Assisting Device for Visually Impaired Person

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Abstract *-The blind detection system is used to help the visually impaired person to travel independently from one station to another bus station. The project objective is to develop a blind detection system using RFID and Bluetooth technology. It is designed using an 8-bit microcontroller (Arduino MEGA2560) with on-chip ADC and UART as a core element of the system. It has three keys, buzzer and LCD (16x2) for setting the destination station via blind. As per the selected station, travelling amount will be deducted and blind will acknowledge the destination station via buzzer.*

Keywords—*RFID, Bluetooth, Keys, micro-controller, blind detection and Buzzer*

I. INTRODUCTION

Assisting devices help the visually impaired person for their daily activity. As per the WHO data base 39 million persons are blind and 246 have low vision and they need constant support to attain their daily activity [7]. To help them many assisting devices were designed for example blind stick [9], assistive devices [8][10], and wearable devices which can make them independent to some extent. For the same many software's are also developed like Screen reading software (consisted of synthetic speech by which person can listen), Dictation software, Braille embossers and optical character recognition Systems [5].

Due to advancement in technology assisting device has become advanced and comes in the form of wearable devices. These are distinctive from portable devices by allowing hands-free interaction. The area of wearable devices is currently a "hot" research topic in assisting people with disabilities such as the blind.

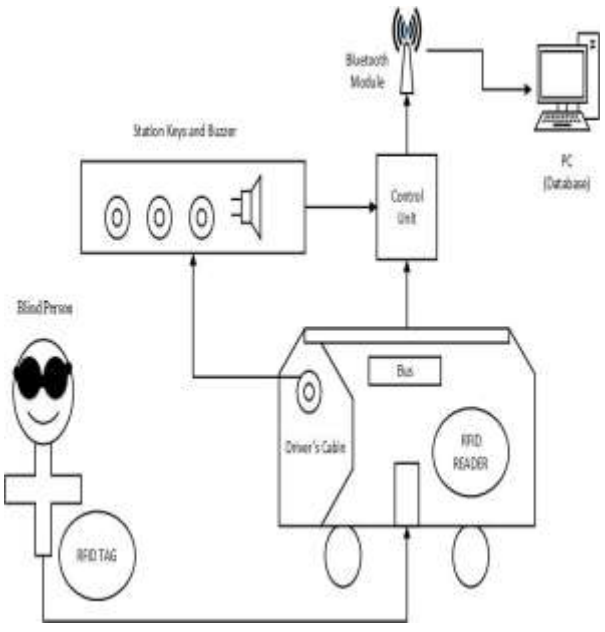
Many assistive devices were designed reported in [5][6][9] for blind to travel for a shorter and nearby ranges. But what if that blind person wants to travel to farther places, so for such conditions and focusing on the travelling and safety of visually impaired person we designed the Assisting device for the same

II. DESIGN APPROACH

The Project objective is to design the assistive device for visually impaired person to make them independent at some extent. It can also help the blind person travel independently in bus and can trace the location of their own. The instrument set up as shown in figure 1, consist of RFID tag, Bluetooth, and microcontroller.

As per the instrument set up every blind person should be having the RFID card with them. That RFID consists of a unique identification number with some amount of balance stored in the card. When the bus arrives the bus station RFID reader present in the bus detects the Blind's RFID card .After boarding the bus blind person communicate with the driver for the destination location. Accordingly the bus driver selects the switch present in his cabin for the separate stations. Hence card is detected; the Identification No. with the deducted amount of that respective card goes to the server (database) via Bluetooth. Then the fare of travelling from one station to another station is stored in the database. When the needed station arrives buzzer rings and the blind person acknowledges that his station has arrived.

Fig 1: Instrument setup



III. BLOCK DIAGRAM

The block diagram of the Assisting device for visually impaired person as shown in figure 2.. It consists of the keys which are actually switches connected for each and every station present in the driver's cabin There is an RFID card which is with the blind person and RFID reader present in the Bus. The Reader is present along the bus so that it could read the RFID cards which are provided to the blind person. The input data goes to the control unit that is in the Arduino. Then as an output the selected location is shown in the LCD and also the fare deducted from that respective ID card for a particular station. That deducted amount from that ID is transferred to the database from Bluetooth Buzzer gets ON to inform the visually impaired person that the desired location is reached.

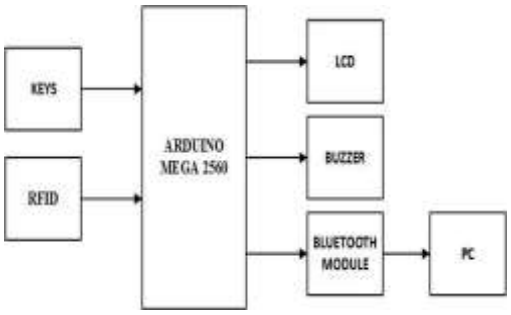


Fig 2: Assisting Device for visually impaired Person

IV. SCHEMATIC DIAGRAM

The complete circuit diagram of the assisting device for visually impaired is shown in figure 4.9 with the microcontroller "Arduino mega2560" u1 as its core component. The microcontroller has internal power-up reset and boots with its internal r-c clock. it has internal program memory and is programmed to run using its internal clock generator. it has three keys designated as sw1, sw2 and sw3, which is used for selecting the station and it has the RFID reader connected to pin. no.63 (Rx3) of microcontroller u1 (used for reading the passive tags). it also has three output devices buzzer, LCD and pc designated as b1, b2 and u2 respectively. the buzzer designated as b1 is used to acknowledge the arrival of station and LCD(u2) is used to display the data, selected by driver. the Bluetooth device designated as b2 connected to Txd and Rxd of controller is used to transfer the data of blind card from Arduino to pc

V. RESULTS

The results of hardware and software as shown in figure 4 and 5.

VI. CONCLUSIONS

The whole circuitry and modules are assembled on zero point PCB. The designed circuit is working for, to detect the RFID card and update the card details on the database. It is also providing a facility to select the destination station as per the blind's requirement and also get acknowledgement via buzzer.

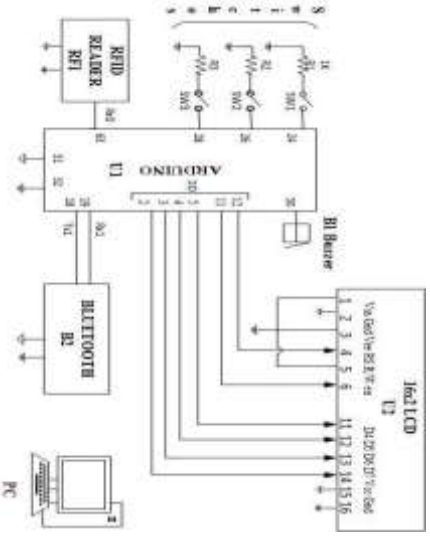
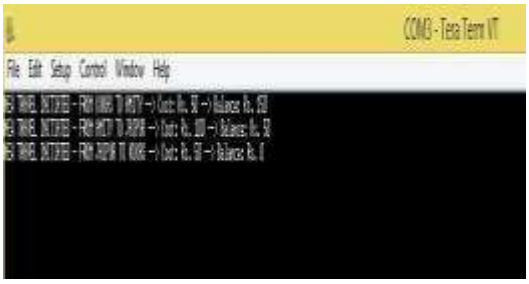


Fig 3: Schematic of the assistive device for visually impaired person

(a) Data transferred to Bluetooth software Teraterm



(b) Data transferred to database via Bluetooth

Fig.4 Software results

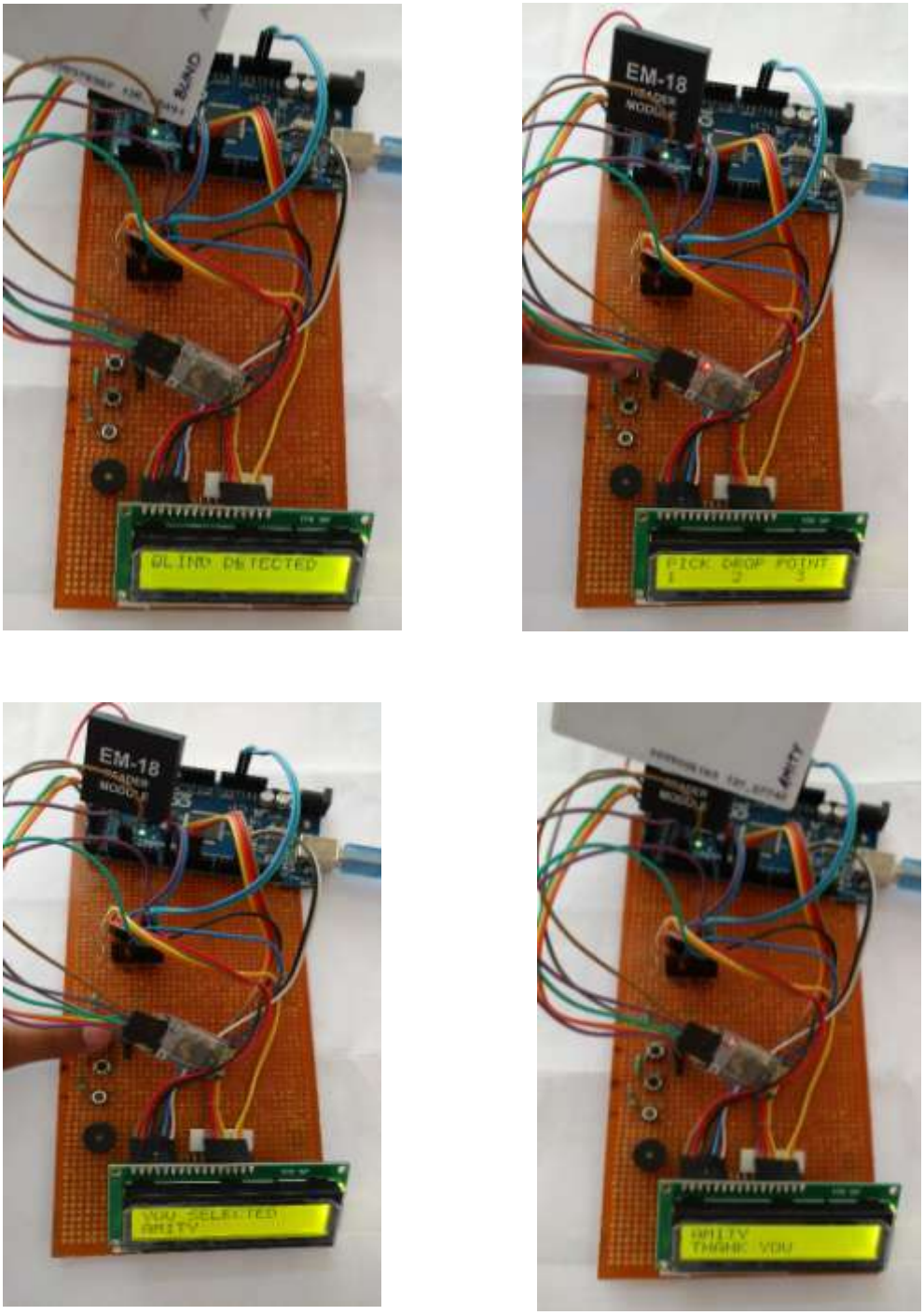


Fig. 5: Hardware results

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