A PROPOSED MODEL OF A SMART LIBRARY AT CIT

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Abstract: It is a technical paper based on the technology of IoT. The Internet of Things (IoT) which connects millions and millions of devices within seconds using computer vision, artificial intelligence, sensors, and deep learning algorithms. Internet connects people to people whereas IoT connects Things. In this paper, we present an overview on how we can transform our manual operated library to automated library, which would make a better future of our institute. Proposing a model of a smart library for this institute has been put up in this paper.

Keyword: IoT, Smart Library,

1 Introduction

The Internet of Things (IoT) is the networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items – embedded with electronics, software, sensors, actuators and network connectivity that enable these objects to collect and exchange data. In 2013, the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society" [1]. The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention [2]. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020 [3].

2 Applications of IoT

Pulse rate of a person running on the track can be measured with "SMART WATCHES" [4] which shows both time and other health related measurements on that. Getting or knowing the time by a doctor of a patient is possible now-a-days, by having "SMART PILLS" [5]. These wearable IoT devices are now used for monitoring, diagnosing, understanding, and improving human health and other conditions. "SMART METERS" were made to regulate the power and consumption of electricity and control the appliances at home. Now IoT is connected to every devices and it is the inter-connection of things, so that humans can control the things from anywhere. Around 2.75 million SMART METERS are in use in Melbourne, Australia. IoT today helps in autonomous and semi-autonomous driving in "VOLVO'S AUPILOT" car [6].

3 Technology behind IoT

3.1 **Sensors:** In the broadest definition, a sensor is an object whose purpose is to detect events or changes in its environment and sends the information to the computer which then tells the actuator (output devices) to provide the corresponding output. A sensor is a device that

converts real world data (Analog) into data that a computer can understand using ADC (Analog to Digital converter).

3.2 **Wi-Fi:**Wi-Fi or WiFi is a technology for wireless local area networking with devices based on the IEEE 802.11 standards. Wi-Fi is a trademark of the Wi-Fi Alliance, which restricts the use of the term Wi-Fi Certified to products that successfully complete interoperability certification testing.

3.3 **Artificial Intelligence:**Artificial intelligence (AI) is intelligence exhibited by machines. In computer science, the field of AI research defines itself as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal.

4 Proposed Model of SMART LIBRARY

The SMART LIBRARY will consist of books, on which paper thin sensors would be attached on each and every book. Entry to the library by both the students and faculties would be with logging in with either an id code or scanning there mobile phones' QR code. By logging in the application, a virtual borrowing cart will open in the mobile phone. Any book picked up by that person, the book will automatically get inside the cart. Keeping back the book at the same place, the cart will remove the book from there automatically. After the person exits the library, if the person has not borrowed any book, a message will pop-up saying "NO BOOKS BORROWED", whereas if the person has borrowed any book, the message will pop-up saying the details of the book, borrowing date, return date and/or the renewal date. So, the person will have no problemof remembering anything or forgetting anything.
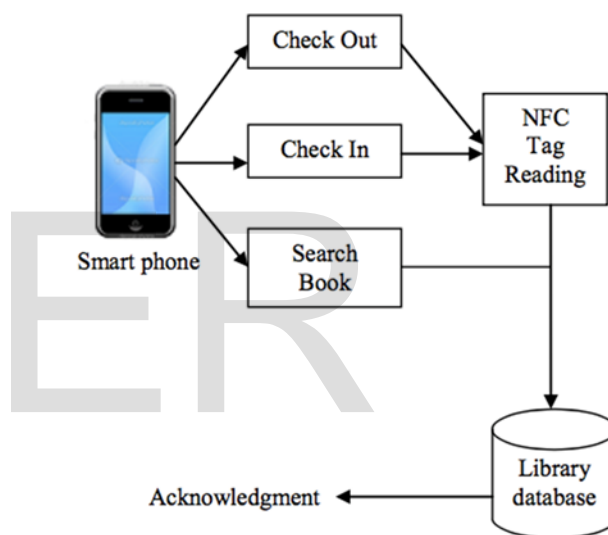
5 Technological Challenges in IOT

❖ Advantages:
1. Data: The more the information, the easier it is to make the right decision. Knowing what to get and remember what you need when you are out, is much more difficult task.
2. Tracking: tracking the things and their quality and viability by the computers when out of home is of much more help. It keeps track of expiration of products and warn us of them.
3. Time: the time saved in monitoring and the number of trips done otherwise would be tremendous.

    4. Money: The financial aspect is the best advantage.

❖ Disadvantages:

    1. Compatibility: As of now, there is no standard for tagging and monitoring of sensors.

    2. Complexity: Complex system may fail and cause major problems.

    3. Privacy/Security: the privacy is the main concern for these systems.

    4. Safety.

6 Algorithm

Step 1: Using biometric verification to enter into the library.

Step 2: Verification of username and password which is already registered with the system.

Step 3: Select choice from menu.
a. Checkout
b. Check in
c. Search

Step 4: If check-in then,
a. Using smart phone to read NFC tag.
b. If user has already issued 4 books then system will not issue the book else issue book and it will automatically add to its cart.
c. Give acknowledgement message and update library database.

Step 5: If check-out then,
a. Using smart phone read NFC tag.
b. If return date is over then finewill be automatically added to the cart and give warning message to user.
c. Else return book successfully and give acknowledgement message and update library database.

Step 6: If search then enter book name, system will give message whether book is available or not in library.

Step 7: Logout.

Step 8: Using biometric verification to exit from the library.

6 References

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