Snakebite Detection & Identification With Snakebite Mark Using Machine Learning Approach

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NAME OF THE PROJECT	: Snakebite Detection & Identification With Snakebite Mark Using Machine Learning Approach
PROJECT REPOSITORY	: https://github.com/MARY2726/group-no-23-main-project

Vision of the Department

•Creating eminent and ethical leaders in the domain of Computational Sciences through quality professional education with a focus on holistic learning and excellence.

Mission of the Department

•To create technically competent and ethically conscious graduates in the field of Computer Science and Engineering by encouraging holistic learning and excellence.

•To prepare students for careers in Industry, Academia and the Government.

•To instill Entrepreneurial Orientation and research motivation among the students of the department.

•To emerge as a leader in education in the region by encouraging teaching, learning, industry and societal connect.

ABSTRACT

- Estimates of 81,410 – 1,37,880 deaths and 4,00,000 cases of disability globally every year
- Complements the current approach to snakebite envenoming
- Bite mark is considered to speed up the process of pinpointing the species before being late
- Avoids fake panicking situations
- Identification of the bite mark to perform anti-venom administration

INTRODUCTION

- Snakes are one of the dangerous reptiles due to their venoms
- Snakebite envenoming needs urgent attention
- A great deal of damage occurs following the delay in medical services
- Misidentification can lead to inadequate treatment for the victim
- Currently, a syndromic approach is widely used but, this strategy has limitations

OBJECTIVE

- Speed up the process of pinpointing the species before being late
- To collect snake bite cases and identify the clinical effects of snake bites
- Immediate medication can be administered

MOTIVATION

Identification and recognition of distinct snake bite at the earliest ,resulting in antivenom administration ,which in turn narrows the mortality rate due to envenomation

LITERATURE SURVEY

1. Image processing for snake identification based on bite using Local Binary Pattern and Support Vector Machine method

The system only classifies venomous and non-venomous snakes without knowing the type of snake

Advantages

- Classifies the venomous and non venomous snakes
- It can help in reducing the fake alarming situations.

Disadvantages

- Wrinkled or hairy skin or bruising on the bite or wound area affect calculated result
- Blood clots on the bite marks causes classification errors because the system incorrectly detects snake bite, resulting in poor accuracy
- This system only determines whether the snake is venomous or not

2. **A Development of Snake Bite Identification System (N'viteR) using NEURO-GA**

- Differentiate between venomous and non-venomous snake
- Enables early identification of snake
- Immediate medication can be administered

Advantages

- Even better than BPNN, this is a combination with GA yields a high accuracy to identify a venomous and non-venomous snake based on cases provided

Disadvantages

- This technique may give higher accuracy but it will take a longer time to finish the training process
- Data will not determine any specific feature other than info about venom

PROPOSED SYSTEM

- The system is to detect the snakebite from the bite image and identify the snake, which helps to get faster medical aid
- Speeds up the process of pinpointing the species before being late
- Concepts of Machine Learning and Image Processing for the identification and classification of snakebites
- Doctors also can use our system to identify the snake and start administering medication

FEATURE OF PROPOSED SYSTEM

- The system provide necessary information regarding the snake using the snake bite mark
- Identifying snakes by using bite mark helps the doctor to diagnose the victim with proper anti venom
- Helps to decrease the snakebite envenoming deaths to a certain length

MODULE -WISE Description

1. Data Acquisition and Pre-processing

- The captured image is taken and subjected to the preprocessing stages
- Python language
- Implemented using Google Colab

The pre-processing stages are :-

- Denoise the image
- Grayscaling
- Adaptive Gaussian Thresholding segmentation

MODULE -WISE Description

2. **Detection and Identification Module**

   Three main processes involved in this Module are::

   1. **Building the Neural Network**

      -Convolutional Neural Network Used

      -Inception v3 for classification

   2. **Training the Models**

      -Dataloader function used to load datasets

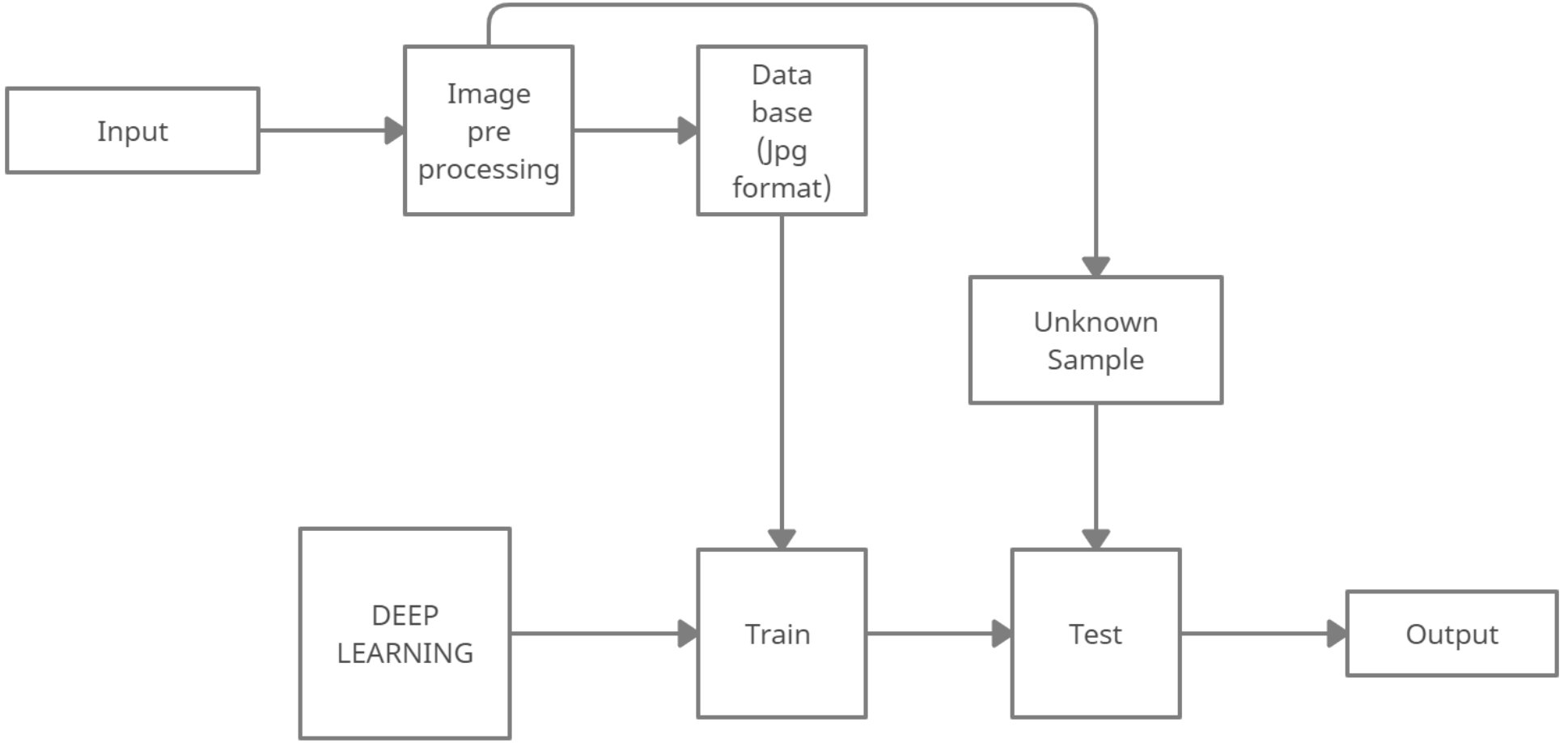
      -Perform the training process

   3. **Testing the Model**

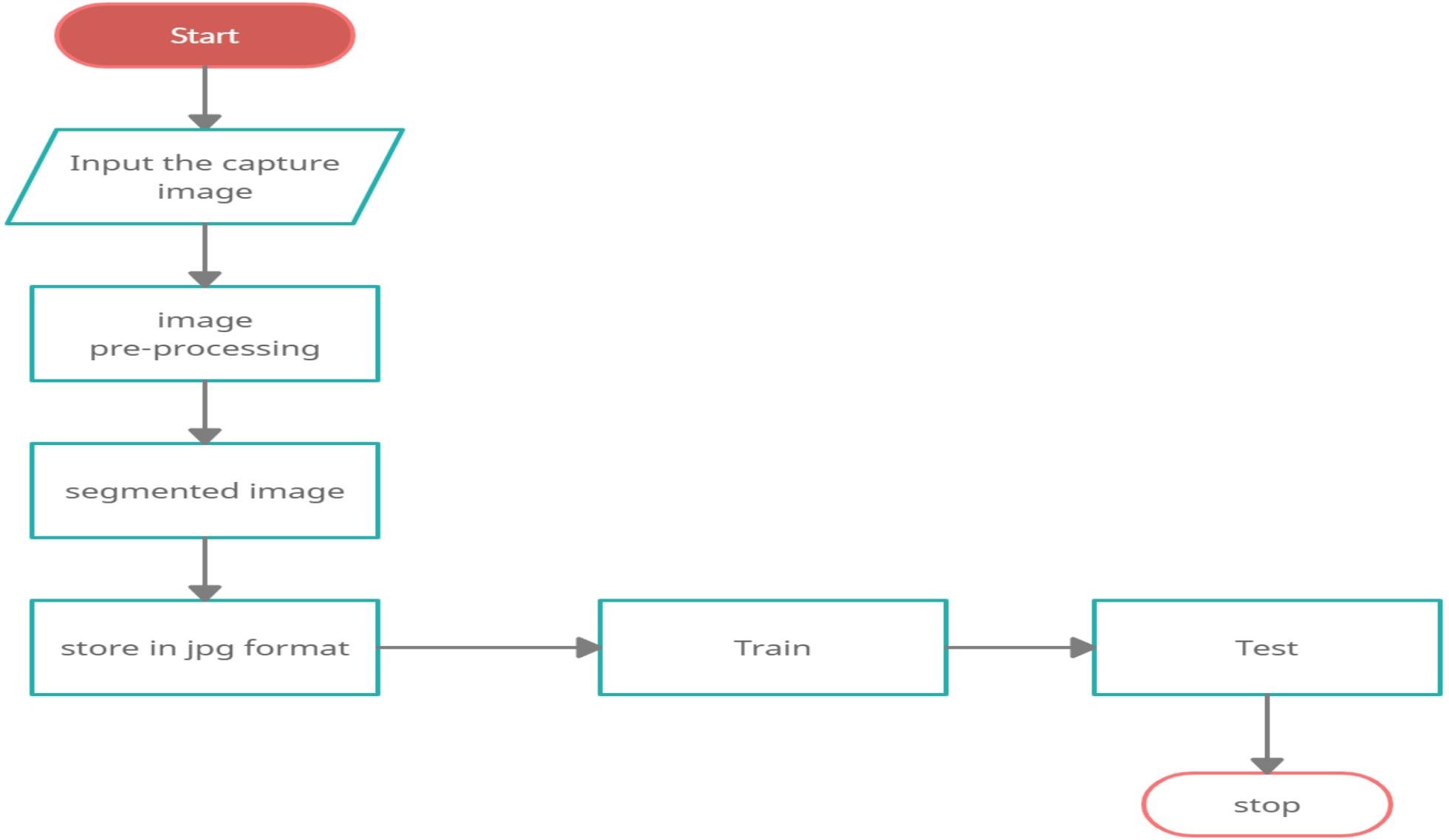
      -Testing the trained area

      -Also testing the Unknown samples

      -Score is generated



ARCHITECTURAL DIAGRAM


Start
Input the capture image
image pre-processing
segmented image
store in jpg format
Train
Test
stop

FLOWCHART

IMPLEMENTATION DETAILS

Methodology

- Obtained image is denoised using **cv2.fastNlMeansDenoisingColored()**and it is converted to grayscale image
- Segmentation using adaptive gaussian thresholding function **cv2.adaptiveThreshold()**
- Conversion to JPG format and storing the image to a path defined using **os.path.basename(sub_dir)**
- Convolutional neural network based inception v3 architecture is used for classification.

IMPLEMENTATION DETAILS

Algorithm

1. Start
2. Capture the image
3. Do the image preprocessing methods
4. Get the segmented image
5. Input the segmented image to train and test using the DataLoader
6. Convolutional neural network based inception v3 architecture provide the Inception v3 library and add preprocessing layers
7. Model is trained for a specified number of epochs ,calculate the accuracy of the image
8. Trained model is then tested and also test the unknown samples.
9. Get the score of the model

RESULTS

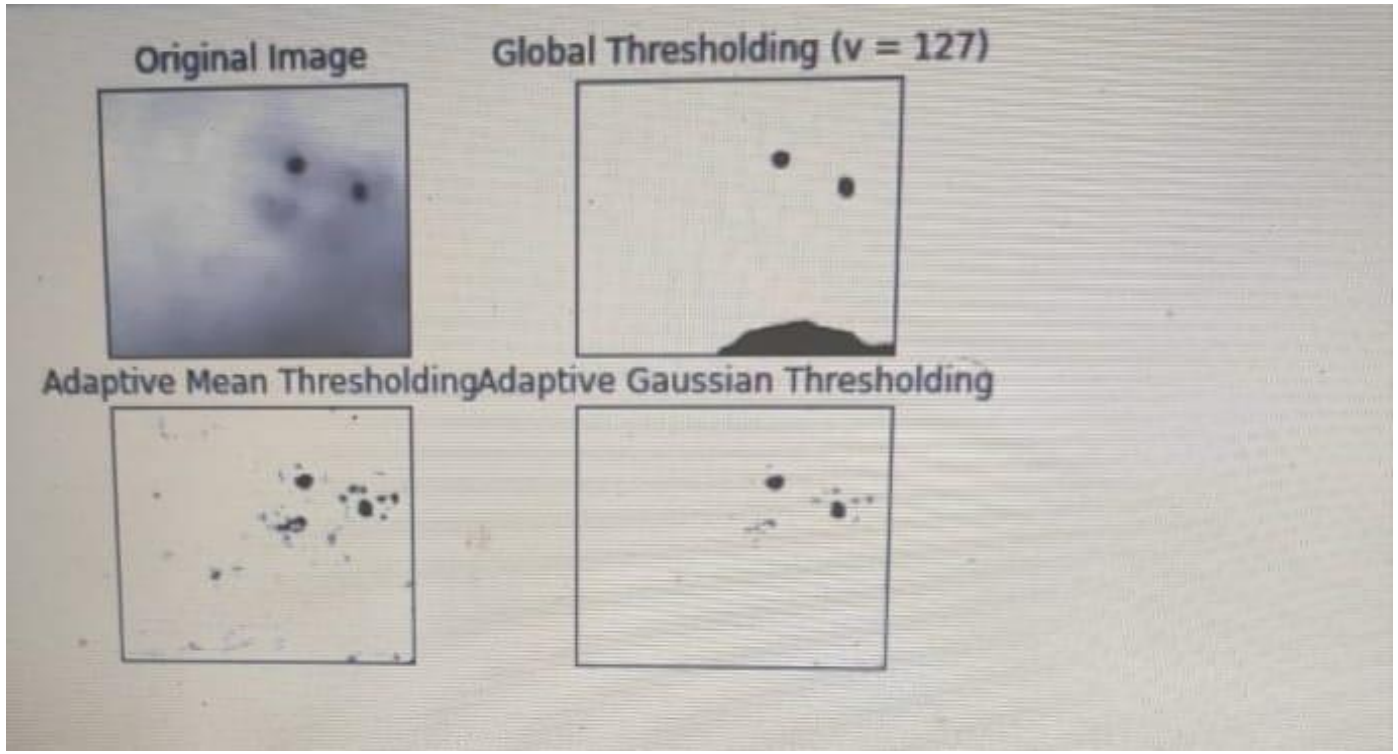
Captured Image

Denoised Image

Grayscaled Image

RESULTS

- Segmentation



RESULTS

+ Code + Text

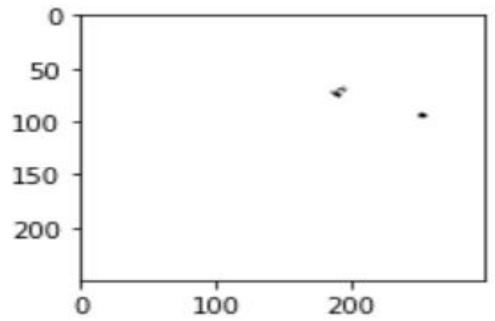
RAM Disk

Editing

```
th = cv2.adaptiveThreshold(img,255,cv2.ADAPTIVE_THRESH_GAUSSIAN_C,\
            cv2.THRESH_BINARY,11,12)

plt.subplot(121),plt.imshow(th,'gray')
cv2.imwrite('segjust.png',th)


plt.savefig('seg.png')
plt.show()
```



crop.jpg

RESULTS

+ Code + Text

RAM Disk

Editing

```
    graph_def = tf.GraphDef()
    graph_def.ParseFromString(f.read())
    _ = tf.import_graph_def(graph_def, name='')

with tf.Session() as sess:
    # Feed the image_data as input to the graph and get first prediction
    softmax_tensor = sess.graph.get_tensor_by_name('final_result:0')

    predictions = sess.run(softmax_tensor, \
             {'DecodeJpeg/contents:0': image_data})

    # Sort to show labels of first prediction in order of confidence
    top_k = predictions[0].argsort()[-len(predictions[0]):][::-1]

    for node_id in top_k:
        human_string = label_lines[node_id]
        score = predictions[0][node_id]
        print('%s (score = %.5f)' % (human_string, score))
```

```
cobra (score = 0.98216)
viper (score = 0.01331)
sea snake (score = 0.00262)
kingcobra (score = 0.00190)
```

CONCLUSION

- It is possible to identify which snake has bitten and give the appropriate treatment
- Mortality rate due to envenoming can be decreased
- Implementation of this system avoids future medical negligence
- High accuracy
- Cross checking can help in pinpointing the species
- Use CNN makes it more efficient

REFERENCES

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Thank you