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EMERGING TRENDS IN ELECTRICAL & ELCTRONICS ENGINEERING

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ABSTRACT
We are entering a new era of Engineering technology Called as Internet of the Things (IOT).The Internet of Things (IoT) is a system of interconnected computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and having ability to transfer data over a network without requiring human-to-human or human-to- computer interaction. Data speed in 4G is 60Mbps and data speed in 5G is 700Mbps.
Things: A thing, in the topic of the Internet of things (IoT), is a body or physical object that has a unique identifier, an embedded system and the ability to transfer data over a network. Things could be a part of domestic, process or manufacturing areas like smart TV, PLC, CNC machine etc.

Keywords:
M2M,CPSs, Building Automation, Home Automation, SCADA

INTRODUCTION

IoT include machine-to-machine (M2M) communication nothing but machines connecting to each other using network without human interaction. For managing it and collecting data M2M connects device to the cloud. IoT is a sensor network of huge amount of smart devices that connect people, systems and other applications to collect and share data. M2M offers the connectivity that enable IoT. It also includes SCADA (supervisory control and data acquisition), a type of software application program for process control, the collecting data in real time from remote locations to control equipment and conditions. SCADA systems include hardware and software components. The hardware collect and serve data into a computer that has SCADA software installed, where it is then processed and presented it in a timely manner. The last version of SCADA Was first version in IOT Application.

Cyber Physical system components

Cyber-Physical Systems (CPSs): Cyber-Physical Systems represent systems, where physical data is the core component & computations are tightly coupled with the physical world, which drives computation. Industrial automation systems, wireless sensor networks, mobile robots and vehicular networks are just a example of cyber-physical systems. as CPSs is embedded into larger systems it has limited computation and storage capabilities due to their small size. By taking advantage of the emergence of cloud computing and the IoT, CPSs extend their capabilities.

Building Automation

Efficient way to monitor and control of buildings IOT gives best solutions as they connect lighting systems, elevators, environmental systems and other electrical appliances with internet and communication technologies. It also saves the power consumption by automatically turning off the lights when rooms are not in used and also by making sure of not drawing too much power by appliances. IOT based appliances provide remote monitoring and control through mobile and web applications to the end users or owners. Building automation system is as shown in Fig.

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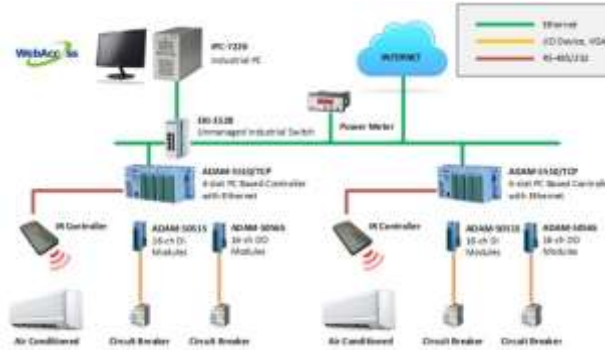
Fig. 1 Building Automation

Home Automation

Home automation is developing automation for a home, called as smart home/house. A home automation system will control home in terms of lighting, climate, entertainment systems, and appliances. It also provides home security such as access control and alarm security systems. When system is connected with internet, home devices are an important part of the Internet of Things.

SCADA

SCADA (supervisory control and data acquisition) is a type of software applications to control industrial processes, which is the collection of data in real time from remote locations in order to control equipment and conditions. SCADA provides managements with the tools needed to make and deploy data-driven decisions regarding their industrial processes. SCADA systems are a combination of hardware and software components. The hardware collects and feeds data into field controller systems, which is then sends the data to other systems that process and present it to a human-machine interface (HMI) in a real time manner. SCADA systems also keep record and log all events for reporting process status and issues. SCADA applications warn when conditions become hazardous by sounding alarms**.** Components of a SCADA system are sensors & actuators, Field controller, supervisory components, HMI software & communication infrastructure.

METHODOLOGY

Home automation works using a network of devices which are connected to the Internet via different communication protocols like Wi-Fi, Bluetooth, ZigBee etc. The devices are mange through controllers & we can use voice assistant like Alexa or Google Assistant or an app. Many of the IoT devices consist of sensors that observe changes in motion, temperature, and light so that user can access information about the devices. To make physical changes to the device, the user turn on or triggers actuators, the physical mechanisms like smart light switches, motorized valves or motors that allow devices to be controlled remotely.

Home automation works on three levels

- **Monitoring:** Users can monitor & keep control remotely through an app. For example, someone can view their live status from a smart security camera.

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Fig. 2 Smart Security Camera

- **Control:** Control means user can control devices remotely, like tweaking a security camera to see more of a living space.
- **Automation:** Finally, automation means setting up devices to turn on or to trigger one another, like having a smart buzzer go off whenever an armed security camera detects motion.

Fig. 3 Alexa & Cloud Cam

Home Automation System Components
- Mobile Application
- Voice Assistants
- Alexa
- Google Assistant
- Siri

Control Protocols
- Wi-Fi
- Z-Wave
- ZigBee
- Bluetooth

CONCLUSION

Electrical & Electronics Engineering aims to bring together leading academic scientists, professional from industries and research scholars to exchange and share their experiences and research results about all aspects of Electrical & Electronics Engineering. It also provides the premier interdisciplinary and multidisciplinary forum for researchers, and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in the research

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