IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 3, March 2016

A Survey on Internet of Things approach for Smart Eco-System

Yashaswini K[1], Janhavi .V [2]

PG Scholar, Dept. of CSE, VidyaVardhaka College of Engineering, Mysuru[1]

Associate Professor, Dept. of CSE, VidyaVardhaka College of Engineering, Mysuru[2]

Abstract: The Internet of Things (IoT) can be incorporated clearly and seamlessly in a large number of heterogeneous end systems, by providing access to data for large number of digital services. The main focus here is on urban IoT system and smart home control system which supports the Smart Eco System vision, using the most advanced technologies as 5G, Artificial Intelligence via pervasive computing ,Cloud of things(CoT) and Internet of things. The IOT supports "Ubiquity" where devices connected anywhere, anytime, with anything and anyone. The word "smart" Smart city means using sensitive information and Communication Technology(ICT). The real-time human behaviors and activities and can be determined by personal devices as smart phones ,Wearable computing devices, smart home and smart city called as Human Dynamics. The capability of the Big Data and Smart Cities will increase quantitative and qualitative perceptive towards the human behaviors. A Non Parametric Bayesian model can be used to open up themes and scaling up in metropolitan living. This Survey is a combination of Smart home control system, Smart city , determining Human Dynamics, Data privacy and Security leading to a Smart Eco system.

Keywords: Internet of Things(IoT), Big Data, Smart Cities, Artificial Intelligence, Cloud of Things(CoT) ,Smart Grid and Smart Health.

1. INTRODUCTION

The IoTs tries to make the Internet more alluring and pervasive by enabling easy access and interaction with a wide variety of devices such as home appliances, actuators, displays, monitoring sensors, surveillance cameras, vehicles, and so on. This has application in many different domains, such as home automation, medical aids, industrial automation, mobile healthcare, intelligent energy management, elderly assistance and smart grids, automotive, traffic management, and others.
The application of the IoT is used to realize Smart City which can be achieved by the deploying urban IoT, which is a communication infrastructure providing affiliated, simple, and efficient access to a plenty of public services, thus growing transparency to the citizens. An urban IoT, has lots of benefits in the management and optimization of public services, such as transport and parking, surveillance and maintenance of public areas, lighting, garbage collection, robustness of hospitals and conserving of cultural heritage.

The Internet of things for smart home will combine all kinds of electrical appliances which are organized adequately integrating a complete system to understand the purity of entire management. This improves the quality of life providing access to modern family. Users mainly concentrate on security alarm, equipment control , remote services and infrared monitoring in smart homes. Intelligent home control systems connects all the smart devices effectively.

The IOT develops a network of Billions or Trillions of wireless identifiable devices communicating with one another and combines Persistent Computing, Omnipresent Computing and Ambient Intelligence . Internet of Things provides visualization of ubiquitous computing and ambient intelligence and enhances them by full communication and using complete computing potential of things and integrating continuous hand-shaking, recognition and interaction .

By 2020 there will be Mega city networked corridors, more than 60 percent of the world population is expected to live in urban cities by 2025.This will result in progression of smart cities with features like Smart Economic growth, Smart Mobility (ability to move freely),Smart Building planning, Smart Information Communication Technology, Smart Energy, Smart Citizen and Smart domination and elegant Planning.

Main components in future smart city infrastructure are Internet of Things (IoT), Clouds of Things (CoT), and Artificial Intelligence (AI) via pervasive computing and M2M communications (5G).The M2M(Machine to Machine) communication requires the IoTs to be context-aware, intelligent , able to communicate via IP, and combining them to a distributed system for the future smart homes and smart cities. They should respond to environment changes and also perform AI-based reasoning to consider the preferences of the user inhabiting the smart home.

For smart cities combining IoT and CoT is necessary as IoT devices produces huge amount of information that needs to be stored and processed. CoT is a pool of resources and calculation capabilities that can be accessed through the Internet. So a modern ICT based infrastructure must combine technologies such as 5G, IoT, CoT and distributed AI and Advanced AI (AAI) system is needed for handling complex IoT patterns.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 3, March 2016

A smart object is an embedded device, or sensor, which are intelligent under particular situation through an autonomous behavior having the potential to be recognized, communicate, sense, and collaborate with the habitat and other smart objects. Watches, clinical devices, building automation sensors, security networks, access control systems, smart phones, tablets, smart TVs, and cars are examples of smart devices. Analyzing these interactions and capability from the viewpoint of the Human Dynamics, the capability of the Big Data and Smart Cities will increase quantitative and qualitative perceptive towards the human behaviors.

A Non Parametric Bayesian autonomous model can be used to uncover themes and scaling up in metropolitan living. Medium-scale estimations are carried out to evaluate statistical methodology in assuming polychromatic understanding of participants.

The citizen participation is supported with required set of contexts so the key essentials are determined, which automation should conclude. Firstly, a wrapping model is required, which correctly defines contained theme from plethora of participatory information. But the recent stage claims scalability, which highlight transformation over time and on connected themes. This leads to optimized decision making for automated service-provisioning. To address these issues an Nonparametric Bayesian autonomous model is considered for uncovering themes and scaling up in metropolitan living. However, an illogical indication of statistical information leads to conclusion.

2. RELATED WORK

One of the efficient ways using Internet of things for Smart ecosystem can be achieved by using following approaches.

Andrea Zanella[1] propose a novel approach for best-practice procedure used in the Padova Smart City project, and deployment of an IoT island in the city of Padova, Italy, performed in participation with the city municipality. This advertise the adaptation of open data and ICT solutions in the public administration. This application system provides for collecting environmental data and following public street lighting using wireless nodes, with contrasting sensors, located on street light poles and connected to the Internet via a gateway unit. This helps to gather environmental parameters as CO level, vibrations ,noise and air temperature and humidity. And provides an accurate way to check the correct working of the public lighting system.

The services offered by Smart City vision which can be empowered by implementing of an urban IoT are proper maintenance of Structural Health of Buildings which requires monitoring of each building. It provides a distributed database of building integrity measurements, received by sensors in the buildings. Waste Management done by using intelligent waste containers by detecting the level of load and trucks route, can reduce the cost and increase the quality of recycling. Monitoring quality of air in crowded areas, parks.

A noise monitoring service to determine the amount of noise per hour in the places using this service. Traffic Congestion and Traffic monitoring may be determined by using the sensing capabilities and GPS in modern vehicles. City Energy Consumption of the whole city can be monitored. Smart parking can be achieved by Radio Frequency Identifiers (RFID) or Near Field Communication (NFC), it to realize the electronic verification of parking permits in reserved slots for citizens and disabled. Smart Lighting will advance the street lamp depth wrt to the time, weather condition and presence of people in a day. Automation of Public Buildings can be performed by different types of sensors and actuators that supervise temperature, humidity and lights.

ZhangJinglu ,ChenLili [2] presents an Smart home control design and implementation of several angles in-depth analysis of operation principle of home control system. The basic feature of smart home control system is to control the smart devices connected which uses decentralized management. A remote monitoring system that combines information network to achieve intelligent controlling. Security alarming system to make necessary end processing .This includes fire sensor, smoke sensor ,gas leakage sensor and infrared sensor. The balanced conjunction between human computer interaction is needed for intelligent advancement of homely life. In wireless communication the realization of intelligent home is based on embedded system condition and this opens up a new way of life.

Anup W. Burange, Harsha D. Misalkar [3] proposes a new Internet of Energy needs web based architectures guarantee information liberation when needed and to change the conventional power system into a networked Smart web which is automated, by applying intelligence to operate, making required policies and monitor . This requires combining a power grid to the data of network. In smart cities the meaning of smart is utilizing sensitive information and Internet communication technology to resolve metropolitan issues.

Energy smart grid and smart metering are used for water monitoring and water flow management which analyzes oil and gas levels in storage tanks and water pressure management in transportation system. These Energy grids are number of small or medium sized energy sources and combined into virtual power plants. Forest fire detection can be performed by monitoring of fire conditions and monitoring of earth density for detecting dangerous patterns in land conditions. The applications of IoT in healthcare provides for a standard interface to create an open retail for bio chemical discoverer and real time data processing on internet with appropriate software .

The Security and Data Privacy for Internet of things is very important. It should be secured from the following malicious activities

- IoT is vulnerable to DoS/DDOS attacks and will involve certain techniques to ensure city infrastructures cannot be disabled.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 3, March 2016

- Malicious code hacking attacks and compromised nodes are overcome with common attack detection.
- IoT infrastructure can be monitored by developing cyber condition awareness tools/techniques.
- The IoT needs a variety of access control and schemes to support procedure models and various authorization by users. The heterogeneity of devices will need new schemes to be developed.
- Cryptographic techniques ensures the data is protected which is stored and processed.
- Data minimization ,identification and authentication are used to ensure data privacy.
- Fine-grain and self-configuring access control mechanism competing the real world.

They describe the concepts which are helpful in building the smart cities with the help of the internet of things (IoT). And an architecture is proposed for data management and security where Map-Reduce is efficient for data management and AAA Architecture is also helpful for privacy of user data. IoTs having data management capability and privacy will be more efficient for building smart cities

K E Skouby, P Lynggard [4] proposes a Smart city approach which needs ICT technologies as a main to handle innovative challenges. It must incorporate a sustainable ,stable and highly leveraged network for connectivity, security and energy management. They are 5G, big data, IoT, CoT, and artificial intelligence.5G provides communication system from which anyone anywhere can communicate with whoever in a human-centric system. The IoT and other internet technologies provides large amount of data which is big data. This data has to be perfectly considered and managed to abstract patterns, which are required by applications and integrated ICT approaches.

Most of the services today are based on embedded AI. Smart environments in smart home area has to implement context-aware services that can deal with day to day activities, such as eating, drinking, cooking and taking medicine. These systems has to interface with many sensors and needs to deal with rich data ,which is very difficult for the AI learning and prediction process.

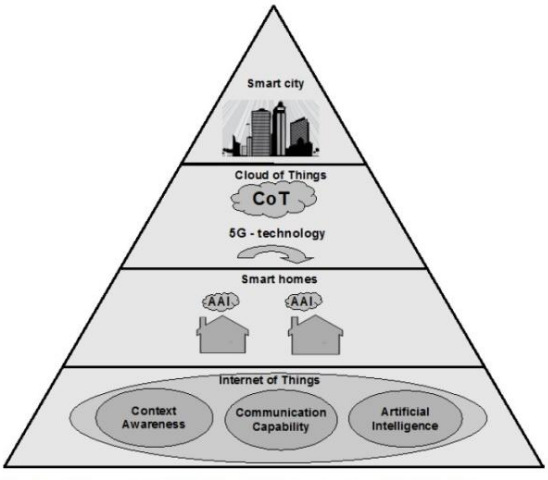

Fig. 1. The suggested ICT-based infrastructure and its four layers

The proposed ISHSC infrastructure is based on a four layer model. This provides many advantages and services . Firstly, it will interconnect Internet of Things of smart homes in a smart way by deploying AI. Secondly, it offers easily transformation to smart grids and other new technologies . Lastly, the smart city Cloud of Things provides the liability to centralize distributed data into few big-data storages by implementing new smart home and smart city services. This infrastructure is an user centric system which provides a platform for a new eco-system.

Antonio J. Jara[5] proposes an approach to outline in real-time, the human behaviors and activities. This can be achieved with quantity of data received by the personal devices as smart phone, and the Smart cities become more intelligent environment by offering a smart area that feels user movements, behavior, and the transformation of the ecosystem. This work investigates the ecosystem determined by the triangle formed by Big Data, Smart Cities and Wearable Computing to realize human behaviors and dynamics.

By the work carried out they will realize the capability of the Big Data and Smart Cities for the human dynamics in three phases: An initial phase of asking the citizens to be connected via mechanism, and encouraging them to be prosumers. For this reason, Smartphone applications (mobile discovery, marketing, etc.) and other technologies used for associated sensing. These applications present the initial steps to support digital inclusion and communication of the citizens with the rising smart cities.

Once, the data is given from users a huge number of new applications, patterns can be achieved. Understanding of this new data is not limited to external analysis for web servers usage, traffic frequency else the combination of the prosumers will to reach a greater and more definite quantity of information at the same time from people. This supports to develop not only general models but also to illustrate and evaluate behaviours from person. It offers feedback to customer asking them to better their behaviours. It will address issues such as diets, drugs ,exercise, and energy consumption.

New threats are arising for users to asking them to provide data with new gadget. Another problem is analyzing this huge data to extract and determine new models for describing human dynamics, and finally defining noninvasive mechanism to offer the feedback.

In the ongoing work first, we new wearable technologies such as smart watches are analyzed. Second, analyzing the data from applications, in partnership with the data from Smart Cities for example SmartSantander EU Project. Third, the capability of the cloud computing for heterogeneous resources will be considered over the Fujitsu RunMyProcess and Paraimpu. Finally, evaluating this monitoring process to be enforced through wearable devices as bracelets and smart watches.

Rossi Kamal ,Choong Seon Hong[6] proposes a system which develops a context-aware model in predicting presence of smart city service and main requirement is citizen participation particularly (a) opening of contexts,

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 3, March 2016

that are relevant, (b) scaling up (over time) of assistance. Some of the challenges are un-observability, independence and complex relationship of contexts. So, a Non-parametric Bayesian model is used to address these issues. Finally, a systematic prototype pinpoints are developed from participants interests, usage and feedback.

A problematic conjecture of context-aware skeleton is anticipated using urban participation information. Annotated contexts should be revealed from database at initial phase. Complex combination among contexts, that evolve over time, must be dealt appropriately at latter stages. Participation knowledge-base is determined to be upgraded in a generative process involving citizen contexts. This generative process is represented by joint probabilistic distribution via observed data and latest random variables. The non-parametric Bayesian scheme houses complex communication among contexts. Therefore, systematic prototype is implemented for the correct by examining participant's opinions and feed-backs.

3. CONCLUSION

The Internet of Things (IoT) can be incorporated clearly and seamlessly in a large number of heterogeneous end systems . By 2020 there will be Mega city networked corridors, more than 60 percent of the world population is expected to live in urban cities by 2025.Main components in future smart city infrastructure are Internet of Things (IoT), Clouds of Things (CoT), and Artificial Intelligence (AI) via pervasive computing and M2M communications (5G). The ecosystem is determined by the triangle formed by Big Data, Smart Cities and Wearable Computing to realize human behaviors and dynamics.

REFERENCES

[1] Andrea Zanella and Lorenzo Vangelista, “Internet of Things for Smart Cities”, in IEEE Internet of Things Journal, Vol. 1, No. 1, February 2014.
[2] ZhangJinglu and ChenLili ,"The Internet of Things the design and implementation of smart home control system", in 2015 International Conference on Intelligent Transportation, Big Data & Smart City.
[3] Anup W. Burange, Harshal D. Misalkar, "Review of Internet of Things in Development of Smart Cities with Data Management & Privacy", in ICACEA 2015.
[4] K E Skouby, P Lynggaard, "Smart Home and Smart City Solutions enabled by 5G,IoT, AAI and CoT Services" , in IEEE 2014.
[5] Antonio J. Jara, Yann Bocchi, Dominique Genoud ,"Social Internet of Things: The potential of the Internet of Things for defining human behaviours", in IEEE 2014.
[6] Rossi Kamal, Choong Seon Hong, "Non-Parametric Bayesian Rejuvenation of Smart-City Participation through Context-aware Internet-of-Things(IoT) Management ", in IEEE 2016.
[7] Schahram Dustdar, "Enabling a Smart City Application Ecosystem", in IEEE Internet Computing 2016.
[8] Salvatore Distefano, Nilanjan Banerjee and Antonio Puliafito, "Smart Objects, Infrastructures and Services in the Internet of Things", in International Journal of Distributed Sensor Networks ,Volume 2016.

DOI 10.17148/IJARCCE.2016.53170