INTERNET OF THINGS AND ITS APPLICATIONS

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ABSTRACT

One of the most important field in the Information Technology is the Internet of Things (IoT). The future of this research is the Internet of Things that have the responsibilities of transforming the real world objects into intelligent virtual objects. Internet of Things aims to unify everything in the world under a single infrastructure, granting people control of things around them, and keeping them informed on the state as well as the trends of the elements. Therefore, this research paper study that address the IoT concepts and trends, through the systematic review of scholarly journals, corporate white articles, online databases, and professional discussions with the experts. Furthermore, this paper focuses on some definitions, necessary requirements, geneses, characteristics as well as the aliases of the Internet of Things. The primary objective of this essay is to provide an overview of the Internet of Things, vital technologies, architectures, and their usage in the daily life. The spread of digital technologies offers a great potential for the creativity and innovation in all aspects of tourism industry. The integration between advanced technologies of ICT and tourism industry plays vital role in enhancing the tourism services and experiences, particularly, in the context of archaeological tourism. Following this, this study proposes a protocol that offers tourists site/destination and experiences according to their preferences. More specifically, tourists can express various preferences regarding the type of tourism site, their contention level in order to avoid crowded ones, the accessibility and convenience of different sections of a site, and the distance and congestion of the paths lead to such site ...etc

Keywords: - IOT, Geneses, Database, ICT, etc

Introduction: - The Internet of Things is a technological revolution that represents the future of computing and communications, and its development depends on dynamic technical innovation in a number of important fields, from wireless sensors to nanotechnology. First, in order to connect everyday objects and devices to large databases and networks – and indeed to the network of networks (the internet) – a simple, unobtrusive and cost-effective system of item identification is difficult. Only then can data about things be collected and processed.

IoT (Internet of Things) is an advanced automation and analytics system which exploits networking, sensing, big data, and artificial intelligence technology to deliver complete systems for a product or service. These systems allow greater transparency, control, and performance when applied to any industry or system.

IoT systems have applications across industries through their unique flexibility and ability to be suitable in any environment. They enhance data collection, automation, operations, and much more through smart devices and powerful enabling technology.

This paper aims to provide you with a thorough introduction to IoT. It introduces the key concepts of IoT, necessary in using and deploying IoT systems.The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has been more inclusive covering wide range of applications like healthcare, utilities, transport, etc. Although the definition of Things has changed as technology evolved, the main goal of making computer sense information without the aid of human intervention remains the same. A radical evolution of the current Internet into a Network of interconnected objects that not only harvests information from the environment and interacts with the physical world, but also uses existing Internet standards to provide services for information transfer, analytics, applications, and communications.

APPLICATIONS OF IOT: - There are several application domains which will be impacted by the emerging Internet of Things. The applications can be classified based on the type of network availability, coverage, scale, heterogeneity, repeatability, and user involvement impact. We categorize the applications into four application domains: (1) Personal and Home; (2) Enterprise; (3) Utilities; and (4) Mobile. Enterprise IoT at the scale of a community, Utility IoT at a national or regional scale and Mobile IoT which is usually spread across other domains mainly due to the nature of connectivity and scale. There is a huge crossover in applications and the use of data between domains. For instance, the Personal and Home IoT produces electricity usage data in the house and makes it available to the electricity (utility) company which can in turn optimizes the supply and demand in the Utility IoT. Internet enables sharing of data between different service providers in a seamless manner creating multiple business opportunities. Personal and Home The sensor information collected is used only by the individuals who directly own the network. Usually WiFi is used as the backbone enabling higher bandwidth data (video) transfer as well as higher sampling rates (Sound). Ubiquitous healthcare has been visualized for the past two decades. IoT gives a perfect platform to realize this vision using body area sensors and IoT backend to upload the data to servers. For instance, a Smartphone can be used for communication along with several interfaces like Bluetooth for interfacing sensors measuring physiological parameters. So far, there are several applications available for Apple iOS, Google Android

and Windows Phone operating system that measure various parameters. However, it is yet to be centralized in the cloud for general physicians to access the same. An extension of the personal body area network is creating a home monitoring system for aged-care, which allows the doctor to monitor patients and elderly in their homes thereby reducing hospitalization costs through early intervention and treatment. Control of home equipment such as air conditioners, refrigerators, washing machines etc., will allow better home and energy management. This will see consumers become involved in the IoT revolution in the same manner as the Internet revolution itself . Social networking is set to undergo another transformation with billions of interconnected objects. An interesting development will be using a Twitter-like concept where individual Things 'in the house can periodically tweet the readings which can be easily followed from anywhere creating a Tweeted. Although this provides a common framework using cloud for information access, Smart environment application domains Smart Home/Office Smart Retail Smart City Smart Agriculture/Forest Smart Water Smart transportation Network Size Small Small Medium Medium/Large Large Large Users Very few, family members Few, community level Many, policy makers, general public Few, landowners, policy makers Few, government Large, general public 11 Energy Rechargeable battery Rechargeable battery Rechargeable battery, Energy harvesting Energy harvesting Energy harvesting Rechargeable battery, Energy harvesting Internet connectivity Wifi, 3G, 4G LTE backbone Wifi, 3G, 4G LTE backbone Wifi, 3G,4GLTE backbone Wifi, Satellite communication Satellite Communication, Microwave links Wifi, Satellite Communication. Information collected from such networks are used only by the owners and the data may be released selectively. Environmental monitoring is the first common application which is implemented to keep a track of the number of occupants and manage the utilities within the building. workflow in commercial environments Transport Traffic management Intelligent transportation through real-time traffic information and path optimisation Infrastructure monitoring sensors built into infrastructure to monitor structural fatigue and other maintenance; accident monitoring for incident management and emergency response coordination Services Water water quality, leakage, usage, distribution, waste management Building management temperature, humidity control, activity monitoring for energy usage management, Heating, Ventilation and Air Conditioning. These are made up of very extensive networks for monitoring critical utilities and efficient resource management. The backbone network used can vary between cellular, WiFi and satellite communication. Smart grid and smart metering is another potential IoT application which is being implemented around the world. Efficient energy consumption can be achieved by continuously monitoring every electricity point within a house and using this information to modify the way electricity is consumed. This information at the city scale is used for maintaining the load balance within the grid ensuring high quality of service. Video based IoT, which integrates image processing, computer vision and networking frameworks, will help develop a new challenging scientific research area at the intersection of video, infrared, microphone and network technologies. Surveillance, the most widely used camera network applications, helps track targets, identify suspicious activities, detect left luggage and monitor unauthorized access. Automatic behavior analysis and event detection (as part of sophisticated video analytics) is in its infancy and breakthroughs are expected in the next decade as pointed out in the 2012 Gartner Chart Water network monitoring and quality assurance of drinking water is another critical application that is being addressed using IoT. Sensors measuring critical water parameters are installed at important locations in order to ensure high supply quality. This avoids accidental contamination among storm water drains, drinking water and sewage disposal. The same network can be extended to monitor irrigation in agricultural land. The network is also extended for monitoring soil parameters which allows informed decision making about agriculture.

Mobile Smart transportation and smart logistics are placed in a separate domain due to the nature of data sharing and backbone implementation required. Urban traffic is the main contributor to traffic noise pollution and a major contributor to urban air quality degradation and greenhouse gas emissions. Traffic congestion directly imposes significant costs on economic and social activities in most cities. Supply chain efficiencies and productivity, including just-in-time operations, are severely impacted by this congestion causing freight delays and delivery schedule failures. Dynamic traffic information will affect freight movement, allow better planning and improved scheduling. The transport IoT will enable the use of large scale WSNs for online monitoring of travel times, origin-destination (O-D) route choice behavior, queue lengths and air pollutant and noise emissions. The IoT is likely to replace the traffic information provided by the existing sensor networks of inductive loop vehicle detectors employed at the intersections of existing traffic control systems. They will also underpin the development of scenario-based models for planning and design of mitigation and alleviation plans, as well as improved algorithms for urban traffic control, including multi-objective control systems. Combined with information gathered from the urban traffic control system, valid and relevant information on traffic conditions can be presented to travellers. The prevalence of Bluetooth technology devices reflects the current IoT penetration in a number Bluetooth technology of digital products such as mobile phones, car hands-free sets, navigation systems, etc. devices emit signals with a unique Media Access Identification (MAC-ID) number that can be read by Bluetooth technology sensors within the coverage area. Readers placed at different locations can be used to identify the movement of the devices. Complemented by other data sources such as traffic signals, or bus GPS, research problems that can be addressed include vehicle travel time on motorway and arterial streets, identification of critical intersections, and accurate and reliable real time transport network state information . There are many privacy concerns by such usages and digital

forgetting is an emerging domain of research in IoT where privacy is a concern . Another important application in mobile IoT domain is efficient logistics management. This includes monitoring the items being transported as well as efficient transportation planning. The monitoring of items is carried out more locally, say, within a truck replicating enterprise domain but transport planning is carried out using a large scale IoT network. 5. Cloud centric Internet of Things The vision of IoT can be seen from two perspectives –Internet centric and Thing centric. The Internet centric architecture will involve internet services being the main focus while data is contributed by the objects. In the object centric architecture, the smart objects take the center stage. In our work, we develop an Internet centric approach. A conceptual framework integrating the ubiquitous sensing devices. In order to realize the full potential of cloud computing as well as ubiquitous Sensing, a combined framework with a cloud at the center seems to be most viable. This not only gives the flexibility of dividing associated costs in the most logical manner but is also highly scalable. Sensing service providers can join the network and offer their data using a storage cloud; analytic tool developers can provide their software tools; artificial intelligence experts can provide their data mining and machine learning tools useful in converting information to knowledge and finally computer graphics designer can offer a variety of visualization 14 tools. The cloud computing can offer these services as Infrastructures, Platforms or Software where the full potential of human creativity can be tapped using them as services.

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