SMART FACE RECOGNITION SYSTEM PROVIDING SECUIRITY FOR VISUALLY IMPAIRED PEOPLE

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Abstract: Various technologies have been developed to help make the world more accessible to visually impaired people, and recent advances in low-cost Embedded and MATLAB Based systems are likely to drive even more advances. However, the unique privacy and security needs of visually impaired people remain largely unaddressed. The inability to recognize known individuals in the absence of audio or haptic cues severely limits the visually impaired in their social interactions and puts them at risk from a security perspective. In recent years, several prototype systems have been developed to aid this population with the face recognition task. This paper aims to provide an overview of the state of the art in this domain, highlighting the strengths and weaknesses of different solutions and discusses some of the issues that need to be addressed and resolved to expedite the practical deployment and widespread acceptance of such systems. In face recognition, various algorithm used are Viola Jones for face detection, PCA (principal component analysis) in which we recognize an unknown test image by comparing it with the known training images stored in the database as well as give information regarding the person recognized. These techniques works well under robust conditions like complex background, different face positions. This technique works well for Indian faces which have a specific complexion varying under certain range. We have taken real life examples and simulated the algorithms in MATLAB successfully.

Keywords: *Microcontroller, Buzzer, Usb Camera, Matlab.*

I. INTRODUCTION

Visually impaired people face a variety of challenges in navigating a physical and social world that is often not designed with them in mind. Visual impairments include not only complete blindness, but also poor vision; one important challenge faced by visually impaired people is how to preserve their privacy and security in their daily lives. Sighted people are able to monitor their surroundings to protect themselves from privacy threats. To provide security Face Recognization is best option. Face recognition has been an active area of research for the last decade, due to the availability of fast computing systems and increased security requirements in public places. This research has led to the development of improved algorithms, as well deployment of access control and identity verification systems, based on face recognition. Although there are numerous algorithms today that can achieve an acceptable level of recognition when face images are captured in a controlled environment, there are no algorithms capable of recognizing people reliably in real-world situations. Face recognition for any assistive device would require algorithms that are more robust than what is being achieved today by training algorithms on controlled face datasets. Research focused on developing face recognition algorithms for security purposes tends to focus on finding methods that can achieve good recognition even when the person under surveillance wears disguises, such as facial hair, sun glasses and head gear. This requirement greatly limits the features that can be used to by face recognition algorithms, and tend to make them less than suitable for practical use in wearable devices. Contrast this with face recognition algorithms for assistive devices, which do not generally assume that the face being recognized is disguised. This allows any stable facial feature to be used for recognition – potentially providing a much more robust recognition.

II. RELATED WORK

Several computer vision-based solutions have been developed lately to assist the visually impaired in their daily activities. Most of these systems focus on

navigation and obstacle detection: e.g., vision based simultaneous localization and mapping (SLAM) has been recently proposed to support blind mobility [14-16].Extensive research has also been conducted on printed information and web access mainly by harnessing the power of OCR [17-20]. Relatively less attention has been directed towards application areas such as generic object recognition [21, 22] and face recognition but research in these domains has started gaining momentum in the past few years. It should be noted that several alternate sensing technologies such as RFID [23], infrared [24]and sonar [25] have also been used either on their own or in conjunction with computer vision to aid the visually impaired. However, these technologies suffer from some limitations, e.g., they all require special sensing equipment while infrared and RFID require specific tags; also, sonar and infrared are not very effective in indoors environments since such surroundings tend to be cluttered and the obstacles present therein may cause the reflected echoes to become distorted resulting in unreliable information being conveyed to the user.

The HUMAN FACE DETECTION AND RECOGNITION is our first paper referred. This paper represents face recognition algorithm such as PCA (principal component analysis), MPCA (Multi linear Principal Component Analysis) and LDA(Linear Discriminant Analysis) in which we recognize an unknown test image by comparing it with the known training images stored in the database as well as give information regarding the person recognized. These techniques works well under robust conditions like complex background, different face positions. These algorithms give different rates of accuracy under different conditions as experimentally observed. In face detection, we have developed an algorithm that can detect human faces from an image. We have taken skin color as a tool for detection. This technique works well for Indian faces which have a specific complexion varying under certain range. We have taken real life examples and simulated the algorithms in MATLAB successfully [8].

III. PROPOSED METHODOLGY

The disadvantages mentioned in the literature survey are overcome and new methods are being implemented in this system. In this we are using MATLAB coding and Embedded Hardware components for full fill the application.

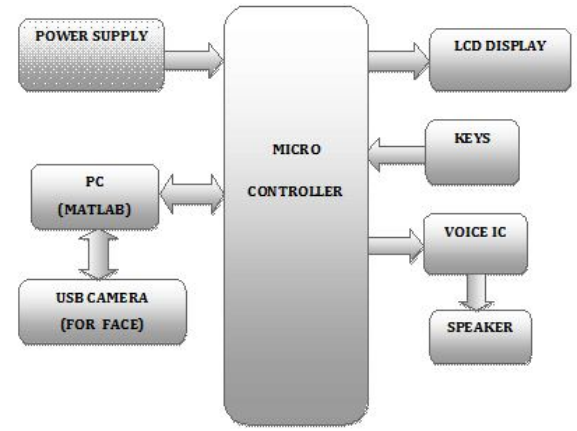

Fig.1.Block diagram

In this USB camera is used for Face capturing purpose and that data will be stored in MATLAB PC for verification. In our PC MATLAB code verify the face of the person with data base if it is matched then send to information to Microcontroller. In microcontroller it will takes the decision of which voice will be delivered to navigate the blind people.

IV. HARDWARE RESOURCES FEATURES

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

MATLAB COMPUTER:

MATLAB (**mat**rix **lab**oratory) is a multi-paradigm numerical computing environment and fourth generation programming language. Developed by MathWorks, MATLAB allows matrix manipulations,

plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, Fortran and Python. Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing capabilities. An additional package, Simulink, adds graphical multi-domain simulation and Model-Based Design for dynamic and embedded systems.

In 2004, MATLAB had around one million users across industry and academia. MATLAB users come from various backgrounds of engineering, science, and economics. MATLAB is widely used in academic and research institutions as well as industrial enterprises.

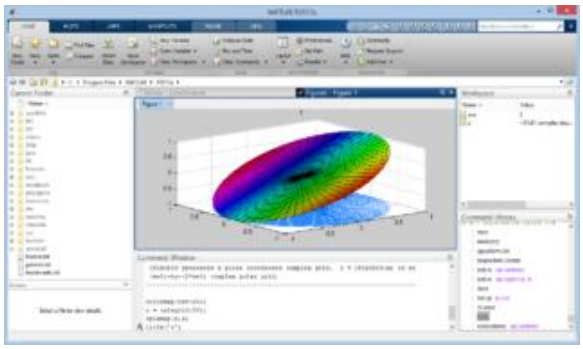

Fig.2.MATLAB Execution

USB CAMERA:

Fig.3.USB Camera

USB Cameras are imaging cameras that use USB 2.0 or USB 3.0 technology to transfer image data. USB Cameras are designed to easily interface with dedicated computer systems by using the same USB technology that is found on most computers. The accessibility of USB technology in computer systems as well as the 480 Mb/s transfer rate of USB 2.0 makes USB Cameras ideal for many imaging applications. An increasing selection of USB 3.0 Cameras is also available with data transfer rates of up to 5 Gb/s. Edmund Optics offers a variety of USB Cameras suited to meet many imaging needs. EO USB Cameras are available in both CMOS as well as CCD sensor types making them suitable across a larger range of applications. USB Cameras contain out-of-the-box functionality for quick setup. USB Cameras using low power USB ports, such as on a laptop, may require a separate power supply for operation.

V. CONCLUSION

The inability to recognize known individuals in the absence of audio or haptic cues severely limits the visually impaired in their social interactions and puts them at risk from a security perspective. An overview of several systems being developed to aid this population in the face recognition task was presented in this paper. In this paper have presented architecture for the facial & currency identification aimed at people with visual disabilities. The architecture has been designed and developed with the aim of achieving a robust and computationally light result that could be embedded in elements with a moderate computing capacity.

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