

# Tensor Flow Based RTO Document Verification

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## ABSTRACT

*More often people may not carry the necessary documents of vehicle and when a cop asks them to produce the appropriate documents they are forced to pay the fine. The implemented project helps to overcome this problem by identifying the person (using the concept of machine learning) and producing their documents. This system is reliable and efficient for the user as it decreases the manual efforts of carrying all the documents along while driving. It also keeps a record of the user's driving license and its expiry date and all the dues that can be paid at the end of the year.*

**Keyword :** - Tensor Flow, Convolutional Neural Network

## 1. INTRODUCTION

TensorFlow is a new technology in the field of machine learning. It is a software library used for machine learning applications such as neural networks. It is used for both research and production at Google. Here the TensorFlow API is used for face recognition. Once the face is recognized, the person's documents are displayed. To collect the dataset an algorithm that opens the camera and automatically captures multiple images of the person from different angles is been used. Cloud service are used in this project as more storage and fast processing is required. Any cloud service can be used for this purpose. An algorithm is designed which will automatically capture a dataset required for machine learning and further use it for real time applications of image recognition. Some Important technical concepts that has been used are

- Machine Learning: It is a field of computer science that gives computers the ability to learn without being explicitly programmed.
- Tensor-flow: It is an open-source software library for dataflow programming across a range of tasks. It is a symbolic math library, and also used for machine learning applications such as neural networks.
- Convolutional neural network: In machine learning, a convolutional neural network (CNN, or ConvNet) is a class of deep, feed-forward artificial neural network that has successfully been applied to analyzing visual imagery

## 2. RELATED WORK

The theoretical foundations of deep learning are well rooted in the Convolution Neural Network(CNN). CNN comes into picture when building a classifier that is changing. It is like a black box that constructs features automatically. These features thus extracted are so generalized that they can handle the variances. Training a CNN from the scratch requires a lot of computing power and lot of time. Hence pre-trained CNN models are used. Then transfer learning is performed on the pre-trained model. Transfer learning is nothing but training the model with the required images of our choice [1] .

Deep learning in different areas paved a new wave of neural network development. As a powerful technology deep learning has been used in fields like machine learning, speech recognition, image translation, face recognition etc. The idea of deep learning originated from artificial neural network(ANN). This is a class of neural network with effective training. The main focus of this paper is in the field of biometrics, combined with the relevant theory and methods of depth learning, face recognition technology, along the order of depth learning, based on the depth of learning face recognition, face recognition application to start research [2] .

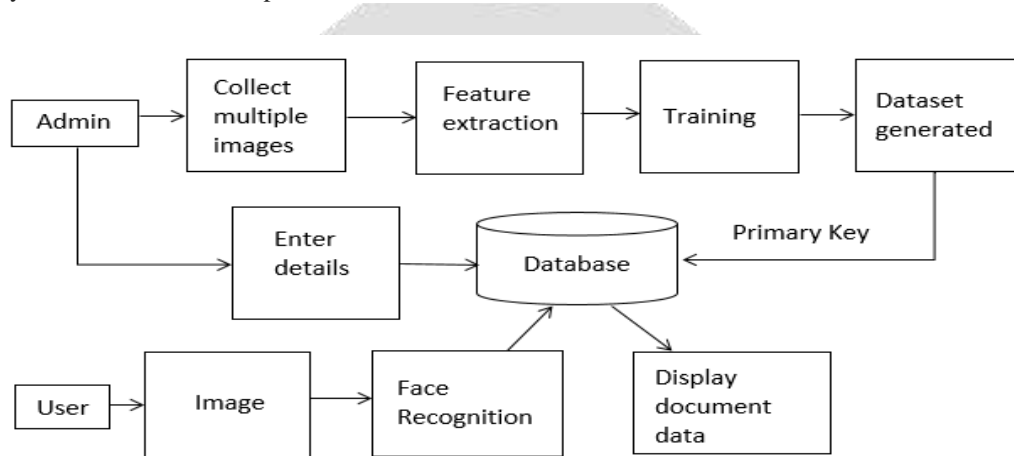
Deep study of the TensorFlow graph visualizer that is a part of the TensorFlow machine intelligence platform. It helps users to analyze complex machine learning architectures by understanding the dataflow graphs. This is done by using a series of

graph transformations. Thus the users find this visualizer useful for understanding, debugging and sharing the structure of their model. [3].

Identifying and prioritizing important input variables to a neural network. The techniques used for these purposes are yet to be fully exploited. The selection techniques like training and distribution of neural network improves the learning speed and simplifies the depiction of the data. Neural network weight-based and perturbation feature ranking algorithms are implemented based on these techniques. This paper also has hybrid approaches for these algorithms that gives constant ranking of features in deep neural network. These algorithms are proved to be better than the already existing ones.[4].

### 3. METHODOLOGY

An architectural diagram is designed by making use of existing standards that depicts set of inherent elements of the structure. It may be used to illustrate a point of view in the software architecture and seek feedbacks accordingly.



**Fig -1:** Architecture diagram of proposed method

In this project, the admin has two tasks to perform:

1. To collect multiple images of different people
2. Collect their details(documents)

Once multiple images are collected, features are extracted and further trained using the TensorFlow API to generate datasets. Both the dataset and all RTO document details are stored in database. The user captures a fresh image of the person during verification and using the concept of face recognition, that person's image is verified and their respective documents are displayed.

### 4. RESULTS

#### Step 1:

```

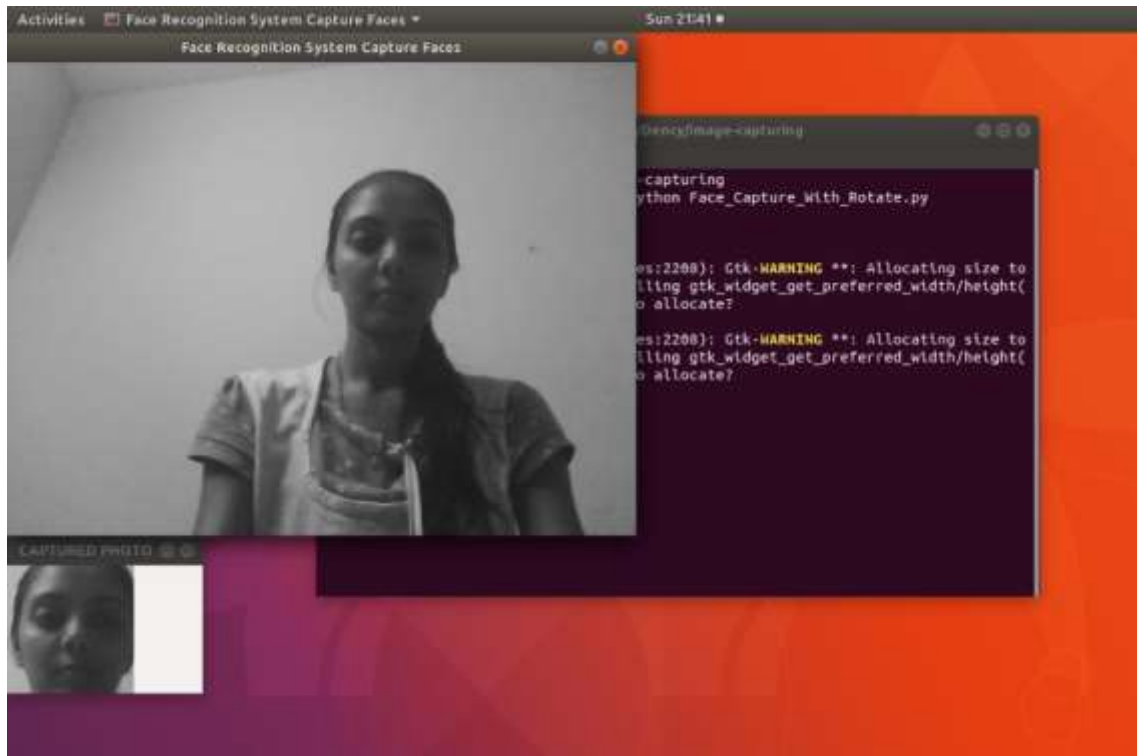
bp@jarvis: ~/Dency/Image-capturing
File Edit View Search Terminal Help
bp@jarvis:~$ cd /home/bp/Dency/image-capturing
bp@jarvis:~/Dency/image-capturing$ python Face_Capture_With_Rotate.py
Enter Your Name dency
  
```

The screenshot shows a terminal window titled 'bp@jarvis: ~/Dency/Image-capturing'. The user navigates to the directory '/home/bp/Dency/image-capturing' and runs the command 'python Face\_Capture\_With\_Rotate.py'. The program prompts 'Enter Your Name' and the user enters 'dency'.

**Figure 4.1:** Executing Face\_Capture\_With\_Rotate code

When the code to capture images is executed, the name of the person is to be given as an input.

### Step 2:



**Figure 4.2:** Image Capturing

Once the code starts running it opens a new window which starts capturing images of that person.

### Step 3:

```

bp@jarvis: ~/Dency/image-capturing
File Edit View Search Terminal Help
bp@jarvis:~$ cd /home/bp/Dency/image-capturing
bp@jarvis:~/Dency/image-capturing$ python Face_Capture_With_Rotate.py
Enter Your Name dency
Name Stored in 45

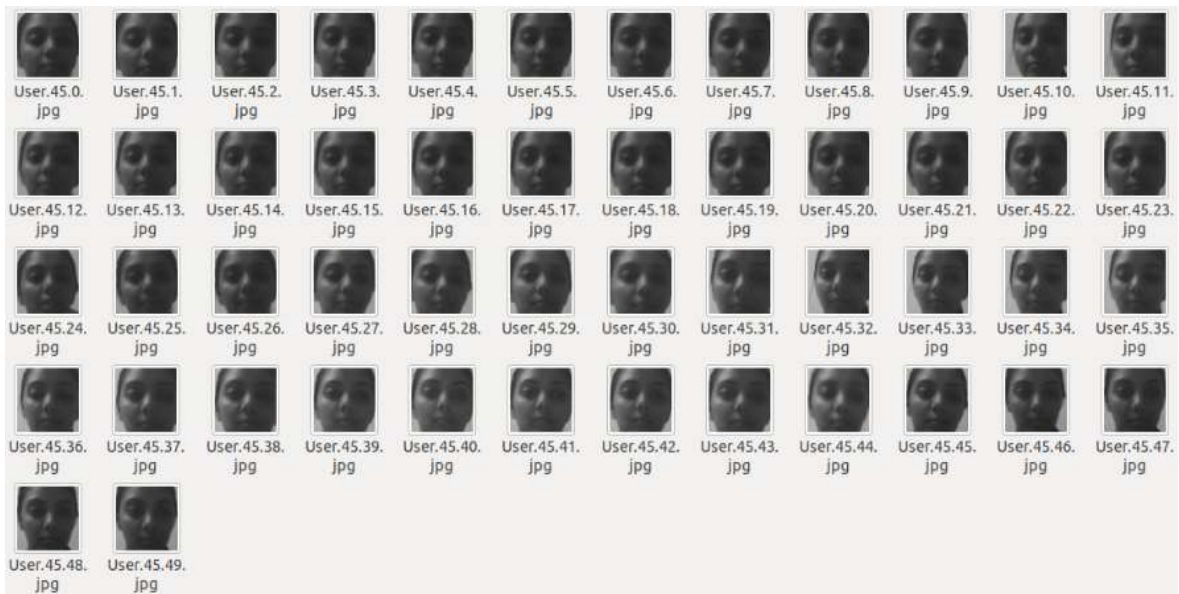
(Face Recognition System Capture Faces:2208): Gtk-WARNING **: Allocating size to
GtkWindow 0x55c1744247e0 without calling gtk_widget_get_preferred_width/height(
). How does the code know the size to allocate?

(Face Recognition System Capture Faces:2208): Gtk-WARNING **: Allocating size to
GtkWindow 0x55c174424a80 without calling gtk_widget_get_preferred_width/height(
). How does the code know the size to allocate?
FACE CAPTURE FOR THE SUBJECT IS COMPLETE
bp@jarvis:~/Dency/image-capturing$

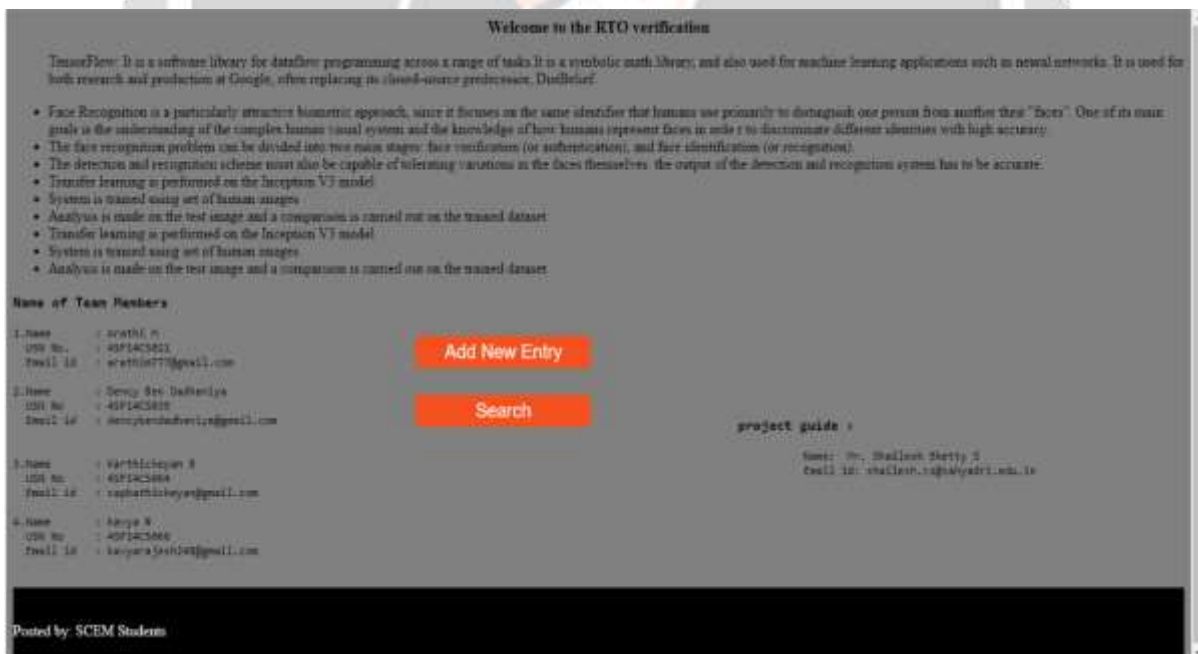
```

**Figure 4.3:** Image Capture is Complete

The number of images that will be captured will be set in the code. Once the required number of images are captured it displays a suitable message saying that the “face capture for the subject is complete”.

**Step 4:****Figure 4.4:** Generated Dataset

The dataset of the person is created successfully.

**Step 5:****Figure 4.5:** Homescreen

This is the Home Screen where one can register and even search for a previously registered person's details.

Step 6:

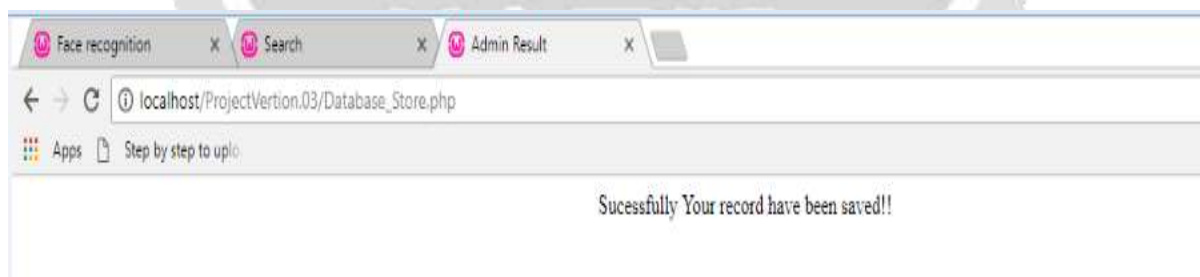
**Add Entry**

Document	Details	Expire Date
Name	<input type="text" value="Dency"/>	
Mobile Number	+91 <input type="text" value="9854685631"/>	
Email	<input type="text" value="dency@gmail.com"/>	
Certification of Insurance	<input type="text" value="985456321"/>	
Driving License	<input type="text" value="785462139"/>	<input type="text" value="2"/> <input type="text" value="6"/> <input type="text" value="2019"/>
Certificate of registration	<input type="text" value="785412369"/>	
Image	<input checked="" type="checkbox"/> Available	

**Figure 4.6:** Registration Form

The RTO document details of the person are entered using “Add New Entry” which will be stored in the database when the “Add Details” button is clicked.

Step 7:



**Figure 4.7:** Registration Successfull

Once the record is added successfully the above screen will be displayed.

**Step 8:**

Local site: C:\Users\Dency\Desktop\				Remote site: /root/tensorflow-for-poets-2/tf_files					
<ul style="list-style-type: none"> <li>Desktop</li> <li>Documents</li> <li>Downloads</li> <li>Favorites</li> <li>GTA_SA</li> <li>IntelGraphicsProfiles</li> </ul>				<ul style="list-style-type: none"> <li>.git</li> <li>android</li> <li>ios</li> <li>scripts</li> <li>tf_files</li> </ul>					
Filename	Filesize	Filetype	Last modified	Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gro...
ADARSH GAMES		File folder	06/26/17 19:26:11	retrained...	40	Text Docu...	05/14/18 11:17:...	-rw-r--r--	root root
Aptitude		File folder	10/07/17 23:19:36	retrained...	5,488,743	PB File	05/14/18 11:17:...	-rw-r--r--	root root
aws		File folder	08/07/17 19:12:05	.empty	0	EMPTY File	05/14/18 11:12:...	-rw-r--r--	root root
billing		File folder	08/21/16 01:37:46	training...		File folder	05/14/18 11:13:...	drwxr-xr-x	root root
digital ocean		File folder	08/15/17 17:02:04	models		File folder	05/14/18 11:13:...	drwxr-xr-x	root root
Final year project		File folder	05/11/18 15:47:20	human_photos		File folder			
human_photos		File folder	04/30/18 11:49:32	flower_p...		File folder	02/11/16 02:22:...	drwxr-x---	270850 5000
kavkav		File folder	05/01/18 10:55:21	bottlene...		File folder	05/14/18 11:15:...	drwxr-xr-x	root root

**Figure 4.8:** Transferring Datasets

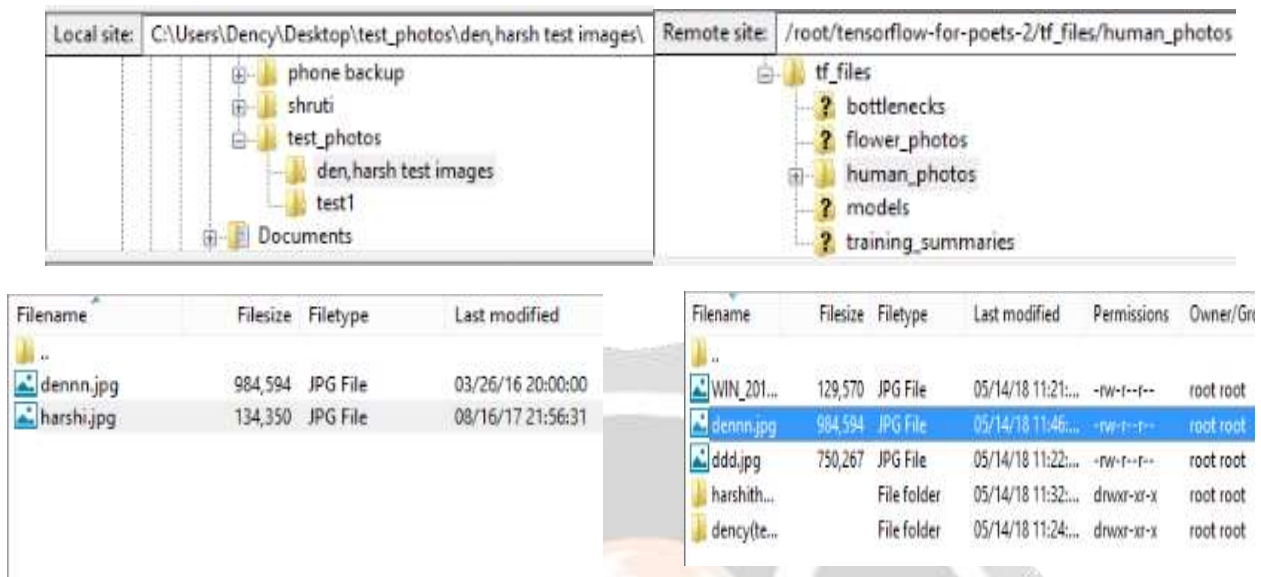
These datasets are transferred from the local site to the remote site.

**Step9:**

```
INFO:tensorflow:2018-05-14 06:11:36.505326: Step 460: Validation accuracy = 100.0% (N=100)
INFO:tensorflow:2018-05-14 06:11:37.016577: Step 470: Train accuracy = 100.0%
INFO:tensorflow:2018-05-14 06:11:37.016976: Step 470: Cross entropy = 0.001119
INFO:tensorflow:2018-05-14 06:11:37.070388: Step 470: Validation accuracy = 100.0% (N=100)
INFO:tensorflow:2018-05-14 06:11:37.618007: Step 480: Train accuracy = 100.0%
INFO:tensorflow:2018-05-14 06:11:37.618391: Step 480: Cross entropy = 0.001118
INFO:tensorflow:2018-05-14 06:11:37.668994: Step 480: Validation accuracy = 100.0% (N=100)
INFO:tensorflow:2018-05-14 06:11:38.214911: Step 490: Train accuracy = 100.0%
INFO:tensorflow:2018-05-14 06:11:38.215388: Step 490: Cross entropy = 0.001099
INFO:tensorflow:2018-05-14 06:11:38.271917: Step 490: Validation accuracy = 100.0% (N=100)
INFO:tensorflow:2018-05-14 06:11:38.735890: Step 499: Train accuracy = 100.0%
INFO:tensorflow:2018-05-14 06:11:38.736279: Step 499: Cross entropy = 0.001256
INFO:tensorflow:2018-05-14 06:11:38.785933: Step 499: Validation accuracy = 100.0% (N=100)
INFO:tensorflow:Final test accuracy = 87.5% (N=8)
```

**Figure 4.9:** Training the System

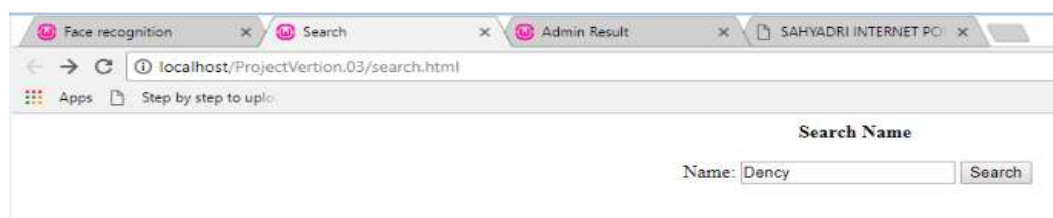
The tensorflow API is then called which starts training the system with the datasets provided and gives a final test accuracy.

**Step 10:****Figure 4.10:** Transferring New Image

A freshly captured image of the person is then transferred from the local site to the remote site.

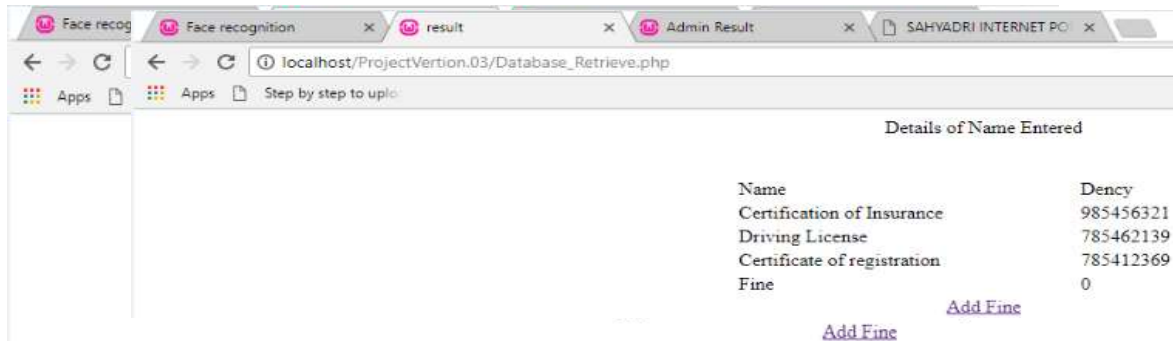
**Step11:**

```
(tensorflow) root@ubuntu-s-1vcpu-2gb-blr1-01:~/tensorflow-for-poets-2# python -m scripts.label_image \
> --graph=tf_files/retrained_graph.pb \
> --image=tf_files/human_photos/dennn.jpg
2018-05-14 06:17:06.301323: I tensorflow/core/platform/cpu_feature_guard.cc:140] Your CPU supports instru
2 FMA
2018-05-14 06:17:06.353558: W tensorflow/core/framework/allocator.cc:101] Allocation of 45287424 exceeds
Evaluation time (1-image): 0.215s
dency tensorflow (score=0.98620)
harshitha tensorflow (score=0.01380)
(tensorflow) root@ubuntu-s-1vcpu-2gb-blr1-01:~/tensorflow-for-poets-2#
```

**Figure 4.11:** Accuracy ScoreNow run the above command with the name of the image and correct location of the image that is to be verified.**Step 12:****Figure 4.12:** Search for Name

Once the person is identified, the name of that person is given as an input that will be searched in the database.

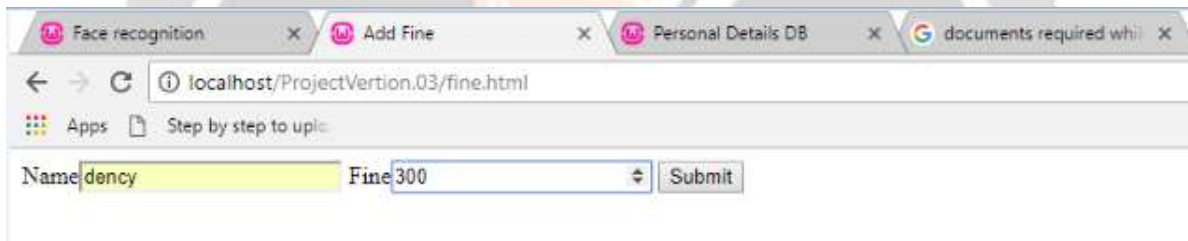
#### Step 13:



**Figure 4.13: Details Displayed**

The respective RTO document details are displayed.

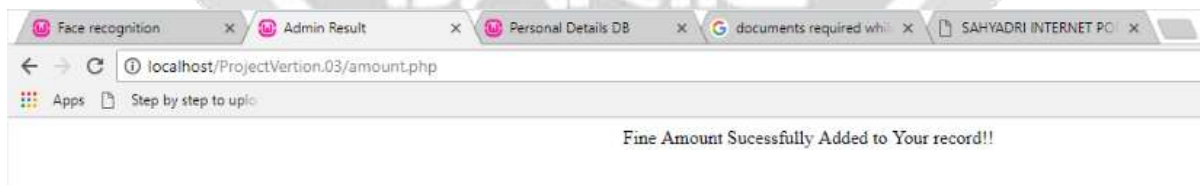
#### Step 14:



**Figure 4.14: Entering Fine**

The fine details can be submitted by clicking on the “Add fine”.

#### Step 15:



**Figure 4.15: Fine Entered Successfully**

Once the fine about is successfully added the above result will be displayed.

## 5. CONCLUSION

The outcome of this project is a system that performs RTO document verification using human faces as the biometric. It serves the societal purpose by making the process of document verification easy for both the victim and the RTO corp. It reduces the risk of losing one's original documents as well as from paying fine when actually not required. This type of system can be enhanced and made more secure and reliable when 2 biometrics are combined for the purpose of identifying the person.

## 6. REFERENCES

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