

IoT based Facial Recognition System for Visually Impaired People

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Abstract. The healthcare area is actually among the most crucial aspects which are actually explored by many scientists to build the best system. Although there were many differences as well as revolutionary methods created, there are usually certain problems that demonstrate in the niche which must be resolved. In days or weeks that are previous, there had been plenty of functions that were not possible to do as well as had a lot of risk factors related to the affected person. In this specialized era that has been altered, extremely main businesses can also be completed with a lot of great ease. Increasing the variety of the public has additionally viewed a growth in the selection of individuals who are actually created visually impaired or perhaps drop their visual sight whenever they close to the older age period of theirs. It's always quite difficult for visually impaired individuals to exist in their life with no assistance. With this paper, we suggest a face recognition process which could be utilized by the visually impaired individuals. In order to reduce the quantity of ambiguity, we've suggested a design that is actually meant for utilizing different machine learning strategies as KNN algorithms. An innovative face detection, as well as recognition device, is created which could operate in a tiny form factor. The suggested effort is noticed working nicely when in contrast with some other existing programs and might be of usage that is very much for the visually impaired persons.

Keywords: Visually Impaired, Face Recognition, Automated System, Motion Control Human-Robot interface

1 Introduction

The healthcare area is actually among the most crucial filed that must be taken care of[17]. Although there are many brand new scientists to update the existing methods in the submitted, currently it might be considerably improved for much better overall performance. As it deals with the lifetime of man enormous care should be provided for the exact same[16]. The progress of Artificial Intelligence has given birth to a lot of brand new systems out of that the famous people aare now being Machine learning Approaches as well as Deep Learning Techniques. Different strategies in Artificial Intelligence are popular in many uses such as for instance healthcare picture evaluation [1], automatic robot course preparing [2], flood detection in a specific community or maybe region [3] as well as land coverage distinction [4]. Visibility is actually among the most crucial provided presents for any man. An individual created with a visual disability or maybe has lost the perception of his for some other factors such as for instance mishaps or even years element suffers a great deal for his whole lifetime. This will make the individual be determined by many other individuals to do his/her daily actions.

Medical area relates to man life and saving them will be the biggest obstacle. A lot of the brand new systems are utilized for enhancing the exact same. With this newspaper, we've suggested a program wherein the KNN algorithms are actually utilized for detection and face recognition that may be quickly employed for understanding the actual individual[18]. Absolutely no human treatment is actually required and just the instructions provided by the people are actually realized by the devices. This way, the movable methods are manufactured semi-autonomous as well as the effort is completed with great ease. There's absolutely no possibility of every disaster at determining the actual man or women as the picture of the individual is actually shot and it is recognized by comparing the various other pictures kept in the repository. The majority of the area can be stated as follows: Section II consists of the Literature Survey, section III consists of the strategy utilized at the newspaper as well as part III consists of different outcomes received. The newspaper is actually concluded within the last by bringing up the appropriate long term works that can be utilized or even included to the suggested deliver the results.

2 RELATED WORK

Many health-related problems are actually solved for making ease for lots of people in importance. A lot of study job concentrates on producing new revolutionary products for visually impaired individuals. An alternative for eyes was created by Sachin Bharambe et al. which was considered as extremely effective & affordable[5], a novel framework was created to identify the flat abandoned items by making use of goal movies and matching a guide with them[19]. The whole goal of the strategy was identifying the items with GPS info of the items. Shaocheng Qu et al. [6] created a smart automobile using a CCD digital camera which was helpful for path recognition by making use of picture recognition methods. A brand new prototype was created in [7] which may be utilized as a traveling tool for visually impaired individuals. The prototype was created in such a manner that it detected equally dynamic and static items that were really employed for the navigation.

A sensible white-colored cane suggested in [8] made use of GPS links coupled with ultrasonic receptors to alert the blind individuals while traveling from one place to another. It was additionally termed as Bind Spot. In [9], a wise stick was suggested that made use of Infrared receptors to alert the blind individuals. The was created in such a manner that it might detect just the items in case it was present in the process. Benjamin et al. [10] created an intelligent aid that utilized the stick coupled with laser beam receptors. The alert was awarded to the blind individuals with the mic that is with them. RFID tag was put to use at the intelligent stick for passing the info regarding the hurdles and alerting the blind individuals [11,15]. It made use of the ultrasonic sensor in determining the items and for alerting the blind individuals through speakers. A vocal sales message was sent to the visually impaired individuals in [12] which additionally mad usage of an ultrasonic sensor for detecting the hurdles. In[13,14,]haptic sensor utilized to identify the hurdles and alert the individuals about the hurdles.

3 Existing System

The system proposed in the current research is divided into three phases as follows:

1) Face Image collection and tagging

The face images of known people for the visually impaired user is collected using different modes. More than four face images of the person are collected for better detection and recognition. The images were verified whether it has a face portion in it by running the face detection algorithm. All the images were tagged and stored in a different folder. The folders were named as the user's name. Any image without a face portion is detected and removed from the dataset.

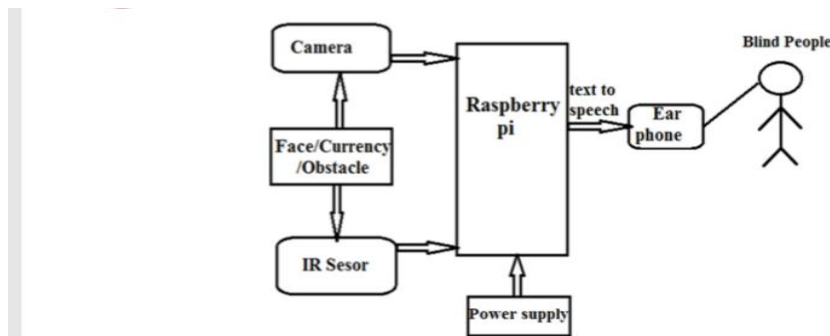


Fig. 1. Architecture of the Proposed System

2) Machine Learning using KNN

K-Nearest Neighbors (KNN) is actually among the easiest algorithms employed in Machine Learning for regression as well as classification problems. KNN algorithms make use of information & classify brand new data points depending on similarity methods (e.g. distance function). The distinction is actually accomplished by a vast majority of the vote to the friends of its. The information is assigned to the category that has the maximum nearest friends. We are going to start by importing the required libraries needed to apply the KNN Algorithm in Python. We are going to import the NumPy libraries for scientific computation. Then, we are going to import matplotlib.pyplot library for plotting the graph.

3) Detecting and recognition Face

The KNN model that is trained in the proposed work is actually utilized to identify the facial skin at the video feed. The video clip frame with experience detected will be given to the KNN design for face recognition. The KNN classifies the detected face with the repository. The face with the greatest matching score is actually selected. The selected ID of the largest matching facial skin is then converted to the title. The title received is actually given to the content to the speech module to talk the title to the end-user. In Fig.1, the structure of the suggested design is actually depicted. It consists of a digital camera to record the facial skin of an individual and then undergoes the different modules face recognition of the individual.

Hardware used :

1 Raspberry Pi

The Raspberry pi is a single board computer developed by the Raspberry pi Foundation. This is used to support the teaching in schools and countries that have been developing. It is slower than a laptop but still it is a complete linux computer, at a low power consumption level.

2 Camera

Web cam is a video camera that feeds the image in real time. These web cams are known for their flexibility, low manufacturing cost, making them low cost form of video telephony.

4. EXPERIMENTAL RESULTS

The experimental results were done on various datasets. The experiment was performed in Python and raspberry pi.



Fig. 2. YTF Dataset

Where a classifier was used to train the model using the various face of persons. The face recognition is one of the critical aspects with which the model needs to be trained.

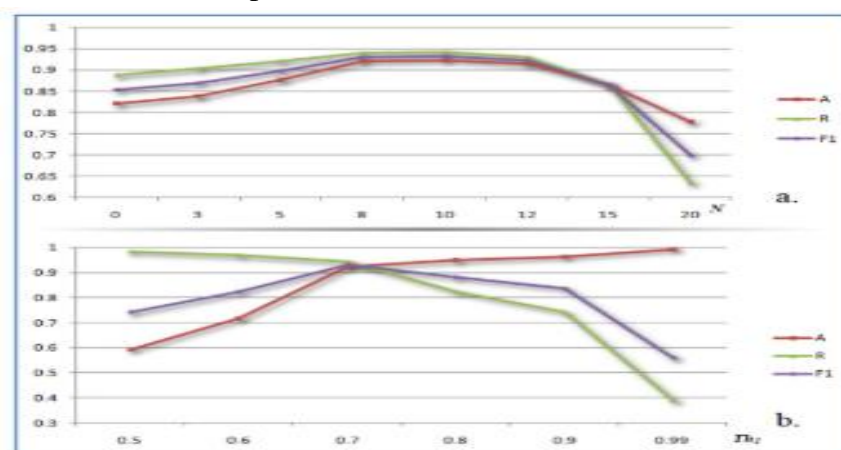


Fig. 3. The Efficiency of Proposed System

In Fig. 3 it is the YTF dataset is used to train the model for recognizing the faces in the proposed model. The functionality of the device was extremely correct as well as the outcomes are actually revealed in Fig. 3. As is usually noticed, the framework of ours returns the greatest score outstanding to eighty 5% no matter the burning conditions, facial skin pose or maybe different kinds of movements existent in the arena. Probably The lowest shows are actually received for blurred facial skin situations, while the top scores are actually obtained for frontal faces. Originating from a user perspective, the battery use of the suggested hardware structure is actually among the most crucial details which have to be taken into consideration. For starters, the video camera embedded on the smartphone is actually utilized as an acquisition unit which continuously records the neighboring arena and transmits the video stream to the processing

system.

5 CONCLUSION

The medical field is one such field where though there are numerous research works going, it still needs new projection to make the existing systems perform better. Machine Learning techniques are widely used in many fields to minimize the manpower and use them for better efficiency and less processing time. In this paper, we have proposed a system that is trained with the YTF dataset for face recognition and is able to recognize the face of the humans using the images captured by the camera. It processes the images using the KNN algorithm and pre-processes it to obtain a very accurate identification of the person. The proposed model has efficiently produced the results and various parameters are also used to measure the performance of the system.

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