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Systematic Approach for Utilization of IOT Environment by the Weak People

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ABSTRACT

Internet of Things is the network of physical objects such as buildings, devices and other items embedded with sensors, electronic, software and network connectivity that enables these objects to collect and exchange data. Even though it is easy to handle devices at the IOT environment, weak people like children, physically disabled and old people struggles a lot to handle the devices properly in IOT environment. This paper proposes a systematic methodology to protect and handle the IOT environment by the weak people using intelligent systems and user centric system to collect the data from IOT environment and measure it to visualize the data, hence provides a user friendly IOT environment.

Keywords: IOT, sensors, embedded system, intelligent systems, user-centric systems

1. INTRODUCTION

The Internet of Things is transforming every day the physical objects that surrounds us into an ecosystem of information that is rapidly changing the way we live our lives. Even though IOT is user friendly in nature, it is difficult for weak people such as children, physically disabled and old people to be a part in IOT environment. In order to overcome these difficulties the intelligent systems and user centric systems can be used. The user-centric system can be used to solve multi stage problems that not only requires designers to analyze and visualize how users are likely to use a product, but also to test the validity of their assumptions with regard to real world environment and modifying the original requirements[1-3].

2. INTELLIGENT SYSTEMS

The proposed IOT architecture uses the intelligent systems which will adjust automatically to individual's skills and pattern of usage. The intelligent systems have the capacity to gather and analyze data and communicate with other systems. The intelligent systems are categorized into three layers which are summarized as follows:

Conception layer: The conception layer is the basic layer in intelligent systems which identifies the objects and gather information. It is mainly comprised of sensors, actuators, monitoring stations, nano nodes, RFID tags and readers/writers [1, 5].

Network layer: The network layer transmits the information obtained from the conception layer. It consists of networks and network administration systems [4].

Application layer: The application layer is the user interface layer. It consists of set of intelligent solutions that apply the IoT technology to satisfy the needs of the users [6].

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3. CONCEPTION LAYER

This layer provides context-aware information concerning the environment of weak people. The components of this layer for blind people are micro and nano sensors along with RFID based assistive devices. The physically impaired people, old people and child requires body sensors, actuators and RFID technology to assist the conception layer.

4. NETWORK LAYER

The Network layer enables the access of monitoring stations to the radio channel to transmit the information obtained from the conception layer. Wireless adhoc networks are a good option to establish wireless and mobile communications within the IoT, since they do not require any preexisting infrastructure, they require minimal configuration and are deployed quickly with low cost.

5. APPLICATION LAYER

This layer provides an operation support platform, which can be accessed by monitoring stations and applications. It provides important functionalities such as authentication, billing, service management service acceptance and routing of packets based on defined policies. In application layer the services are run by application servers which host, execute the services and provide the interface to communicate with the operation support platform.

6. DOMESTIC ENVIRONMENT

The smart home technology in domestic environment is the integration of technology and services through home networking for a better quality of living. Smart home enable the automation and control of the home

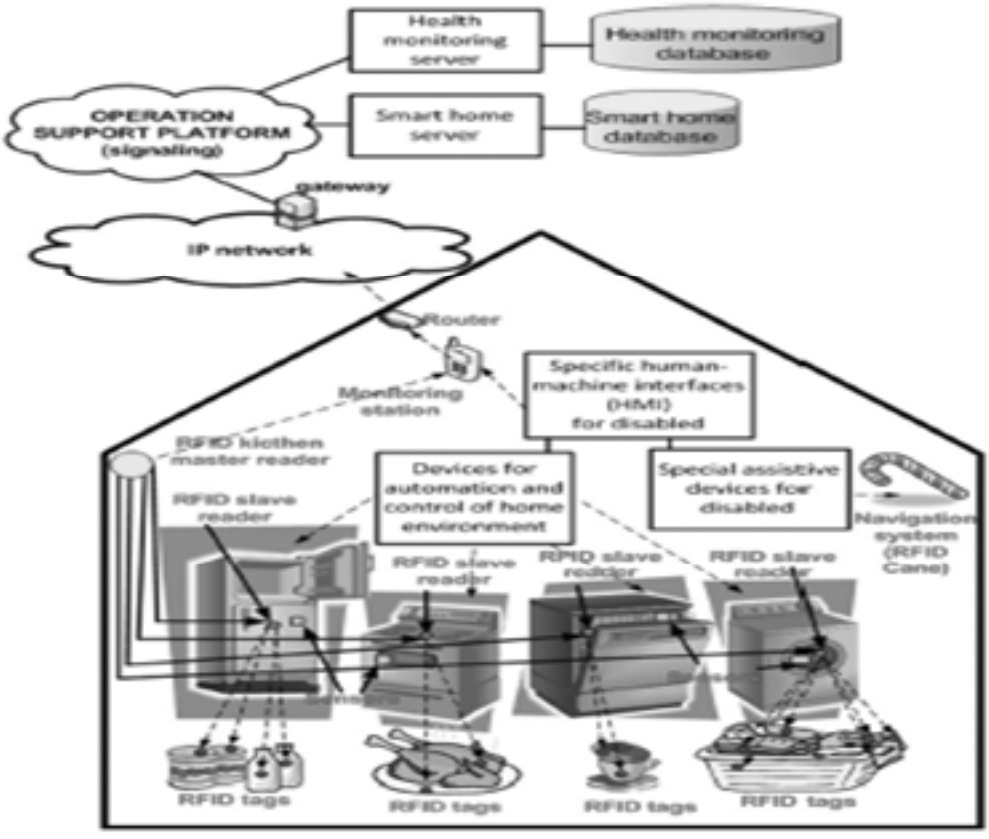

Figure 1: Domestic environment using IoT

environment using multiple devices such as automatic kitchen equipment, light and door controllers, indoor temperature controllers, water temperature controllers and home security devices. These home devices for automation and control are formed by sensors and actuators embedded in goods, home appliances or furniture. The integration of RFID in the smart home environment is essential for identification and tracking purposes. The master-slave RFID architecture is proposed in which the slave readers communicate with mobile reader and master reader, whereas different master readers can communicate with each other and mobile readers. In order to utilize the IoT environment more efficiently various techniques can be enhanced.

7. SPECIFIC INTERFACES

Visually impaired people could use specialized zooming devices and voice control of home installed devices to access the devices. Hearing impaired people could make use of touch screens to access graphical information and read text. Physically impaired people such as paralyzed people could use head tracking devices to produce up to three independent proportional signals such as forward-backward head tilting, left-right head rotation and lateral head tilting, Other techniques such as biometric scanning could be used to authenticate and access the devices in IoT environment.

8. CONCLUSION

Thus by using the proposed system in this paper the weak people could participate and include in social, economic, political and cultural life independently. The smart home technology using IoT in domestic environment makes the weak people to carry out their daily activities at ease. The future enhancement includes the techniques to improve the reaction data of specific interfaces, RFID and visualize usability data measured from sensors.

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