

Automatic challan machine machine for blind people

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ABSTRACT

This Project "Automatic challan writing machine for blind" is done to help the blind and making them to feel ease in filling the forms such as bank challans, withdraw format. which are sometimes look tedious even for the normal ones. Blind people are the ones who will always be given preference in services, yet some sort of input is required from them to make the service a best one. It would be tough for the blinds if these inputs are received in a written format. This project reduces the constraints for the blind in filling up a forms. This is achieved by of a set of modules to recognize the customer, interpret the details and making it an authenticated transaction with a feedback mechanism. Face recognition module to identify the customer, voice recognition module to get the details from the customer, printer to provide an acknowledgement to the customer for future use, voice feedback module to direct the customer and to make sure that the process is done in the right path, are some of the modules that are used in the project to provide an effective output. All these modules are controlled by a microcontroller. Thus the project will definitely be a golden egg to the blind by making them to fill the forms on their own without seeking help from others. The Feedback mechanism receive and verify the details in an interactive manner making the machine more user friendly. Thus all these features,advantages of the features also with their constraints are discussed in this paper.

1.INTRODUCTION

In this project, we are going to do a challan filling format for a blind users in a bank through a voice process. A computer generated voice will ask the user to deposit or withdraw. For that the blind users has to reply for that voice by this the process will start executing. Here we are going to implement this project through a pic microcontroller, and then a microphone to recognize a voice and then a USB camera to check the account number and mainly a PIR sensor is used to detect the heat of the a person .If the PIR sensor get sensed the process will get started. Finally, the whole data will be printed through UART communication by a printer. The data will be send to the microcontroller through UART communication and then the a microcontroller will make the printer to print the whole data.

2. LITERATURE REVIEW

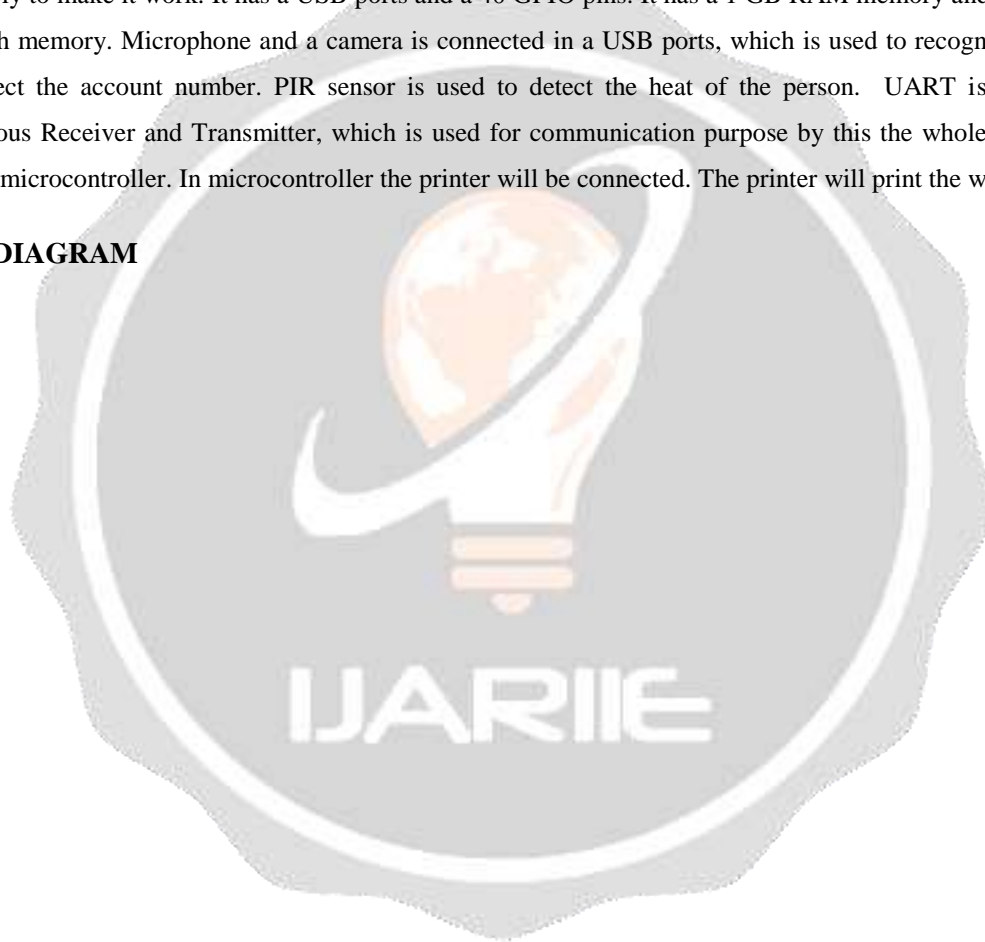
In this study, the researchers apply mental model to investigate blind user's experiences of usability concerns for Thai banknotes recognition to develop mobile application for them. The study explains the role of mental model and

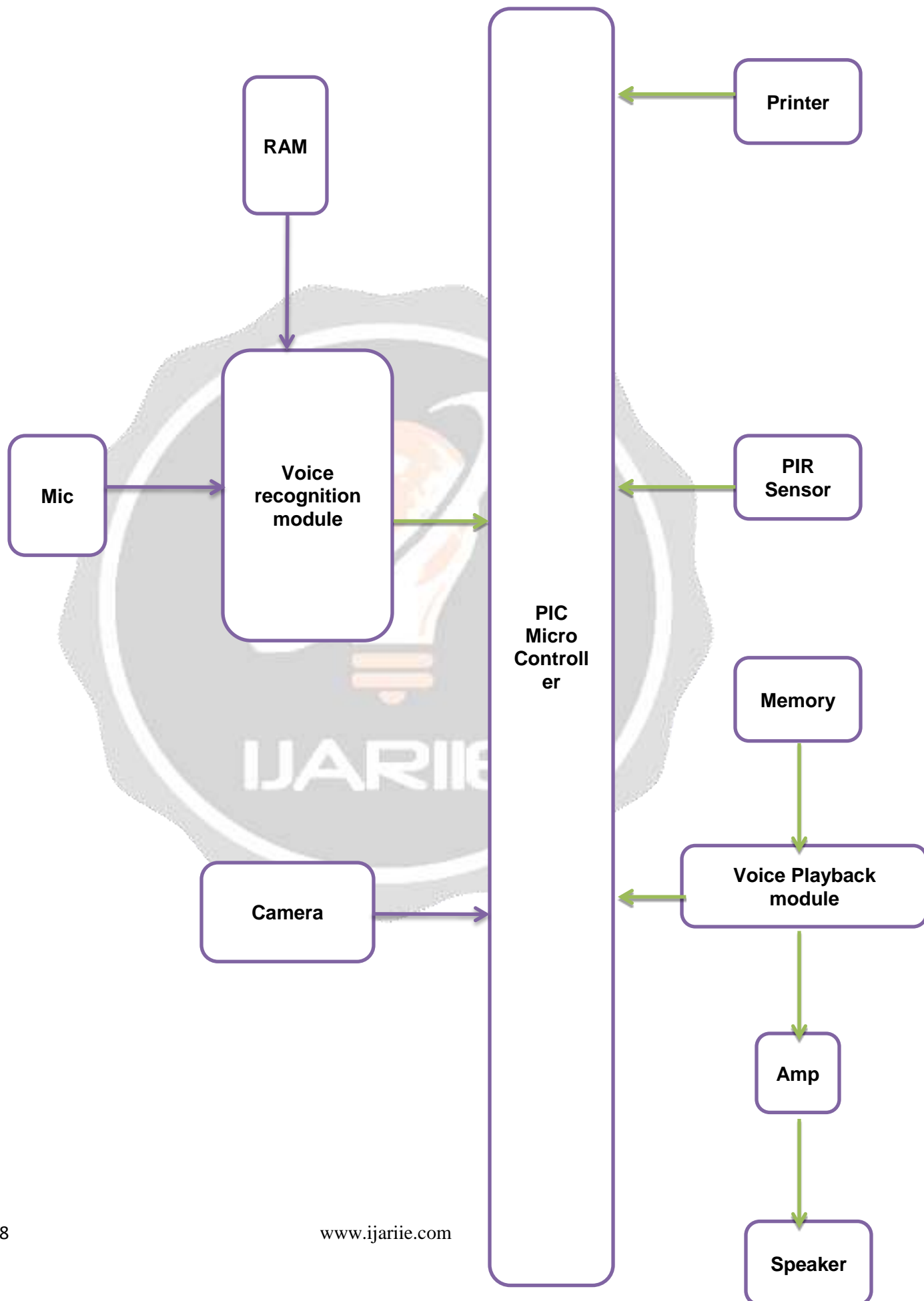
illustrates how the model can assist to design the application. The user has to show the bank notes in front of the mobile device by opening the application. So by this, the application will tell the users how much the amount is shown, by this the user can get the information that how much they are having.

3. PROPOSED SYSTEM

In our project we are going to make a automatic challan writing machine for blind people. This machine will automatically fill the challan by getting the information of person from the camera. Person will stand in front of the camera. Data will be written into challan automatically by the pre-defined data. A microcontroller, it needs a 5V power supply to make it work. It has a USB ports and a 40 GPIO pins. It has a 1 GB RAM memory and deals with a 16 GB flash memory. Microphone and a camera is connected in a USB ports, which is used to recognize the voice and to detect the account number. PIR sensor is used to detect the heat of the person. UART is a Universal Asynchronous Receiver and Transmitter, which is used for communication purpose by this the whole data will be send to the microcontroller. In microcontroller the printer will be connected. The printer will print the whole data.

BLOCK DIAGRAM





Block diagram description

The circuit contains the functional part and the power supply to that functional part. The components in these parts are as follows.

POWER SUPPLY

- Battery (12V)
- Bridge rectifier (W10M)
- Voltage Regulator(IC 7805)

FUNCTION PART

- PIC microcontroller (PIC 18F6527)
- PIR Sensor
- Voice Recognition Module
- Voice Playback Module
- PC
- Thermal Printer

DESCRIPTION

Power Supply- A good regulated AC to DC power supply circuit is essential for any electronic hobbyists and electronic students to do their electronics hobby projects. Also a bridge rectifier power supply is one of the introductory circuits for beginners. Firstly we need to know what a bridge rectifier is. A rectifier

circuit employs the conversion of AC voltage to DC voltage. Full wave bridge rectifiers have the benefit that they transfer both half cycle of AC input into DC output and also efficiency is two times greater than that of half wave rectifier. Bridge rectifier circuits are put into practice using diodes such as 1N4001, 1N4007 etc.

- Transformer less AC to DC power supply
- Dual power supply using single battery source

Below is the circuit schematic of rectifier regulated power supply using 78XX voltage regulator IC.

78XX is a positive voltage regulator and available at different output voltages as 7805 for 5V, 7809 for 9V, 7815 for 15V etc. Hence you can implement power supplies for required voltages that is 5V, 9V or 15V as you like. Here we make use of 7805.

FUNCTION UNIT

When we consider the functional unit, the Micon (18F6527) plays the vital role as this is the brain of the whole device. The Micon consists of two UARTS which the foremost reason to choose this IC. To the application we need PC and Printer. Hence we connect these devices to the UARTS of Micon and the ports are RG1 and RG2 (pin4 and 5) for printer and RC6 and RC7 (pin 31 and32) for PC respectively.

The PIR Sensor which is used to detect the motion of a person is connected to the port RB4 (pin 44). The output from the Voice recognition Module is given to the Ports RB0, RB1, RB2, RB3 (pin45, 46, 47, 48) respectively. The voice recognition module is the most important module as this is only device which interacts with the user get the details and the perform the process.

The voice playback is the next important module as it gives the feedback to the user and explains the process. This Module takes up a full series of ports i.e. RD0 – RD7. The voice play back uses a SD card as its memory and execute as per the process sequence.

The PC is where the Face Recognition process takes place and communicate to the Micon through a USB connected to the UART 1. The Printer provides the Acknowledgement to the user as a result of the complete process which is connected to the UART 2.

HARDWARE DESSCRPTION

HARDWARE REQUIREMENT

- **Power Supply**
- **Battery**

- **USB camera**
- **Microphone**
- **PIR Sensor**
- **PIC Microcontroller**
- **Printer**

4.1 LEAD ACID BATTERY

All lead acid batteries consist of flat lead plates immersed in a pool of electrolyte. Regular water addition is required for most types of lead acid batteries although low-maintenance types come with excess electrolyte calculated to compensate for water loss during a normal lifetime. A lead-acid battery is a electrical storage device that uses a reversible chemical reaction to store energy. It uses a combination of lead plates or grids and an electrolyte consisting of a diluted sulphuric acid to convert electrical energy into potential chemical energy and back again. The electrolyte of lead-acid batteries is hazardous to your health and may produce burns and other permanent damage if you come into contact with it. Thus, when dealing with electrolyte protect yourself appropriately.

WORKING OF LEAD ACID BATTERY:

A lead-acid battery is composed of a series of plates immerse in a solution of sulfuric acid. Each plate consists of a grid upon which is attached the active material (lead dioxide on the negative plates, pure lead on the positive plates.) All of the negative plates are connected together, as are all of the positive plates. When the battery is discharged (when it is subjected to an electrical load), acid from the electrolyte combines with the active plate material. This releases energy and converts the plate material to lead sulfate. The electrolyte becomes less acidic in the process, and the specific gravity of the solution drops. When a battery is recharged, the opposite occurs: the lead sulfate reverts back to active material, and the electrolyte becomes more acidic with a higher specific gravity.

4.2 MICROPHONES

Microphones are a type of transducer - a device which converts energy from one form to another. Microphones convert acoustical energy (sound waves) into electrical energy (the audio signal). Different types of microphone have different ways of converting energy but they all share one thing in common the diaphragm. This is a thin piece of material (such as paper, plastic or aluminium) which vibrates when it is struck by sound waves. In a typical hand-held mic like the one below, the diaphragm is located in the head of microphones.

Working of thermal printer

4.3 THERMAL PRINTER

Thermal printing (or direct thermal printing) is a digital printing process which produces a printed image by selectively heating coated thermochromic paper, or thermal paper as it is commonly known, when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing an image. Two-colour direct thermal printers can print both black and an additional colour (often red) by applying heat at two different temperatures.

Thermal transfer printing is a very different method that uses a heat-sensitive ribbon instead of heat-sensitive paper, but uses similar thermal print heads.

Your average home user will probably never own a thermal printer. One of today's primary uses of thermal printers are in businesses or stores that need a POS (point of sale) receipt printer. Some offices may have thermal technology in their fax machine or MFP. Thermal printers work in one of two ways, for older models heat sensitive paper is used by placing a roll in a container inside the machine and the end of that roll is stuck into a slot. The heat that has built up in the machine reacts with the heat-sensitive paper and the pigments transfer the image to the sheet. For newer machines, they use ribbon printer cartridges. Inside of the ribbon cartridge there is a waxy material stored inside. When the printer is in use, paper is fed through the a slot located between the print head and a roller and the heat then melts the substance and sticks it onto the paper.

4.4 Voice Recognition

Speech Recognition

Automatic speech recognition is the process by which a computer maps an acoustic speech signal to text. Automatic speech understanding is the process by which a computer maps an acoustic speech signal to some form of abstract meaning of the speech.

Speaker Independent

A speaker dependent system is developed to operate for a single speaker. These systems are usually easier to develop, cheaper to buy and more accurate, but not as flexible as speaker adaptive or speaker independent systems. A speaker independent system is developed to operate for any speaker of a particular type (e.g. American English). These systems are the most difficult to develop, most expensive and accuracy is lower than speaker dependent systems. However, they are more flexible.

A speaker adaptive system is developed to adapt its operation to the characteristics of new speakers. It's difficulty lies somewhere between speaker independent and speaker dependent systems.

5 SOFTWARE DESCRIPTION SOFTWARE REQUIREMENT

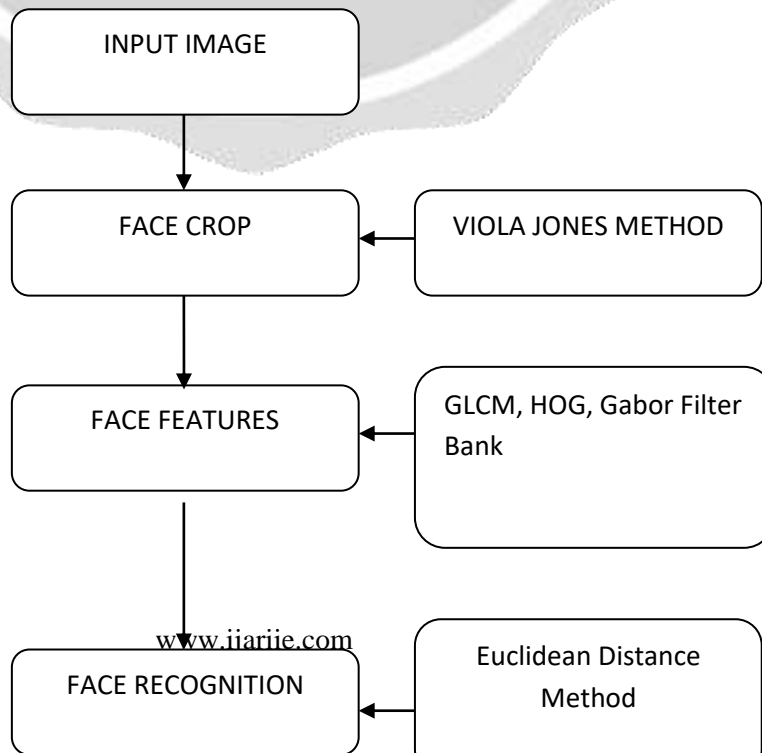
PROGRAM LANGUAGE - Embedded C

PROGRAM SOFTWARE - Matlab

5.1 Embedded C Language

Embedded c programming requires nonstandard extensions to the c language in order to support exotic features such as fixed-point arithmetic, multiple distinct Memory banks, and basic i/o operation. It includes a number of features not available in normal c, such as fixed-point arithmetic, named address spaces, and basic i/o hardware addressing.

5.2 MATLAB Face Recognition



MODEL DESCRIPTION

Face recognition system consists of three modules

- Face detection
- Feature extraction
- Face recognition

FACE DETECTION

THE VIOLA/JONES FACE DETECTOR

It's a widely used method for real-time object detection. Training is slow, but detection is very fast. Training Data – 5000 faces , All frontal – 300 million non faces ,9400 non-face images. The cascade object detector uses the Viola-Jones algorithm to detect people's faces, noses, eyes, mouth, or upper body. The Viola-Jones algorithm uses Haar-like features, that is, a scalar product between the image and some Haar-like templates. More precisely, let I and P denote an image and a pattern, both of the same size $N \times N$, The feature associated with pattern P of image I is defined by

$$\sum_{1 \leq i \leq N} \sum_{1 \leq j \leq N} I(i, j) 1_{P(i, j) \text{ is white}} - \sum_{1 \leq i \leq N} \sum_{1 \leq j \leq N} I(i, j) 1_{P(i, j) \text{ is black}}$$

FEATURE EXTRACTION

GLCM, HOG, Gabor Filter Bank

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval. Feature detection, feature extraction, and matching are often combined to solve common computer vision problems such as object detection and recognition, content-based image retrieval, face detection and recognition, and texture classification.

FACE RECOGNITION

EUCLIDEAN DISTANCE METHOD

In image analysis, the distance transform measures the distance of each object point from the nearest boundary and is an important tool in computer vision, image processing and pattern recognition. In the distance transform, binary image specifies the distance from each pixel to the nearest non-zero pixel. The euclidean distance is the straight-line

distance between two pixels and is evaluated using the euclidean norm. The city block distance metric measures the path between the pixels based on a four connected neighbourhood and pixels whose edges touch are one unit apart and pixels diagonally touching are two units apart.

RESULT AND CONCLUSION

This study has successfully applied the mental model to look for usability concerns for the blinds when developing the mobile application for them in the case of Thai banknotes recognition. The researchers found that the mental model is very useful tool to assist the system developer to understand how the users cognitive idea when developing the application. For the blind system users' mental model, it should be useful, easy, and available. For example, providing some automation features which could facilitate their impairment challenges like text to speech in assisting them for the direction of features and functions related to the applications.



FUTURE WORK

The researchers believe that this prototype has several limitations that need to be improved for the better version in the future. Therefore, it will be sent to the blind users to do usability testing and find more usability concerns for the future improvement of the application.

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