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Voice Based Application as Medicine Spotter

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ABSTRACT: Nowadays, smartphones have reached each hand and each home. As a result, individuals are creating use of the useful mobile applications to form their daily life easier. This paper focuses on the development of a mobile application to help to provide an effective health care system. This is an android based application in which voice based alarm is used which may be closed by tapping the close alarm button, under the image of the medicine which is to be taken at that particular time. It may even have the contact numbers of the doctors for an emergency. This application will be helping hand for the people who are busy in their day to day life or old age people and blind people who forget which medicine is to be taken and when. Many such drugs reminder systems are developed wherever areplacement hardware is needed however in our work, we have made an attempt to develop a system which is free of cost, time-saving and supports medication adherence without any extra hardware. The pictures of the medicine strip held in the hand are captured by the inbuilt camera of the mobile. The image is processed and consequently text localization [7] and extraction is completed by that the name of the drugs is known.

KEYWORDS: OCR, alarm, Image Processing, visually impaired, medicine identification, Text localization and Extraction, SQLite.

I.INTRODUCTION

This is the most important and essential work for the visually challenged user to identify and choose the right documents he has to take. The proposed application uses the inbuilt camera of the system for capturing the text data from image. The captured image is initially processed using text localization algorithms to separate the text from the background [4]. Then text extraction methods are used to extract the text from image or medicine related document. The extracted text is then converted into a voice output is given to the user.Our smart medicine reminder system[2] is designed for, but not restricted to, helping old people in taking care of themselves in taking their medications at the correct time and in the correct amount. It has been observed that people in general neglect their health and give preference to other things than taking their medicines. This is also the reason they forget to take their prescriptions on time [8]. Many health maintenance organizations, health practitioners and medical researchers have realized that increased use of patient reminders can significantly increase the treatment of chronic illness and delivery of medical services to the patients who need it. Several organizations have themselves started implementing the patient medicine reminder system in the health care field and it is currently being implemented in several hospitals in the western countries to see if the method reaps any benefits. It is known throughout that Over The Counter (OTC) medication taking patients should take prescriptions in a limited or prescribed quantity at the respective times they are supposed to take their medications. However, many patients and especially old people do not take their medicines in the correct quantity. They either take overdose of medicines thinking it will help them heal faster, or they fear the doctor has prescribed a larger quantity than required and take under dosage of medicines. The former leads to several disastrous health implications while the latter delays the treatment of the patient and in women cases, allows the illness to spread further requiring further treatment.

II.LITERATURE SURVEY

1.Voice Based Application as Medicine Spotter For Visually Impaired Dr.D.Jayashree1,Afritha Farhath.K2,[1] etc. In this paper we propose an image processing based android mobile application that provides top- to-bottom guidance and assistance to the visually impaired user for taking their medicines. Throughout the process the user is guided using the voice output rather than text. The Android platform has been used to build this app mainly because of its wide popularity and cost effectiveness in the smart phone market. Android platform has Comprehensive libraries for image processing, SQLite for facilitating data storage and good hardware features for video or image capture.[1]

2. AniR, Effy Maria introduce a smart spec for the blind persons which can perform text detection thereby produce a voice output.Text to speech conversion technique using raspberry pi.This is an economical as well as efficient device for the visually impaired people.Working on limited number of images. Very small amount of images dataset is taken for development [2].

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3. Xunyi Yu, Aura Ganz Says Audible Vision, a system that can help blind and visually impaired users navigate in large indoor open spaces.The system uses computer vision to estimate the location and orientation of the user, and enables the user to perceive his/her relative position to a landmark through 3D audio.The majority of time is spent in feature extraction and feature matching[3].

4.Alessandro Dionisi proposed for objects at short distances using RFID technology.The device is able to provide to the blind the information stored in the scanned tags and the value of RSSI correlated to a biofeedback signal [9].For development purpose this system is very costly and most of hardware part is needed for developed this system. [4]

5.Alwi, S. R. A. W., & Ahmad says a survey conducted on a group of blind people living in urban are. (1) Occupation details, (2) Vision Medical History, (3) Outdoor Navigation History, (4) Features and Functions for outdoor navigation system findings revealed that blind people requires a blind navigation system that is portable and able to help them cross the roads and avoid obstacles during their outdoor excursions while retaining the blind's identity that is the walking stick and black glasses.Developed this system for only Mongolian language in Malaysia not developed for worldwide.[5]

III.PROPOSED WORK

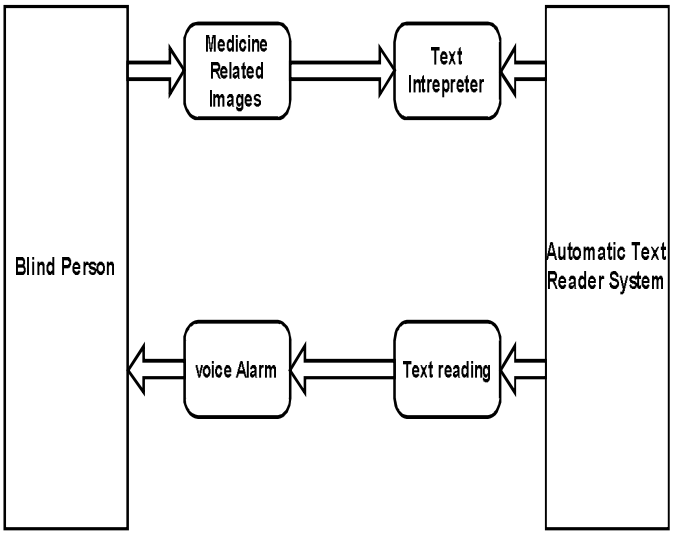

Fig 1: Architecture Diagram

We are going to invent system which will assists blind peoples to read medical text documents like prescription without any person's help.

- Our work is based on machine learning techniques for text reading using OCR tool [7] with better performance and with advantages of voice generation.
- We are going to develop following modules:
    1) Text reading from images
    2) Read Doctor's prescription
    3) Reading confidential documents

Main motive behind this system is to help blind peoples by reading out all type of text documents and covert that document into the voice. So this system is used as an interpreter for blind person for medicine purpose.
To configure the app, the user has to enter the following details:
A. Name of the Patient (helpful for future prescriptions)
B. Age of the Patient (helpful for future prescriptions)
C. Prescription Duration - the duration for which the patient has to take the medicine
D. Number of Medicines - field is mandatory to generate further options
E. Dosage Time - the time at which to remind the user, whether in morning, evening, night or a combination of the three
F. Dosage Quantity - the quantity of dosage to be taken for each medicine

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Algorithm

OCR: OCR consists of many phases such as Scanning of image, Pre-processing, Segmentation, Feature Extraction, Classifications and Recognition, Post Processing. The task of preprocessing relates to the removal of noise and variation in the image [3]. In scanning step the image is acquired. The quality of image depends highly on the scanner being used. In practical applications, the scanned images are not perfect there may be some noise due to some unnecessary details in the image which can cause a disruption in the detection of the characters in the image. Preprocessing involves removal of noise (applying filters like Gaussian filter, Gabor filter etc.) and proper conversion of image like a colored image can be converted into gray scale or binary image for further processing of image. Feature extraction involves recognizing the feature required. Classifications and Recognition phase is the extraction phase of the process. After finishing the OCR process several post processing steps are necessary depending on the application, e.g. tagging the documents with meta-data (author, year,etc.) or proof-reading the documents for correcting OCR errors and spelling mistakes [4]. OCR is still in research and much advancement need to be made in this technology. The future scope of this is OCR in mobile devices, handwriting recognition, recognition of various languages except English (like Arabic, Devanagari, Telugu text), extraction and processing of images from video, processing and restoration of old documents and many more.

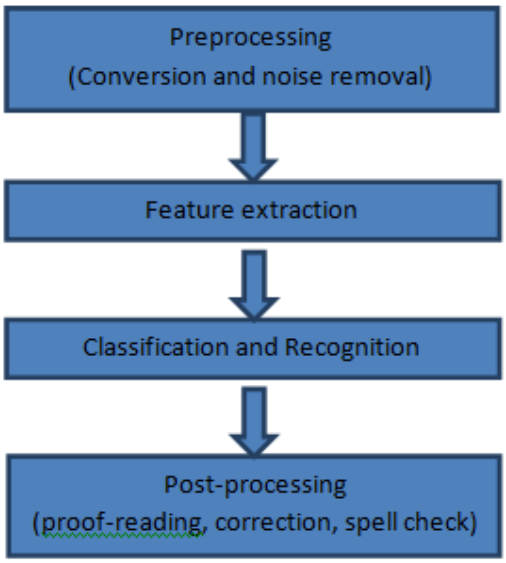

Fig 2: Stages of OCR

2. **Conventional Neural Network (CNN)**

- A convolutional neural network works very well to evaluate picture. This type of architecture is dominant to recognize objects from a picture or video [10].
- To build a CNN, you need to follow six steps:

Step 1: Input layer:

- This step reshapes the data. The shape is equal to the square root of the number of pixels. For instance, if a picture has 156 pixels, then the shape is 26x26. You need to specify if the picture has color or not. If yes, then you had 3 to the shape- 3 for RGB-, otherwise 1.

```
input_layer = tf.reshape(tensor = features["x"],shape =[-1, 28, 28, 1])
```

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Step 2: Convolutional layer

- Next, you need to create the convolutional layers. You apply different filters to allow the network to learn important feature. You specify the size of the kernel and the amount of filters.

```
conv1 = tf.layers.conv2d
( inputs=input_layer,
filters=14,
kernel_size=[5, 5],
padding="same",
activation=tf.nn.relu)
```

Step 3: Pooling layer

- In the third step, you add a pooling layer. This layer decreases the size of the input. It does so by taking the maximum value of the a sub-matrix. For instance, if the sub-matrix is [3,1,3,2], the pooling will return the maximum, which is 3.

Step 4: Add Convolutional Layer and Pooling Layer

- In this step, you can add as much as you want conv layers and pooling layers. Google uses architecture with more than 20

```
pool1 = tf.layers.max_pooling2d(inputs=conv1, pool_size=[2, 2],
```

Step 5: Dense layer

- The step 5 flatten the previous to create a fully connected layers. In this step, you can use different activation function and add a dropout effect.

```
pool2_flat = tf.reshape(pool2, [-1, 7 * 7 * 36])
dense = tf.layers.dense(inputs=pool2_flat, units=7 * 7 * 36,
activation=tf.nn.relu) dropout = tf.layers.dropout
( inputs=dense, rate=0.3, training=mode == tf.estimator.ModeKeys.TRAIN)
```

Step 6: Logit Layer

- The final step is the prediction.

```
logits = tf.layers.dense(inputs=dropout, units=10)
```

IV.CONCLUSION

The medicine reminder system is a useful resource for those who need technological help in completing or need help in working through day-to-day tasks and taking care of their health. It is a smart and organized system that is designed with helping the elderly people in our homes, but we have not put any restrictions that stop an everyday user from using the system. Anyone can need medical attention and normal people forget taking their prescriptions as well. The system feature will help them out in regulating their medications. It can also help a working person with a busy schedule by sending him a notification on the device he uses full day, his laptop. Thus there is no restriction on the user base for our system.

V.FUTURE SCOPE

For the future work we have decided to add a confirmation from the user whether they have taken the medicine or not. If they haven't taken the medicine the information will be send to the doctor and he can they reschedule the further medicine reminders according to the new schedule. Overall, app is a much needed system by the elderly people in our homes. It helps them in taking their medications in the prescribed quantity and at the prescribed time.

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