BUILDING AN AI SNAKE IDENTIFIER USING FASTAI

BY

THENMOZHI.M

(19PCS018)

IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF

MASTER OF COMPUTER SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND HIGHER EDUCATION FOR WOMEN

COIMBATORE – 43

MAY 2021

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Project Report Submitted

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Signature of the
Head of the Department **Signature of Supervisor**

Viva-voce Examination held on _____

Signature of Examiner

DECLARATION

I hereby declare that this project work entitled **'BUILDING AN AI SNAKE IDENTIFIER USING FAST AI'** submitted to **Avinashilingam Institute for Home Science and Higher Education for Women , Coimbatore** in partial fulfillment of the degree of Master of Computer Science is a record of original work done by me under the guidance of **Dr.P.Subashini, M.Sc., M.Phil., Ph.D., professor, Department of Computer Science,** Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore and this project has not formed the basis for the award of any Degree/Diploma/Associate Ship/Fellowship or similar title to any candidate of this University.

SIGNATURE OF THE GUIDE **SIGNATURE OF THE CANDIDATE**

ACKNOWLEDGMENT

I would like to express my sincere thanks to **God Almighty**, for his constant love and grace that he has showed upon me, which kept me in good health, and sound mind without which my project would not have reached a successful end.

I would like to express my deep sense of reverential gratitude and sincere thanks to **Dr. S. P. Thyagarajan., Chancellor**, Avinashilingam Institute of Home Science and Higher Education for Women, Coimbatore , for the opportunity given to me for undertaking this study and for providing the needed facility during the course of my study.

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I have great pleasure in expressing my deep sense of gratitude to all other teaching and non-teaching staff members who stood behind the screen for the completion of the project.

I would extend my hearty thanks to one and all that helped me directly or indirectly for the successful completion of my project.

ABSTRACT

The project entitled "**BUILDING AN AI SNAKE IDENTIFIER USING FAST AI**" The main objective of this project is to identify the given snake images as venomous or non-venomous using Deep learning algorithm.

In this project, I aimed to use image classification for identify the snake images This project develops an algorithm to detect the snake specious in wild life. Since there are 3500 large number of different specious manually identifying them can be a difficult task. This algorithm classifies snake based on their images so we can monitor them more efficiently. Snake detection and classification can help to prevent snake bitten accident, trace that specious. This can be achieved by applying effective deep learning algorithms(CNN).

In this project presents automatic snake identification from the snake images. Loading the images is the first phase, later the image is pre-processed to resizing the all image into 255 x 255 matrix and rescaling the image is converted to RGB to grayscale image. In Feature extraction I used Grayscale pixel techniques This simplest way to create features from an image is to use these raw pixel values as separate features. Finally Deep learning algorithm (CNN) used to predict the snake images as venomous and non-venomous.

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INTRODUCTION

1. INTRODUCTION

Snakes that are cold-blooded vertebrates falls into two categories, which is venomous and non-venomous. Many venomous snakes have apperead in many countries, and they are a real threat to the public safety and health.

Snake identification is the observable visual traits in a major reason of death resulting from snake bites. So far no automatic classification method has been proposed to indentify snakes by using the neural network (AI). Image based snake species identification problem. Here snake species identification is conducted manually based on the observation of the characteristics such as head shape, body pattern, body color, and eyes shape. Then, an intelligent approach is proposed to automatically identify a snake species based on an image which is useful for content retrieval purpose where a snake species can be predicted when ever image is given an input to identify the snakes as venomous and non-venomous.

1.1 PROBLEM DEFINITION

The human beings face the many problem by snake bitten. The first comprehensive snake identifier though was to simply test if an neural network(AI) system would do better than humans in avoiding a common snake mistake. E.g., Namely, the venomous copperhead and the harmless corn snake are frequently confused, resulting in many harmless corn sakes being killed as “copperheads”. In this project presents automatic snake identification from the snake images. Loading the images is the first phase, later the image is pre-processed to resizing the all image into 255 x 255 matrix and rescaling the image is converted to RGB to grayscale image. In Feature extraction I used Grayscale pixel techniques This simplest way to create features from an image is to use these raw pixel values as separate features. Finally Deep learning algorithm (CNN) used to predict the snake images as venomous and non-venomous

1.2 OVER VIEW OF THE PROJECT

The main aim of the project" **BUILDING AN AI SNAKE IDENTIFIER USING FAST AI"** is to identify the snakes as venomous and non-venomous. In this project present automatic snake identification from the snake image dataset. They are many images in dataset I split the data as train and test. Later, the dataset trained network and I get an model loss and accuracy value of the trained data. Finally, I used deep learning algorithm (CNN) to predict the images as venomous and non-venomous.

SYSTEM SPECIFICATION

2. SYSTEM SPECIFICATION

2.1 HARDWARE SPECIFICATION:

- Hard Disk : 232.89 GB
- Monitor : 15”color monitor
- RAM : 2.00 GB
- Processor : AMD A4 PRO-3340b with Radeon HD graphics
- Processor speed : 2.20 GHZ
- System Type : 64-bit Operating System

2.2 SOFTWARE SPECIFICATION:

- Operating System : Windows 8
- Software : Python 3.7(JYPETR NOTEBOOK)

2.3 ABOUT THE SOFTWARE

Python Programming

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- **Python is Interpreted**: Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- **Python is Interactive**: You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- **Python is Object-Oriented**: Python supports Object-Oriented style or technique of programming that encapsulates code within objects
- **Python is a Beginner's Language**: Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

HISTORY OF PYTHON

- Python was developed by Guido van Rossum in the late eighties and early nineties at the National Research Institute for Mathematics and Computer Science in the Netherlands.
- Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, SmallTalk, and Unix shell and other scripting languages.
- Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL).
- Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

PYTHON FEATURES

Easy-to-learn − Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.

- **Easy-to-read** − Python code is more clearly defined and visible to the eyes.
- **Easy-to-maintain** − Python's source code is fairly easy-to-maintain.
- **GUI Programming** − Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the Window system of Unix.

Anaconda

Itis a free and open source distribution of the Python and R programming languages for data science and machine learning related applications (large-scale data processing, predictive analytics, scientific computing), that aims to simplify package management and deployment. Package versions are managed by the package management system conda. The Anaconda distribution is used by over 6 million users, and it includes more than 250 popular data science packages suitable for Windows, Linux, and MacOS.

JUPYTER NOTEBOOK:

Jupyterlab is web based interactive development environment for Jupyter notebooks, code, and dagta. JupyterLab is flexible configure and arrange the user interface to support a wide range of workflows in data science, scientific computing, and machine learning.

Features

- Editor with syntax highlighting and introspection for code completion
- Support for multiple Python consoles (including IPython)
- The ability to explore and edit variables from a GUI Available plugins

Fastai

fastai is a deep learning library which provides practitioners with high-level components that can quickly and easily provide state-of-the-art results in standard deep learning domains, and provides researchers with low-level components that can be mixed and matched to build new approaches. It aims to do both things without substantial compromises in ease of use, flexibility, or performance.

- A new type dispatch system for Python along with a semantic type hierarchy for tensors
- A GPU-optimized computer vision library which can be extended in pure Python

Python Packages

There were a number of different Python packages and modules used for different areas of functionality across this project. Below are a list and a description of the packages.

- **NumPy** It provides some advance math functionalities to python.
- **matplotlib**. **pyplot** is a collection of command style functions that make matplotlib work like MATLAB. Each pyplot function makes some change to a figure. Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Matplotlib is one of the most popular Python packages used for data visualization.

SYSTEM ANALYSIS

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

The existing system involves trained and experienced. One of the application of market may be used as an upgraded system for snake species identification. Currently, the adopted DNA barcoding system is based on one and limitation in classifying species separated short divergence time.

DIS ADVANTAGES:

- No efficient methods used.
- Real time data are not used.

3.2 PROPOSSED SYSTEM

The proposed system implemented by using Data augmentation is a collection of techniques applied to image processing. This is a strategy that enables practitioners to significantly increase the data available for training models, without actually collecting new data. Then, Feature extraction helps to reduce the amount of redundant data from the data set.

ADVANTAGES

- Reduces analytical time.
- Improves accuracy

SYSTEM DEVELOPMENT

4. SYSTEM DEVELOPMENT

4.1 MODULES

- Image acquisition
- Data pre-processing
- Data Augmentation
- Splitting data
- Feature extraction
- Deep learning classification (cnn)

4.2 MODULE DESCRIPTION

4.2.1 Image Acquisition

Data collection plays an important role. Finding the required datasets is a prime task. The data preparation typically consumes about 90% of the time of the project. Once available data sources are identified, they need to be selected, cleaned, constructed and formatted into the desired form. The data is collected from the github. It contain 5 specious snake images.

4.2.2 Pre-processing

The input image of resizing into (255 × 255) pixels is selected for further processing. The input image may have low brightness and contrast. . Low-quality data will lead to low-quality mining results. Hence it is essential to pre-process the data. There are a number of pre-processing techniques. Later rescaling process The dataset images are converted from RGB to Grayscale image.

4.2.3 Data augmentation

Data augmentation is a collection of techniques applied to image processing. This is a strategy that enables practitioners to significantly increase the data available for training models, without actually collecting new data.

4.2.4 Spiltting data

The data set consist of only one class. I split the dataset into two class. Training and test Train data consist of 80% images. Test data consist of 20% images. Dataset Splitting is easy to process the data.

4.2.5 Feature extraction

Feature e Feature extraction is a part of the dimensionality reduction process, in which, an initial set of the raw data is divided and reduced to more manageable groups. Feature extraction helps to reduce the amount of redundant data from the data set. Grayscale Pixel Value works as simplest way to create features from an image is to use these raw pixel values as separate features.

4.2.6 Deep learning

Deep learning uses artificial neural networks to perform sophisticated computations on large amounts of data. It is a type of machine learning that works based on the structure and function of the human brain**.** Deep learning is a subset of machine learning. Deep artificial neural networks are a set of algorithms that have set new records in accuracy for many important problems, such as image recognition, sound recognition, etc., In deep learning, a convolutional neural network (CNN) is a class of deep neural networks, most commonly applied to analyzing visual imagery.CNNs use relatively little pre-processing compared to other image classification algorithms

Convolutional neural network (CNN)

CNN also known as ConvNets, consist of multiple layers and are mainly used for image processing and object detection. Yann LeCun developed the first CNN in 1988 when it was called LeNet. When building Convolutional Neural Networks, we can actually *skip* the feature extraction step. The reason for this is because CNNs are *end-to-end* models. We present the raw input data (pixels)to the network.

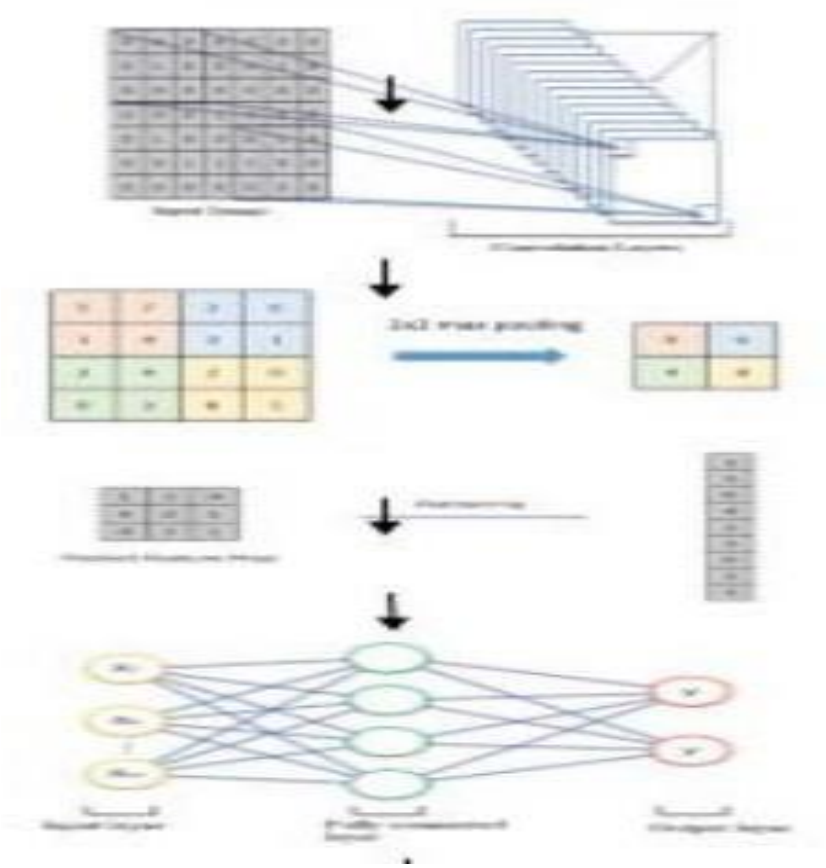
CONV layer will compute the output of neurons that are connected to local regions in the input, each computing a dot product between their weights and a small region they are connected to in the input volume.

POOL layer will perform a down sampling operation along the spatial dimensions (width, height), resulting in volume.

Flattening is the process of converting all the resultant 2 dimensional arrays into a single long continuous linear vector. It gets the output of the convolutional layers, flattens all its structure to create a single long feature vector to be used by the dense layer for the final classification.

Fully connected layer will compute the class scores, resulting in volume of size. As with ordinary Neural Networks and as the name implies, each neuron in this layer will be connected to all the numbers in the previous volume.

CNN Block diagram



SYSTEM IMPLEMENTATION

5. SYSTEM IMPLEMENTATION

The main aim of the project" **BUILDING AN AI SNAKE IDENTIFIER USING FAST AI**" is to identify the snakes as venomous and non-venomous. In this project present automatic snake identification from the snake image dataset. In this project presents automatic snake identification from the snake images. Loading the images is the first phase, later the image is pre-processed to resizing the all image into 255 x 255 matrix and rescaling the image is converted to RGB to grayscale image. Later data agumentation a collection of techniques applied to image processing. This is a strategy that enables practitioners to significantly increase the data available for training models, without actually collecting new data. In Feature extraction I used Grayscale pixel techniques This simplest way to create features from an image is to use these raw pixel values as separate features. Later, the dataset trained network and I get an model loss and accuracy value of the trained data. I got an module accuracy value as Finally Deep learning algorithm (CNN) used to predict the snake images as venomous and non- venomous.

CONCLUSION

6. CONCLUSION

This project uses Convolutional Neural Network (CNN) algorithm to detect wild animals. The algorithm classifies animals efficiently with a good number of accuracy and also the image of the identify specious is displayed for a better result so that it can be used for other purposes such as identify snake specious entering into human habitat.

SCOPE FOR FUTURE ENHANCEMENT

7. SCOPE FOR FUTURE ENHANCEMENT

The system which is at present developed using Python software Convolutional neural metwork (CNN) techniques can be used to analyze and classify the snake species. The system can be used as a helping guide, especially in places where there are less experts related to the field. This work can be further extended by sending an alert in the form of a message when the snake is detected to the nearby tourist hotels, forest office.

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8. BIBLIOGRAPHY

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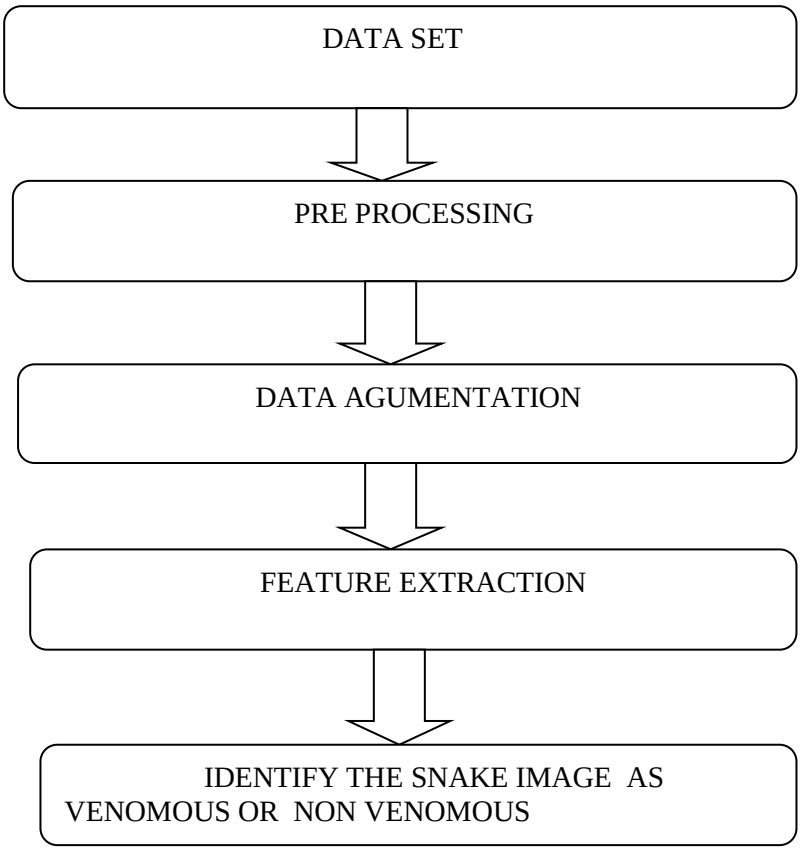
APPENDIX

9. APPENDIX

SYSTEM FLOW DIAGRAM



DATASET

The dataset is downloaded from the github website. It contains 5 specious snake images.

SAMPLE DATASET

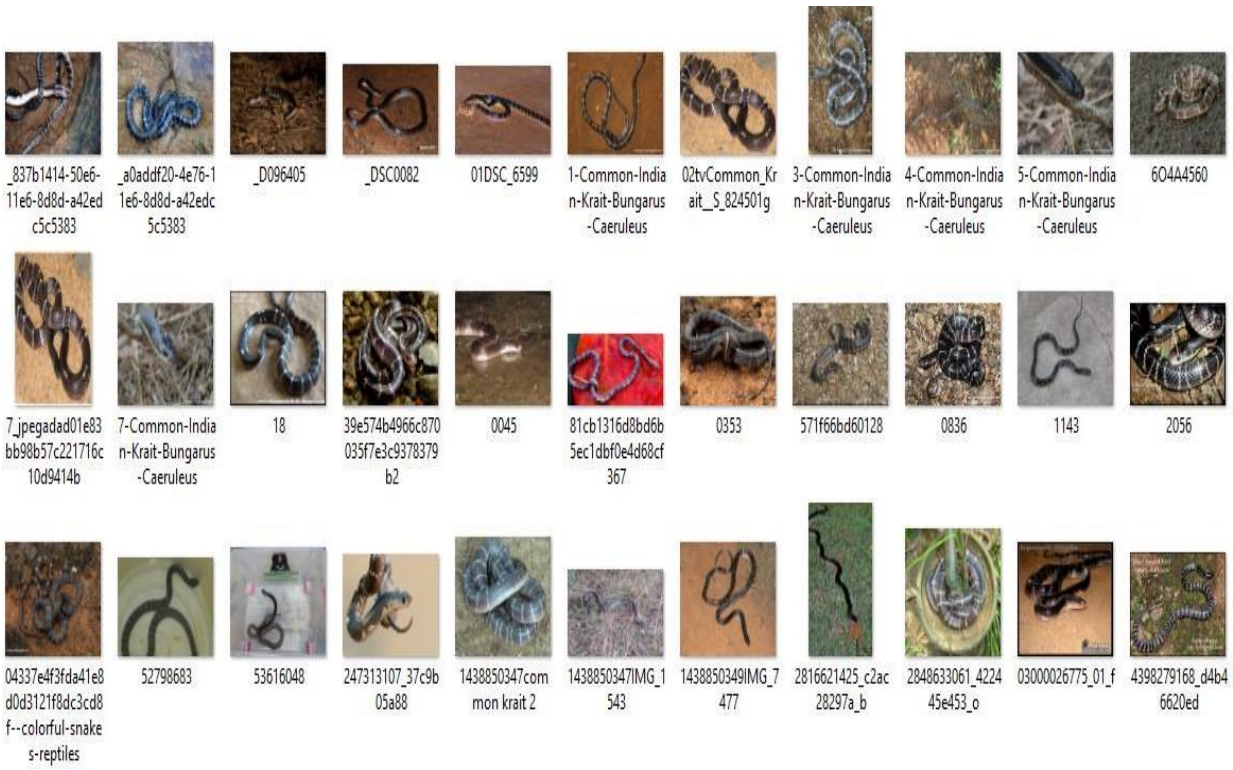


Fig1: dataset

10. SCREEN SHOT

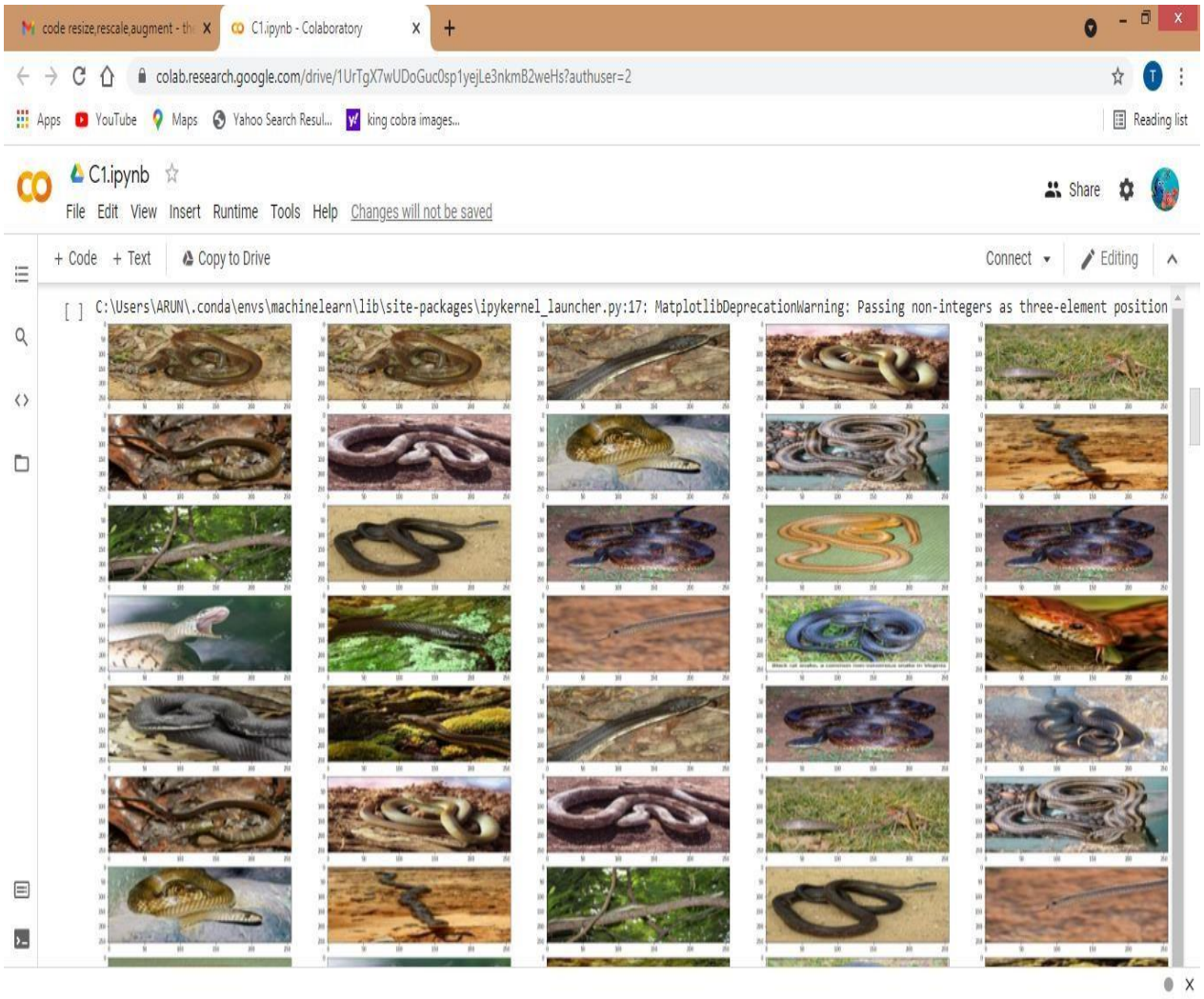


Fig: 2 resized images

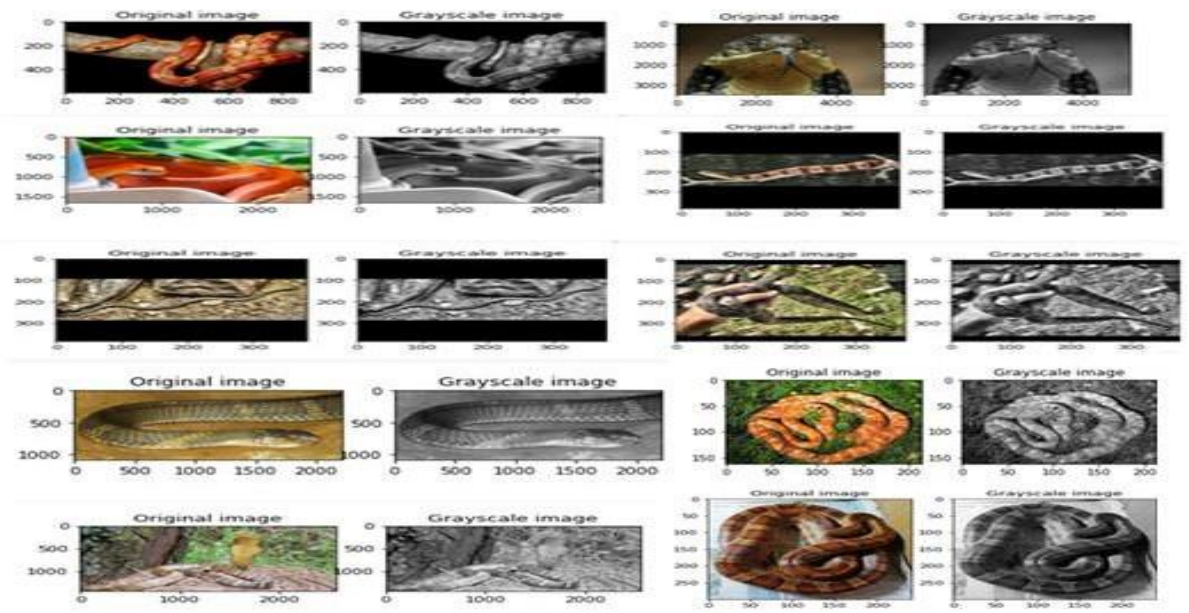


Fig:3 rescaling image

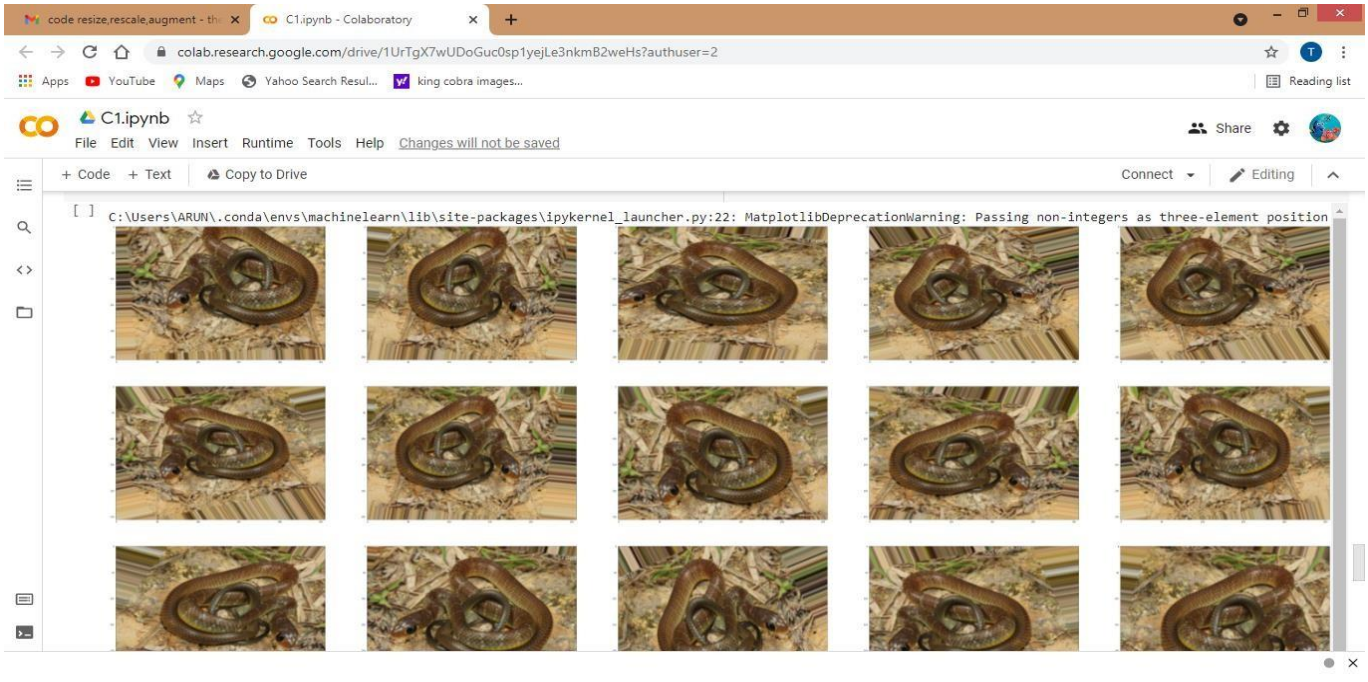
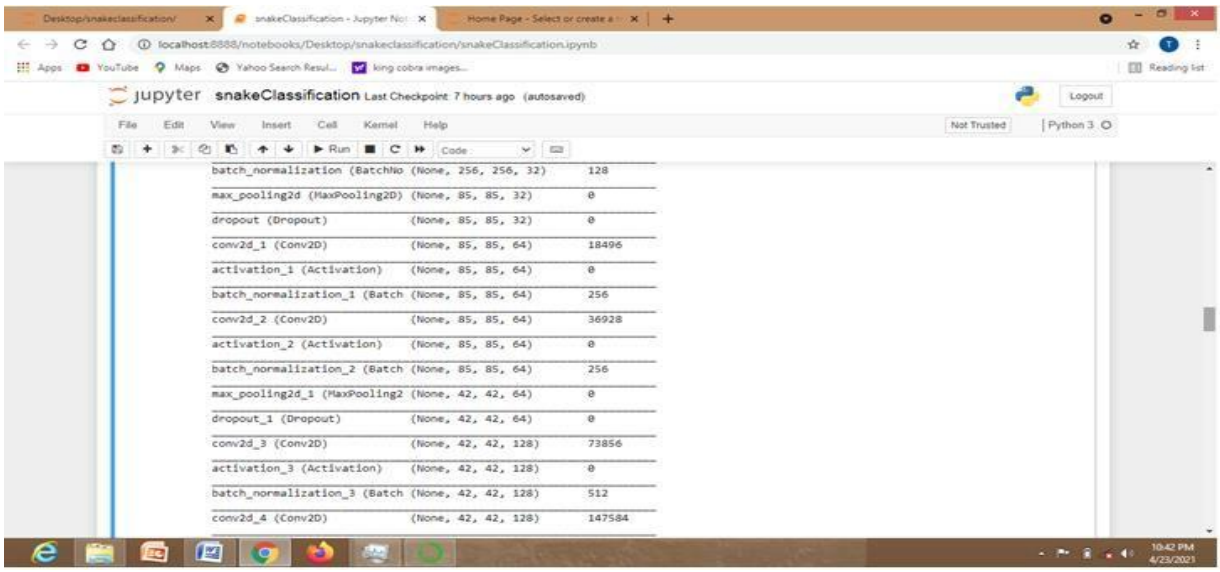


Fig:4 augmentation snake image



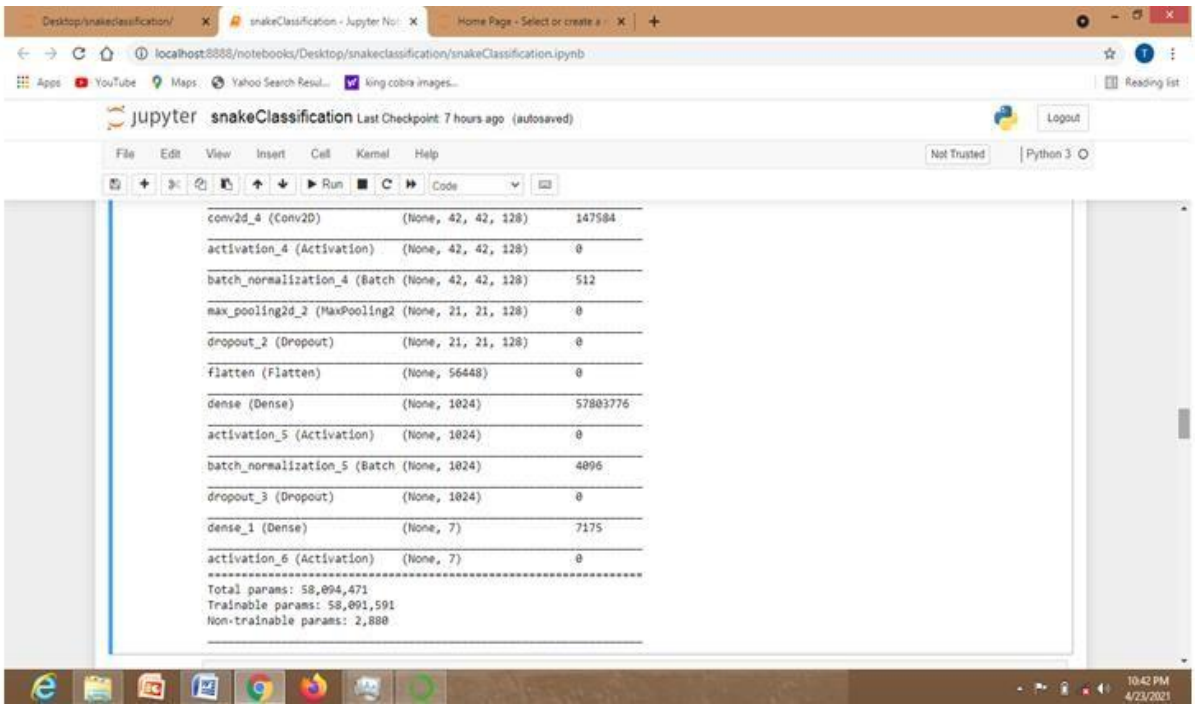
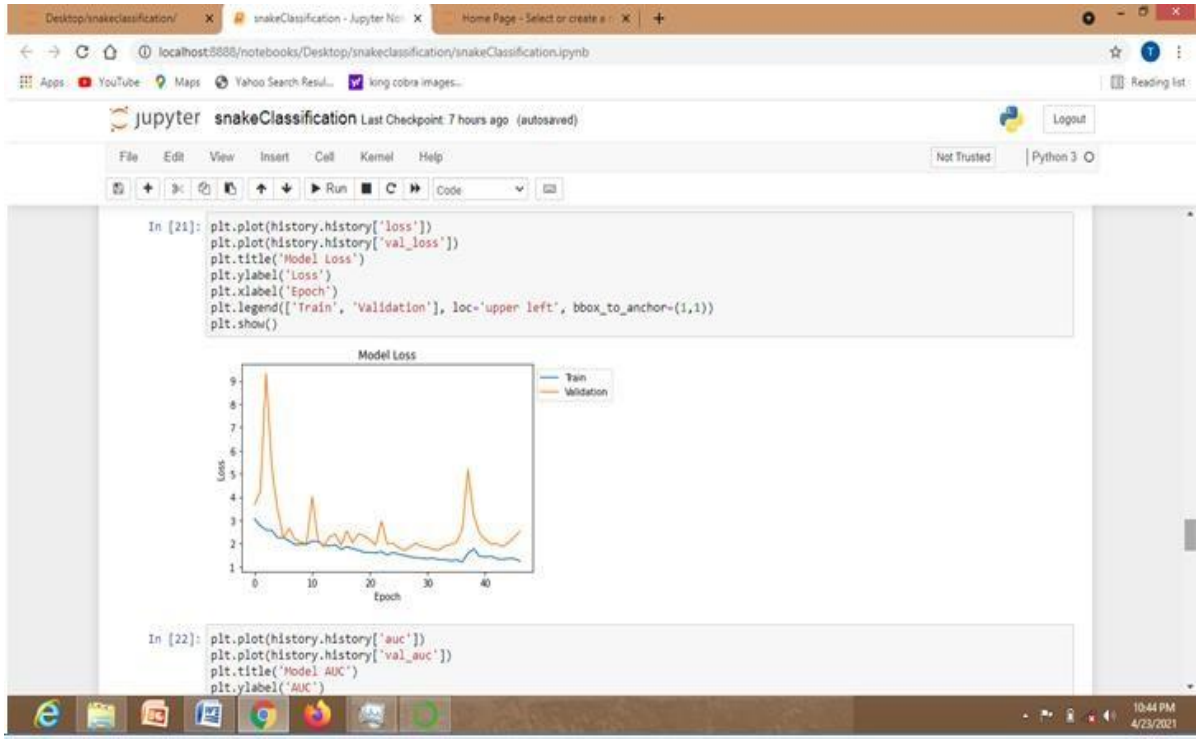


Fig: 5 Cnn sequential data



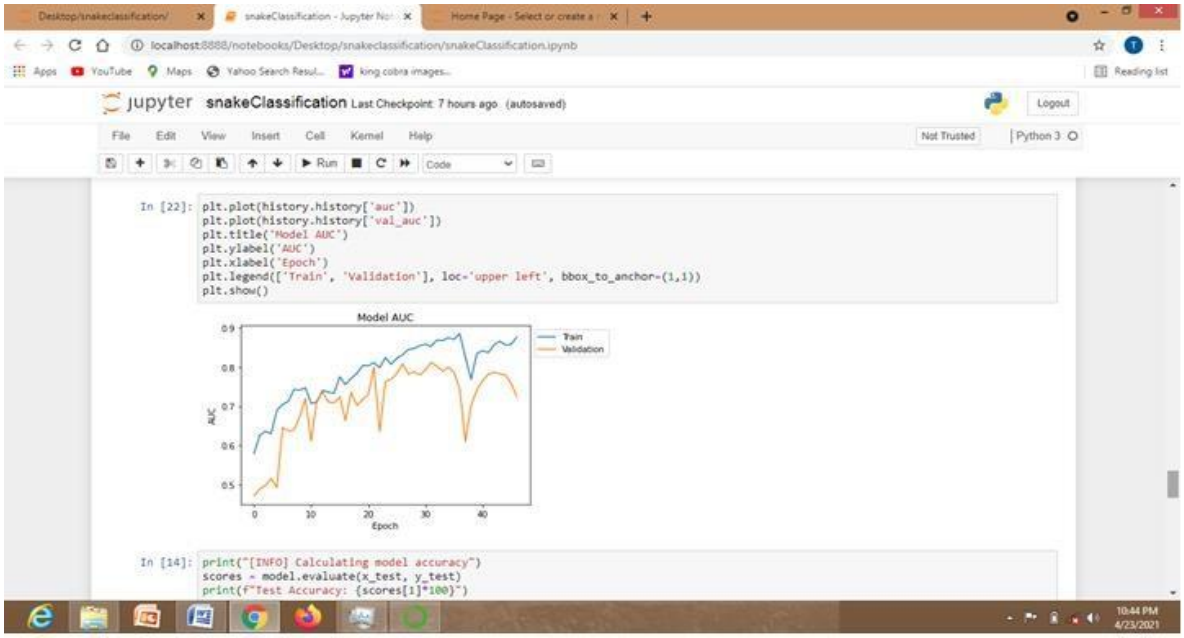


Fig:6 Module loss and Accuracy graph

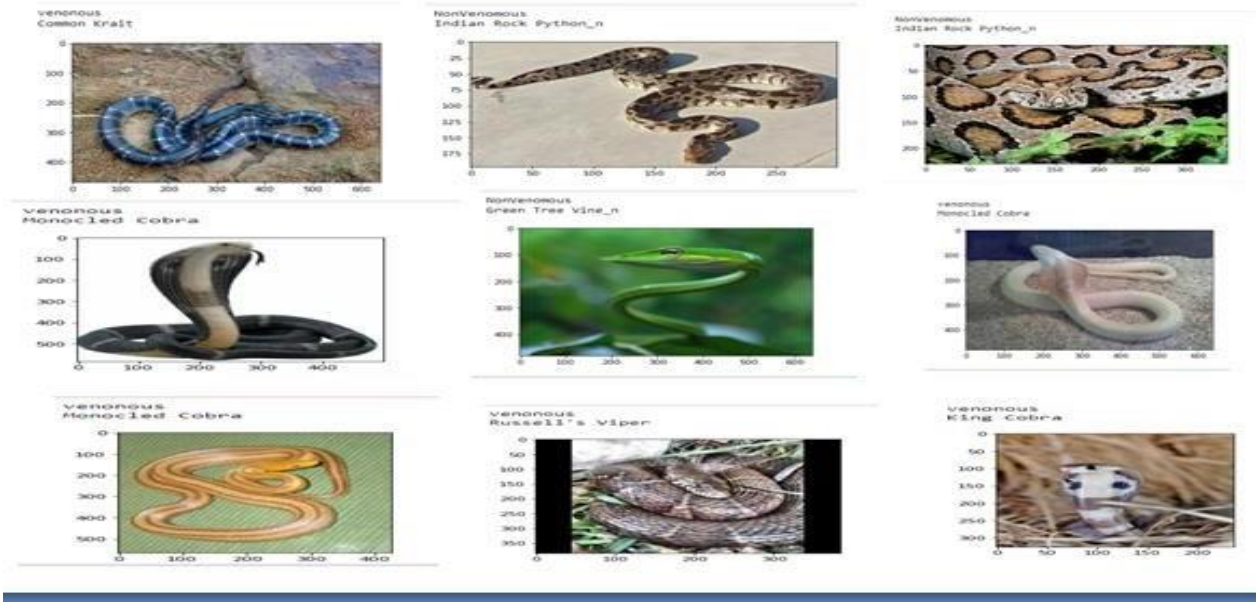
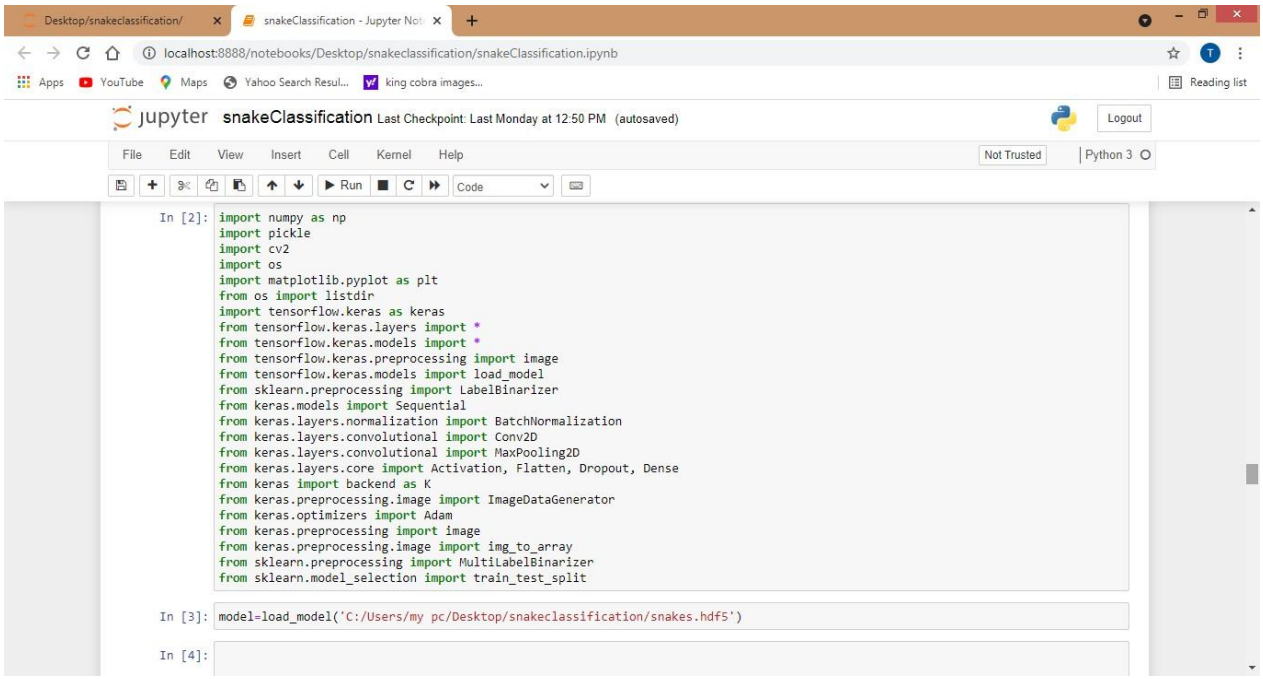
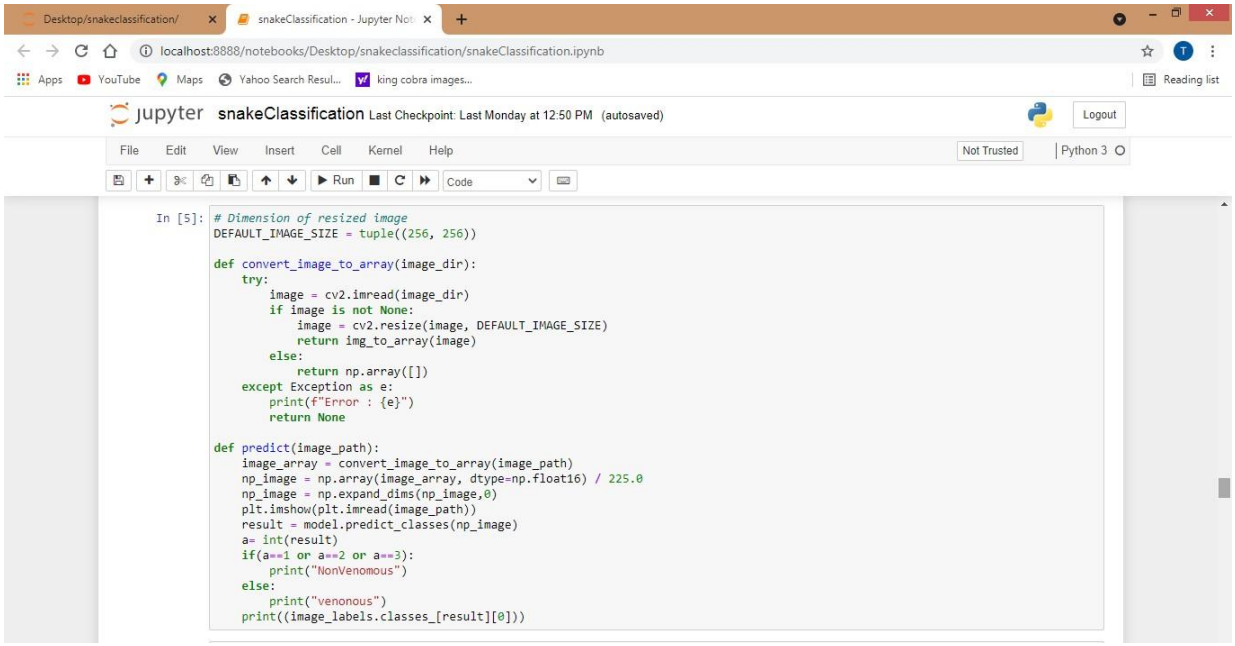
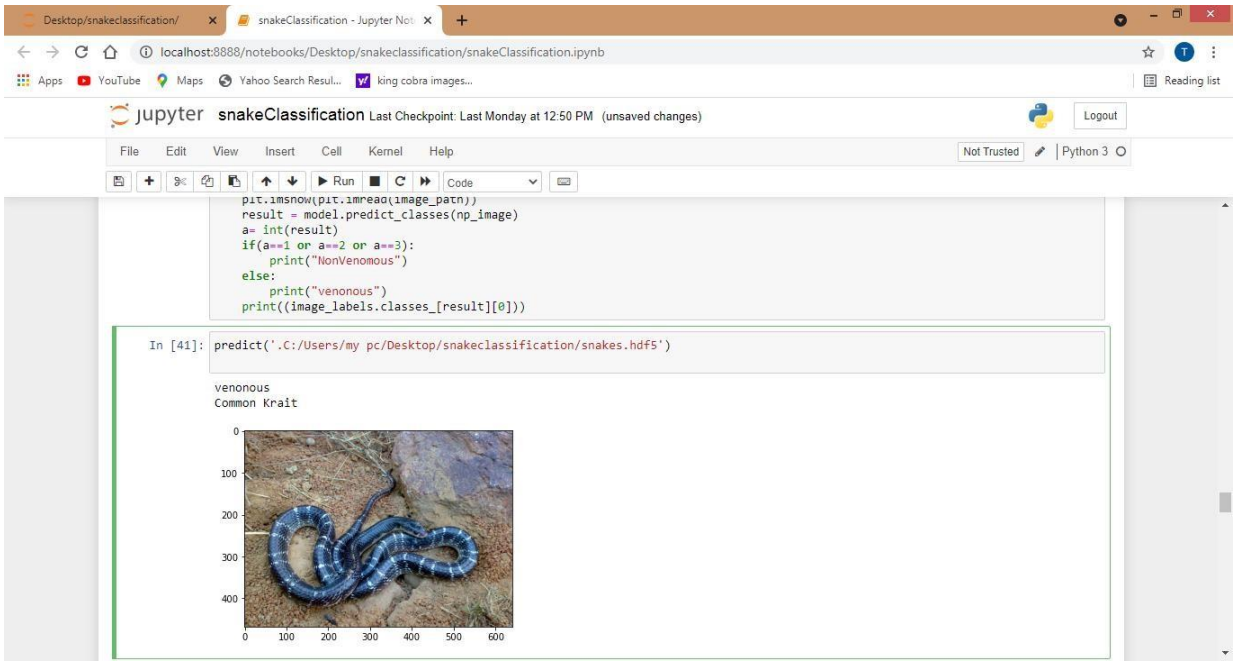


Fig:7 Result(Predict the images as venomous and non-venomous)

SAMPLE CODING:






Desktop/snakeclassification/
snakeClassification - Jupyter Not
localhost:8888/notebooks/Desktop/snakeclassification/snakeClassification.ipynb
Apps
YouTube
Maps
Yahoo Search Resul...
king cobra images...
Reading list
jupyter
snakeClassification Last Checkpoint: Last Monday at 12:50 PM (unsaved changes)
Logout
File
Edit
View
Insert
Cell
Kernel
Help
Not Trusted
Python 3
Run
Code
pit.imshow(pit.imread(image_path))
result = model.predict_classes(np_image)
a= int(result)
if(a==1 or a==2 or a==3):
print("NonVenomous")
else:
print("venonous")
print((image_labels.classes_[result][0]))
In [41]:
predict('.C:/Users/my pc/Desktop/snakeclassification/snakes.hdf5')
venonous
Common Krait
0
100
200
300
400
0
100
200
300
400
500
600