bandicoot, Rabbit, Mouse,cat.

CHAPTER 3

SYSTEM ANALYSIS

3.1 Problem statement

This System Count the Animals in the Farm and also Check Any Other Animal has Entered the Farm.

3.2 Existing system

Existing system recognizes only a specific set of mammals. This method is not dynamic which leads to numerous complications. Technology applied : Image recognition (RGB).Single Shot Detector (SSD).

3.3 Proposed system

This project is user friendly and can easily be accessed by every individual. This project can be operated in an anywhere in the World provided a computer system with internet. Input for the proposed system: Image / Video. Output for the proposed system: Checks the count of the Farming animals, also checks any other than the farming animals had entered in to the farm.

3.4 Hardware requirements

- Camera (CCTV).
- Computer system.
- Power supply.
- Internet connectivity.

3.5 Software specification

- Python3

  Python 3 has an easier syntax compared to Python 2. A lot of libraries of Python 2 are not forward compatible. A lot of libraries are created in Python 3 to be strictly used with Python 3.

- TensorFlow Libraries

  TensorFlow is a Python-friendly open-source library for numerical computation that makes machine learning and developing neural networks faster and easier.

- Keras

  Keras is a powerful and easy-to-use free open-source Python library for developing and evaluating deep learning models. It wraps the efficient numerical computation libraries Theano and TensorFlow and allows you to define and train neural network models in just a few lines of code.

CHAPTER 4

SYSTEM DESIGN

4.1 Architecture Diagram

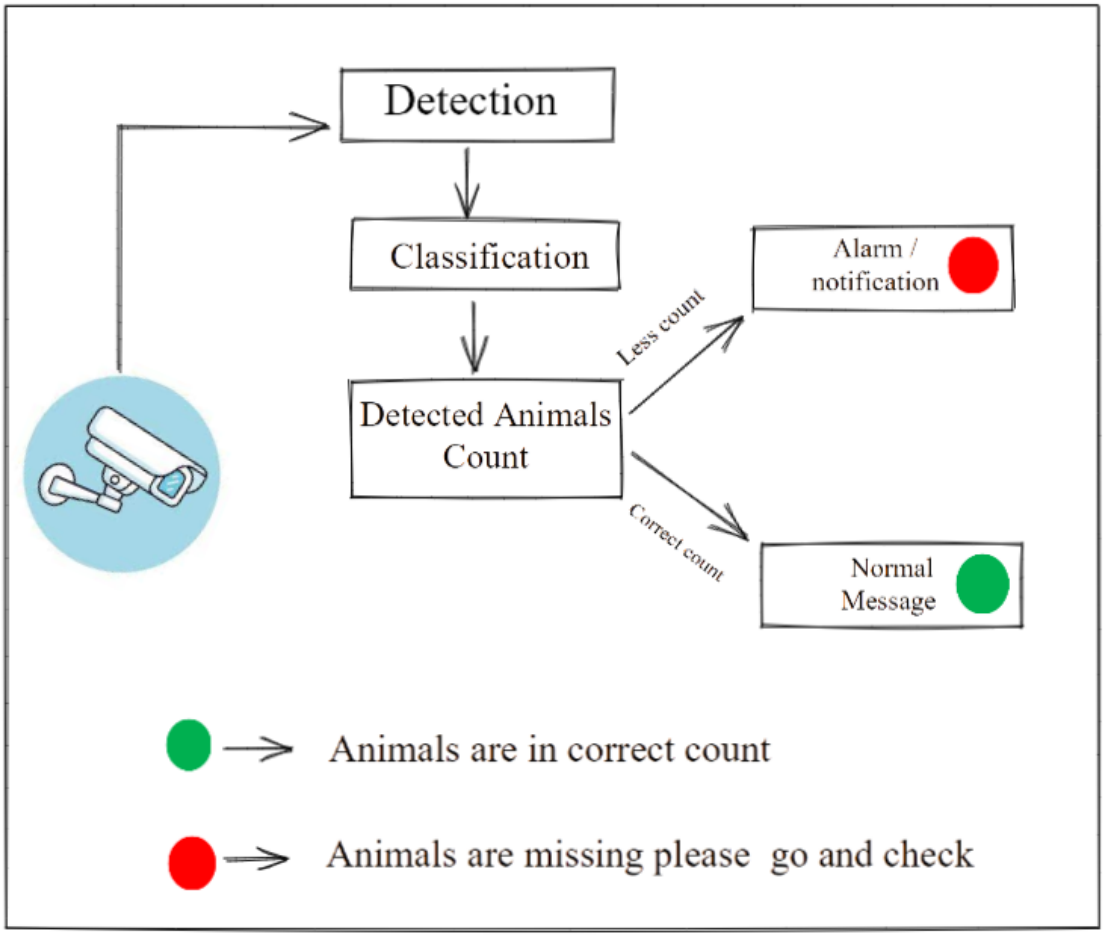

Fig 4.1

4.2 Modules Description

4.2.1 Module 1-Creation of Animal Database.

This module is worked on the platform MySQL - the most commonly used open-source SQL database management system to have the number of animals present in the given area.

At the same time, companies must record this information for a long time in order to compete. Since it is possible to quickly access the data

stored on the computer, it should be preferred. However, the data should be kept in the form of a database file, not a conventional filing system. In this method, the data can be filtered according to all kinds of criteria and the desired data can be reached quickly. With the data stored in animal husbandry enterprises for a long time, increasing the productivity in animal production, meeting the breeding needs of the desired characteristics, making efficient breeding organizations, and obtaining high income as a result of identifying the animals to be extracted from the herd will be made easier. At the same time, with the data stored for a long time, the legislation will be fulfilled in addition to quality and safe food monitoring from farm to table. Database software for storing technical data in animal husbandry; MySQL, Microsoft SQL, Microsoft Access, Postage SQL, Oracle, Firebird, IBM DB2 are some of them.

4.2.2 Module 2-Detection Through Camera(CCTV).

Object detection is the ability to identify objects present in an image. Thanks to depth sensing and 3D information, the ZED camera is able to provide the 2D and 3D position of the objects in the scene.

IMAGE PROCESSING

We propose reviews of the methodology presently used for detecting the presence of animals in the environment with focus on the most convenient techniques and approaches. The proposed system uses the deep learning CNN algorithm for image classification. By using image processing techniques, it is able to detect whether animals are there or not in real time. In order to recognize individual cows and to mitigate all the challenging tasks, an image processing system is proposed using the body pattern images of the cow. This system accepts an input image, performs processing operation on the image, and output results in the form of

classification under certain categories. CNN is mainly used in image analysis tasks like Image recognition, Object detection & Segmentation. Technically, convolutional neural network is modeled for the training and testing of each pattern image of 1000 acquired images of 10 species of cow which will pass it through a series of convolution layers with filters, pooling, fully connected layers and SoftMax function for the pattern images classification with probabilistic values between 0 and 1. The aim of this project is to use Deep Learning as a tool to correctly classify images of farming animals.

4.3 UML Diagrams

The design is a plan or drawing produced to show the look and function or workings of an object before it is made. Unified Modeling language (UML) is a standardized modeling language enabling developers to specify, visualize, construct and document artifacts of a software system. Thus, UML makes these artifacts scalable, secure and robust in execution. UML is an important aspect involved in object-oriented software development. It uses graphic notation to create visual models of software systems.

The different types of UML diagram are as follows.

- Use Case Diagram
- Class Diagram
- Activity Diagram
- Deployment Diagram

4.3.1 Use Case Diagram

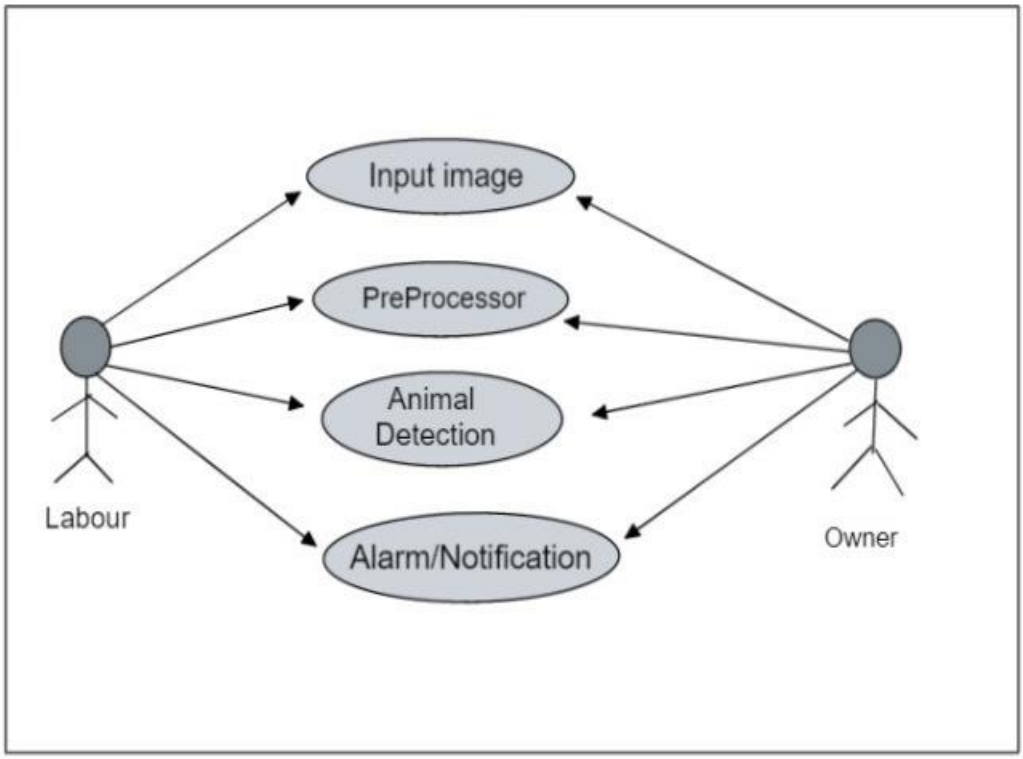

Fig4.2

4.3.2 Sequence Diagram

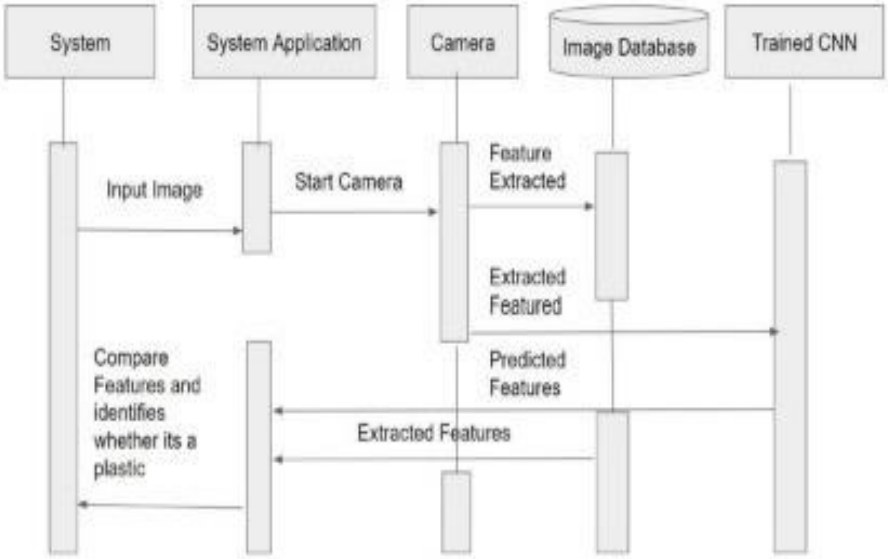

Fig4.3

4.3.3 Activity Diagram

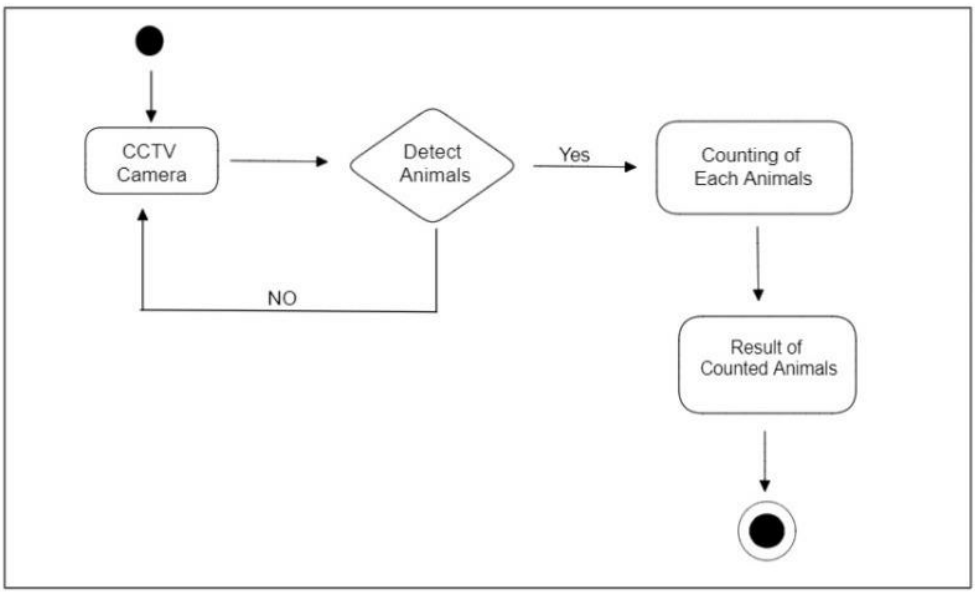

Fig4.4

4.3.4 Class Diagram

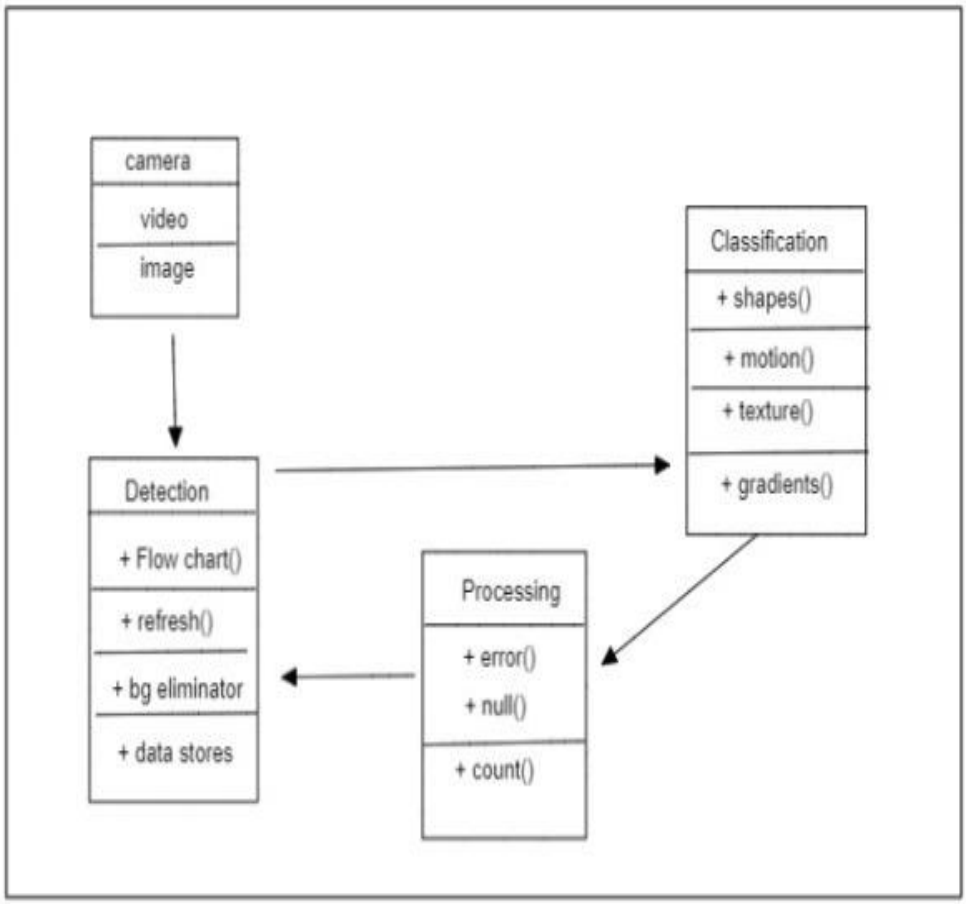

Fig4.5

CHAPTER 5

IMPLEMENTATION AND RESULTS

5.1 Implementation methodology

CONVOLUTIONAL NEURAL NETWORK

Within Deep Learning, a Convolutional Neural Network or CNN is a type of artificial neural network, which is widely used for image/object recognition and classification. Deep Learning thus recognizes objects in an image by using a CNN. Object detection consists of two separate tasks that are classification and localization. R-CNN stands for Region-based Convolutional Neural Network. R-CNN helps in localizing objects with a deep network and training a high-capacity model with only a small quantity of annotated detection data. It achieves excellent object detection accuracy by using deep learning to classify object proposals. Mask R-CNN, 3 an instance segmentation method popular for its class and mask regression, has been widely applied for cow image segmentation tasks. However, its algorithm relies on simultaneous localization and mapping algorithms, thereby discrediting its ability to completely segment an image foreground from the image background. In this paper, a Mask R-CNN segmentation method integrated with Grab cut is proposed. The method is for the detection and complete extraction of an image foreground from the image background. We performed an experiment using edge detection to compare the segmentation that is region-based with the boundary estimation. After comparing the segmentation, we have concluded that the Grab cut integrated with the Mask R-CNN is based on the computation of the edge detection approach employed by our proposed method.

5.2 MODULE WISE SCREENSHOTS

- FARMING ANIMALS DETECTION

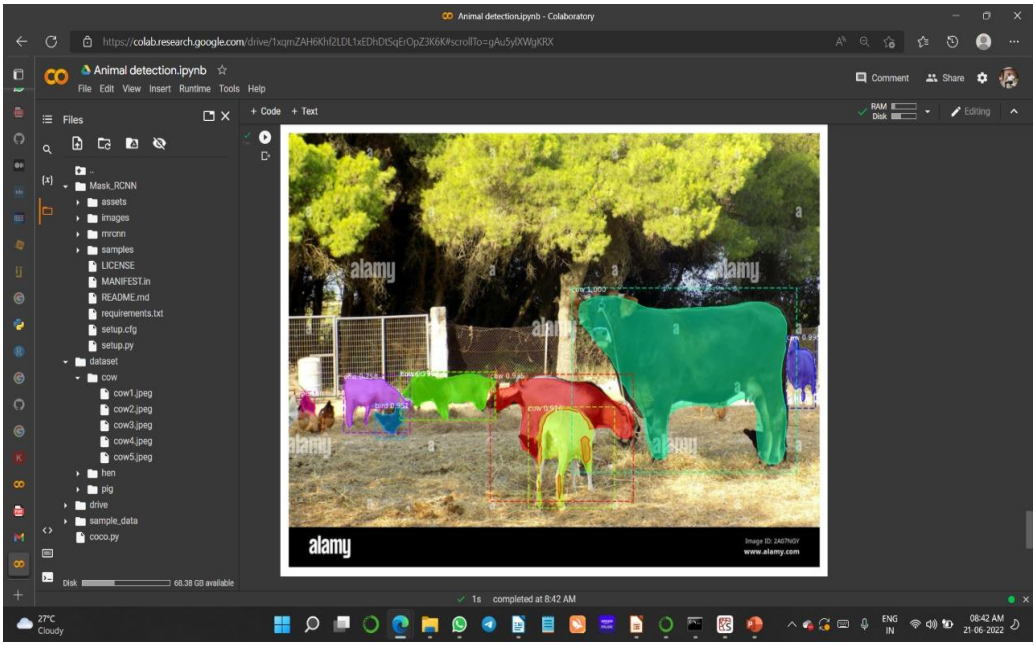

Fig 5.1

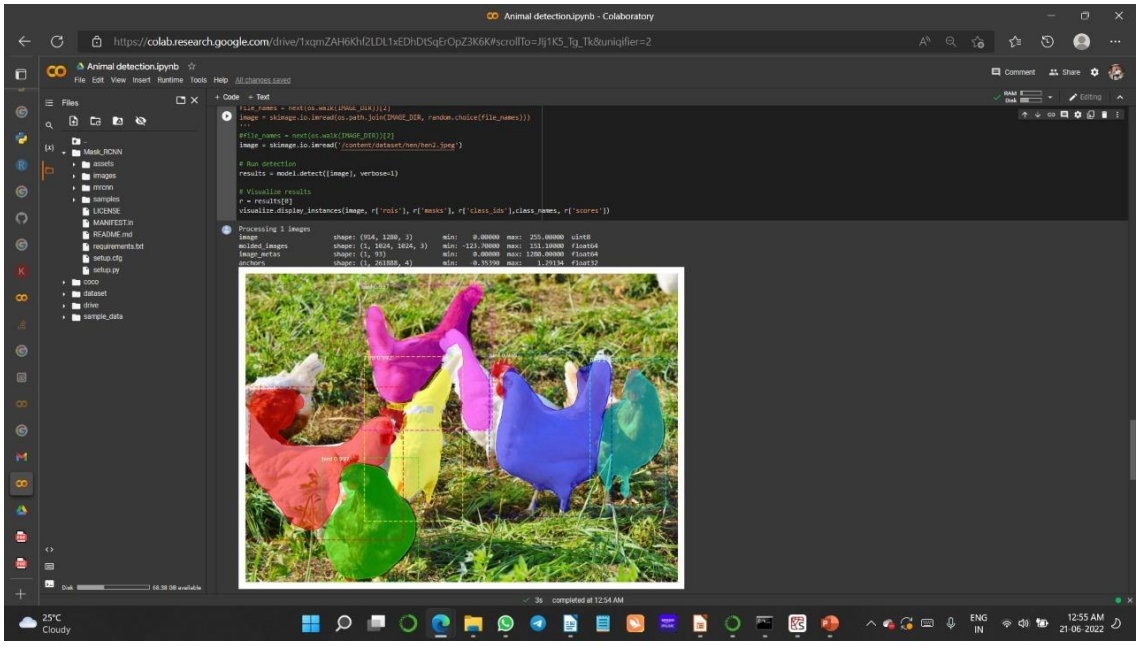

Fig 5.1.2

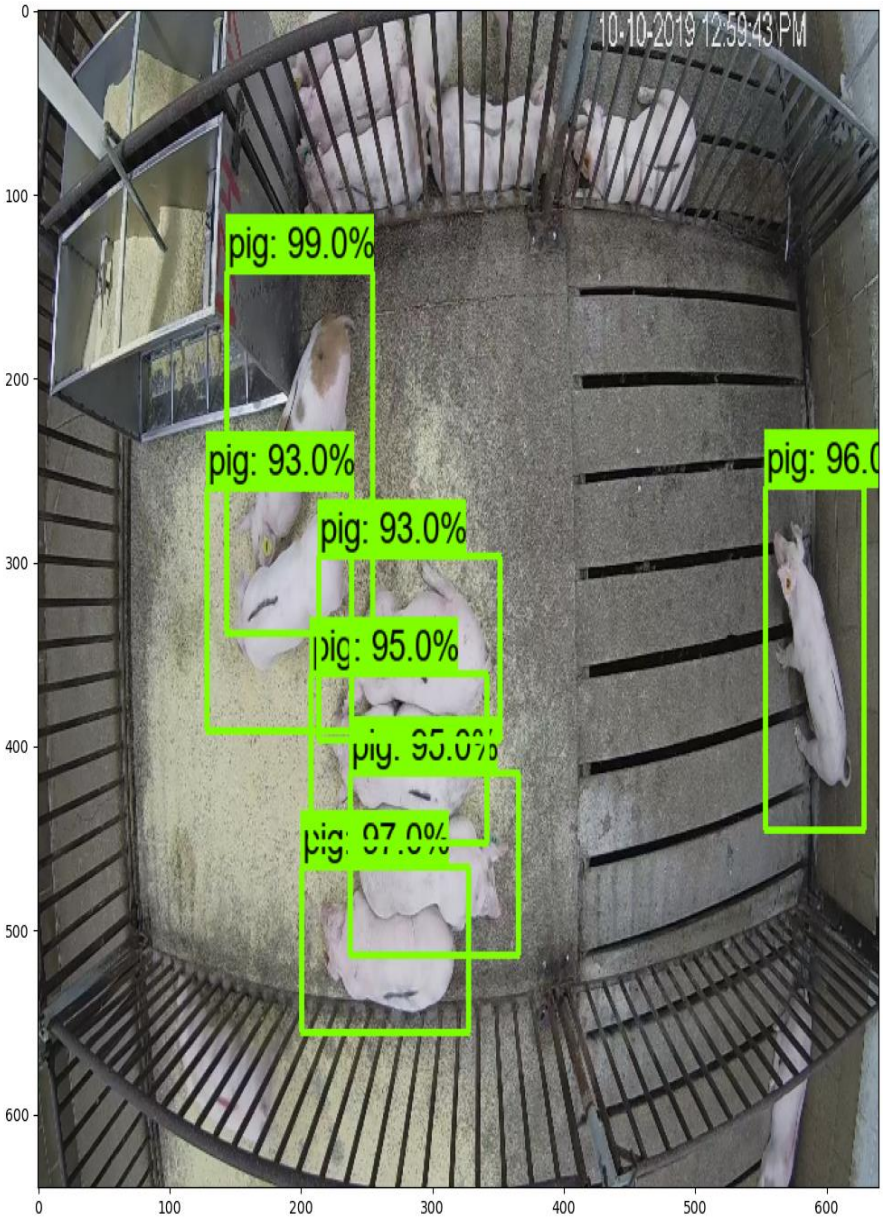
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Fig5.1.3

- LIBRARY FILES

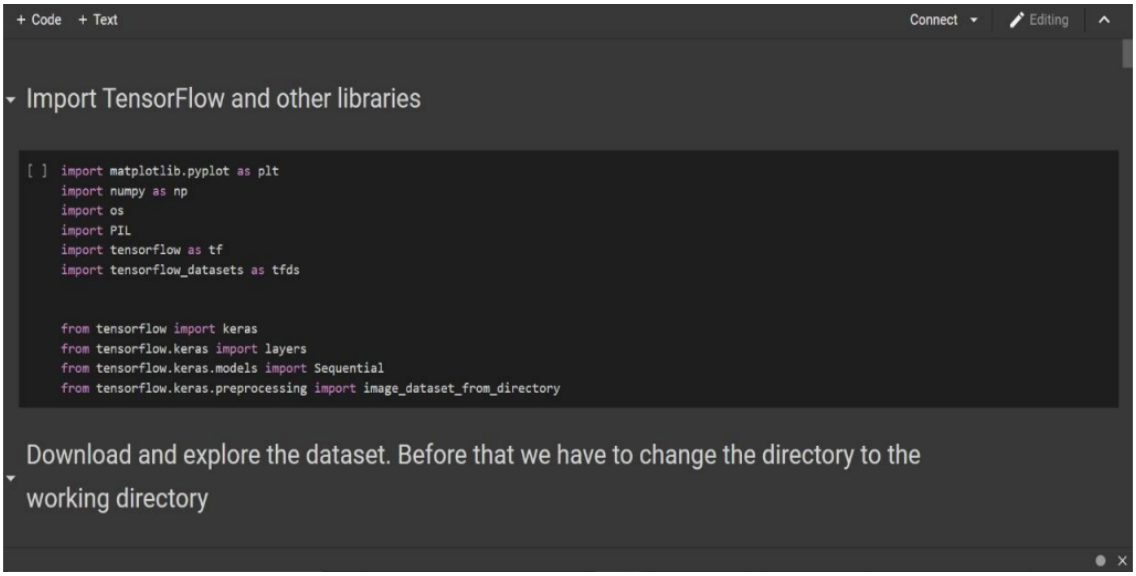

Fig 5.2

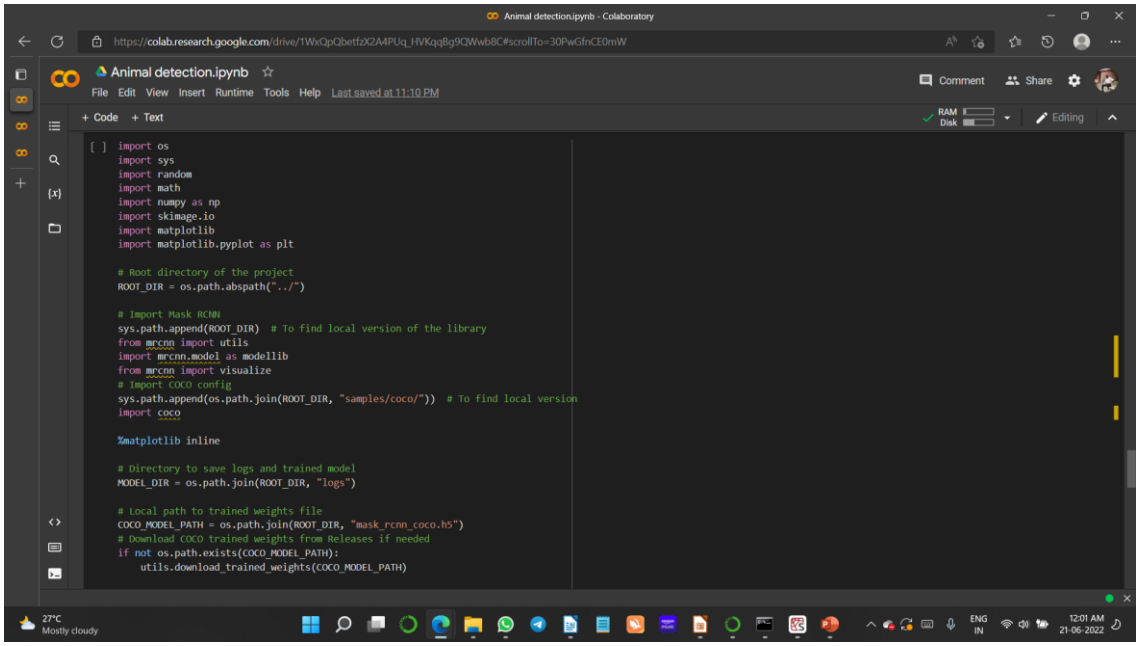

Fig 5.2.1

CHAPTER 6

CONCLUSION AND FUTURE WORK

CONCLUSION

We have proposed this model using the Convolutional Neural Network (CNN) to detect and know the number of animals in the farm or agricultural area. As we didn't have a large dataset its easy to use neural network. The hardware and software requirements are not much compared to other methodologies such as sensors chips . This project can be used in various farms and livestock factories as it can recognize various animals such as cow, goat , pig , hen .

FUTURE WORK

Now, this project is done using the current version of Convolutional Neural Network. And in the future the new version of the CNN will be used to prove its efficiency. The module represented in the above chapters will be produced as a small prototype and in the future, it will be in the form device. In the future many other features can be added to this project such as a warning system , an attached geographical map and so on . When this project comes to reality , it would significantly improve the field of cattle grazing and livestock maintenance.

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