RESEARCH ARTICLE

TALKING HANDHELD DEVICE FOR VISUALLY CHALLENGED PERSON

M. Smitha[1], T. Ayesha Rumana[2]
[1]Lecturer, Department of Biomedical Engineering, P.S.N.A College of Engineering and Technology, Dindigul, India
[2]Assistant Professor, Department of Biomedical Engineering, P.S.N.A College of Engineering and Technology, Dindigul, India

[1] shrinidhi42@yahoo.com; [2] ayesharumana@gmail.com

Abstract— A cost effective talking handheld device was developed to identify the products in the supermarket and also announces the product information to visually challenged person. The device consists of i) Product section ii) Handheld section iii) Billing section. In the Product section all information's about the product will be encoded in encoder. The encoded information is transmitted through RF transmitter. In the handheld section RF receiver receives the information about the chosen product and Decoder decodes the information that is to be fed to the microcontroller unit. The product details will be conveyed immediately using loudspeaker. The selected products amount is added or subtracted from the total amount using add or remove button. Total amount of products purchased is transmitted via Zigbee transmitter. In the billing section the transmitted information is received by the Zigbee receiver.

Key Terms: - RF transmitter and receiver; Encoder; Decoder; Zigbee transmitter and receiver

I. INTRODUCTION

Blindness is one of the largest disabilities in the world. From the statistics of world health organization 285 million people are visually challenged worldwide, 39 million people are blind and 246 have low vision. Visually challenged people can play an effective role in the society with the help of many assistive devices. This device helps to improve the quality and standard of their life by enabling the visually challenged people to shop effectively in the supermarkets. Central monitoring system based on Zigbee wireless sensor network was developed to automatically monitor and control the temperature and humidity of the surveyed area in the supermarket[1].In the French health care environment RFID was used to track and trace the surgical equipment within and among hospitals along with the knowledge based system to improve the overall performance of the surgical instrument management process[2].A mobile RFID reader with an integrated Zigbee transceiver transmits the information tagged in the utensils and other objects in the house using RFID tags[3].

II. METHODOLOGY

The device consists of three sections namely product section, handheld device section and billing section shown in Fig.1. The product section informations are transmitted to handheld device section through RF transmission. The handheld device receives information about the products and conveys product information to the visually challenged person. The selected product details are transmitted to the billing section through Zigbee transmission
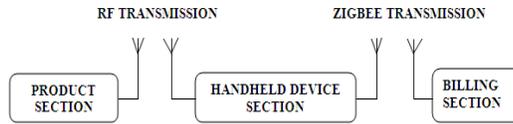
Fig.1 General Block diagram

2.1 PRODUCT SECTION

   Each and every product has a unique ID, which contains the information about the product such as product name, maximum retail price, expiry date, etc. The encoder HT – 12 E is powered by a 9V battery to encode the product information. Then the encoded information is transmitted by the transmitter (RFID Tag) to the RF receiver in the handheld device section. The operating frequency of RF (Tx/Rx) is 434 MHz. Fig.2 shows the block diagram of product section.
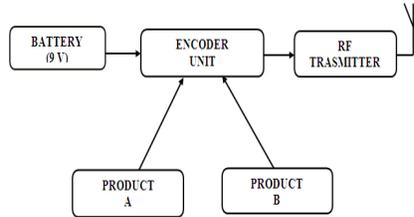

Fig. 2 Block diagram of product section

2.2 HANDHELD DEVICE SECTION

   The transmitted product information is received by the RF receiver. The decoder decodes the information and it is given to the microcontroller (AT 89S51) unit. Product details are conveyed using voice chip with speaker shown in Fig.3. Using the add button, the selected product amount is added to total amount for billing purpose. On pressing the remove button, the selected product amount is subtracted from the total amount. While adding or subtracting the product, the total amount of the purchased products is conveyed to the visually challenged person and transmitted via Zigbee transmitter to the billing section.
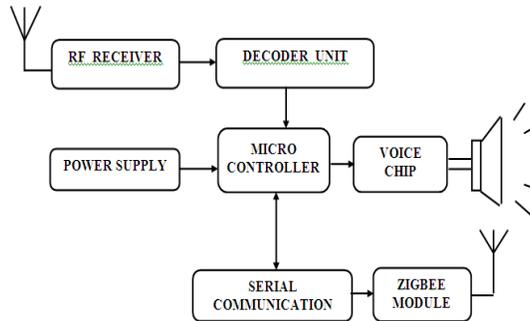

Fig.3 Block diagram of handheld device section

2.3 BILLING SECTION

   In Fig.4, the Zigbee module on the billing area receives the total amount of purchased products. Then Zigbee transfers the information to PC via RS 232 for bill generation.
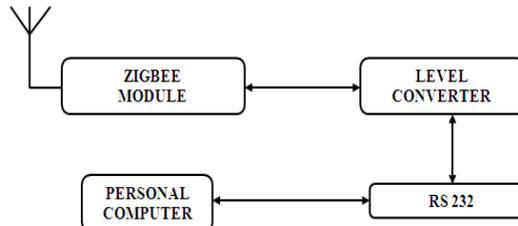

Fig. 4 Block diagram of billing section

115

III. RESULTS AND DISCUSSION

The results are summarized in this section. We first obtain the information about the product chosen from the visually challenged person and the product details are informed to the visually impaired person through the loud speaker. Finally the total amount purchased by the visually challenged person is transmitted to the billing section. Fig.5, Fig.6, Fig.7 shows the snapshot of each module. This device assists the visually challenged person to shop in the supermarkets individually.
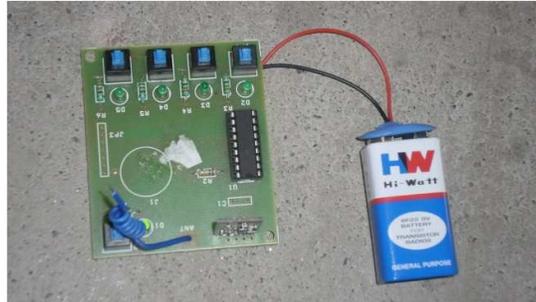

Fig.5 Product section module

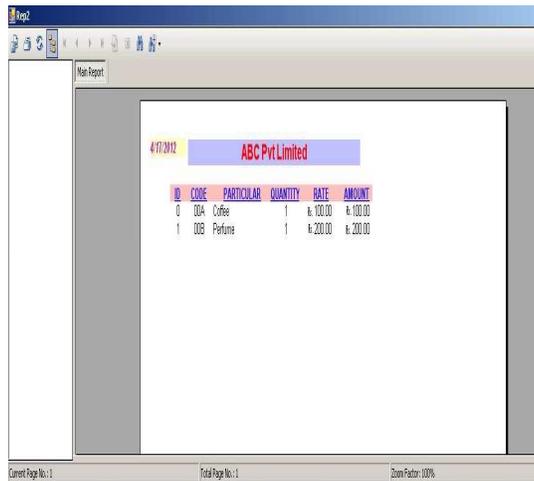**Fig.6 Handheld device section module**

Fig.7 Billing Section

IV. CONCLUSION AND FUTURE ENHANCEMENT

Accurate identification and details of the purchased products are important for visually challenged person as well as for the aged people. The device reduces the waiting time for billing and also reduces the shopping time. A talking handheld device was developed to identify the products in the supermarket and announces the product

information to visually challenged person. Portable handheld device can be developed to identify the damages in the products and also monitors the freshness of the groceries.

REFERENCES

[1] Yang Chenwei, Liu Dao, Yao Dunping and Yao Shengxing, Li Zuling, "Design of Monitor-and-control System for Supermarket Fresh Area Based on ZigBee", ICEICE 2011; p.1302- 1305.

[2] Yannick Meiller, Sylvain Bureau, Wei Zhou, Selwyn, Information   Technologies & Modeling, ESCP Europe, Paris, "RFID-Embedded Decision Support for Tracking Surgical Equipment", HICSS 2011; p.1-6.

[3] Murad, M.; Rehman, A.; Ullah, S.; Fahad, M.; Yahya, K.M., "An RFID based navigation and object recognition assistant for visually impaired people", ICET 2011; p.1-4.

[4] Donghun Kim and Yudaya Sivathanu; En'Urga, "An Information Delivery System for Visually Impaired People In   Dynamic Environment", SMC 2011; p.2062-2067.

[5] Bastinb Tony Roy, Savarimuthu Morgan Bruce, Maryam PurvisA "A Software Framework for Application Development using ZigBee Protocol", The Information Science Discussion Paper Series Number 2009/03.

[6] Bao Changchun, "Designed of Monitoring system for grain depot based on zigbee technology" Transactions of the CSAE, vol .25 No. 9 Sep .2009(Chinese).

[7] Y. Meiller, and Bureau, S. "Logistics Projects: How to Assess the Right System? The Case of RFID Solutions in Healthcare," Proceedings of the Americas Conference on Information Systems (AMCIS), 2009.

[8] S. Piramuthu, and Shaw, M.J. "Learning-Enhanced Adaptive DSS: A Design Science Perspective." Information Technology & Management, 10(1), pp. 41-54 2009.

[9] Y.-J. Tu, Zhou, W., and Piramuthu, S. "Identifying RFID-embedded Objects in Pervasive Healthcare Applications." Decision Support Systems, 46, pp. 586-593, 2009.

[10] Jinying Chen Zhi Li Min Dong Xuben Wang, "Blind Path Identification System Design Base on RFID," in Proceedings of (ICECE), 2010 International Conference on Electrical and Control Engineering, 2010.