

Cognitive IoT: An Eco friendly Technology

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Abstract:

Cognitive Technology is a new technology that resulted as an evolution of Internet of things. Internet of things has been already influenced the everyday life of human beings in terms of smart phones, smart watches, smart TVs, Security alert devices. Different sensors used in these devices, use the wireless communication media, some of which are harmful to human life. Artificial Intelligence has brought dramatic changes in the field of Internet of things in terms of automation. Cognitive computation now induces the cognitive capabilities in the field of Internet of Things for better decision making in complex environments. This paper focuses on how the cognitive capabilities are helpful for Internet of things, The resulting technology so called as Cognitive IOT has lead to an eco friendly technology. Thus the major goal of sustainability achieved by the cognitive IOT.

Keywords: Cognitive IOT, Internet of Things, Cognitive Computation

I. INTRODUCTION

The field of computer science has seen so many technological changes over the past decades. Among that the major ones are artificial Intelligence and machine learning is the one that brought automation. Automation lead to the concept of smart devices, which resulted in Internet of things. Cognitive computation has boosted these technologies by helping in taking decisions in dynamic situations.

The use of various automation tools and smart devices has an adverse impact on the environment in terms of radiations. This also has destroyed many living things. Thus the focus is to use technologies that are not only useful but also help in preserving the ecosystem.

The use of cognitive technologies in Internet of thing has lead to a new branch of study known as Cognitive IoT. The focus of Cognitive IoT is to help the smart devices to behave in an eco friendly manner and thus support the concept of sustainability.

II. WHAT IS IOT

IoT is the shorthand notation for Internet of Things. IoT is inter related collection of digital devices and various sensors that are capable of collecting and exchanging data. The IoT definition has evolved over decades by the invention of new technologies[1]. The major aim of IoT is to use smart devices. IoT has been used in variety of applications ranging from home appliances to large industrial environments[2]. Because of its abilities to get the data concerning the physical world, the Internet of Things (IoT) phenomenon is quick picking up force in various handy spaces. Its benefits are not restricted to interfacing things, however incline toward how the gathered data are changed into experiences and interact with Domain Experts for better decision making.[3].

III. COGNITIVE IOT

In 2002, DARPA characterized as a cognitive system one that can "reason, utilize represent knowledge, gain as a matter of fact, accumulate knowledge, account for itself, acknowledge direction, know about its very own behavior and

capabilities just as react in a robust manner to surprises."12 Cognitive algorithms translate information by learning and matching pattern in a manner that freely emulates the procedure of cognition in the human personality. Psychological frameworks gain from their encounters and afterward improve when performing repeated tasks.undertakings. Through data mining, pattern recognition, and regular language handling, psychological computing is advancing quickly toward creating innovation to help our capacity to address complex inquiries. Cognitive computing works as prosthetics for human perception by analyzing an enormous amount of data and having the option to address questions humans might have this when making certain decisions. IBM has utilized the expression "Cognitive Computing" for a system that can ingest multimodal data, comprehend common language, generate and assess theories, and learn through interactions with humans. With IoT being unavoidable crosswise over different areas and having the potential to convey an incentive to organizations,CognitiveIoT tries to include extra "detects" containing different sensors, devices, and unstructured information on the IoT to IBM Watson to assist influence with valuing from IoT data.4 IBM and its accomplices have investigated subjective IoT in wellness and prosperity scenarios. Although semantic registering promotion dresses interoperability and reconciliation parts of heterogeneity, psychological computing can address integral aspects, for example, speculating relationships and approving them through proof. Consolidating numerous information data sources can bolster managing deficiency. The level of certainty the subjective processing framework has in its observations measures vulnerability. The cognitive processing framework doesn't explicitly address the dynamism challenge of IoT. In particular, with IoT, the adjustments in the physical world are reflected in the perceptions being gathered from the physical world. Understanding the present condition of the world, assumes a pivotal job in getting value from data [4].

IV. COGNITIVE COMPUTATION

Cognition refers to the process of behaving according to the environmental conditions. Cognition we mean thinking. Artificial Intelligence is concerned with the concept of making machine to think[5]. Human like thinking is introduced in machines by the concept of cognitive computation. Cognition involves the main elements like understanding, reasoning , learning and thereby making appropriate decisions according to the situation. Thus the cognitive computation provides machines to behave properly, instead of making mere computations. The dynamic decision making property of cognitive computation has lead to a new branch of study known as cognitive computation[6].

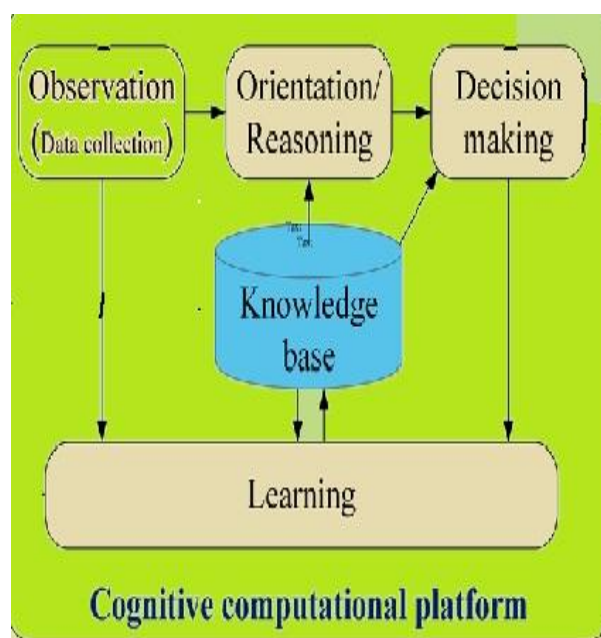


Fig 1:Process of Cognition

The first element in cognition understands, which means the ability to get large volumes of structured and unstructured data and get the semantics. This means constructing models of the data items and their relationships. The second element reasoning is concerned with the usage of the constructed model to answer the related questions which are similar to previous problems. The third element is Learning, which refers to the ability to automatically derive new knowledge from the data.

Constructing models of data elements and their relationships for large volumes of data is a complex task and it is a costly and time consuming process. Not only is this much data ambiguous and incomplete. Thus cognition focuses mainly on how efficiently machine can automatically analyze large data sets and able to discover the useful patterns[7].



Fig 2:Steps in Cognitive Computing

In [8] Taylor raised various intriguing focuses with regards to his endeavors to develop an artificial being enabled with its own cognitive powers. At first, he recorded a scope of key inquiries applicable to the formation of such a machine and made detailed and methodical questions to address these inquiries by giving persuading proof from national and universal research ventures he had driven throughout the years. Taylor's hypothesis is one of not very many endeavors to build a worldwide cerebrum hypothesis of discernment and cognizance and depends on a one of a kind multi-modular

methodology that contemplates vision and consideration, engine activity, language and feeling. On the other hand, customary investigations in perception and awareness have generally focused on single modalities, for example, vision or progressively conceptual plans . As this energizing exploration field has advanced, industry, trade, mechanical technology and numerous different zones are progressively requiring the making of subjective machines, with 'intellectual' powers like those of ourselves: machines that can 'have an independent perspective, arrive at choices on activities in an assortment of ways, are adaptable, versatile and ready to gain from both their very own past understanding and that of others around them [8]. As Taylor contended, that might need to make such machines for an assortment of reasons, running from considering this to be a multi-disciplinary research challenge of the most elevated request, understanding our own cognitive powers and to discovering how they are made and encouraged, and how they can turn out badly because of mind malfunction, to make self-governing robots and vehicles ready to 'think' and 'act' subjectively and morally, so they can bolster us in our day by day lives [8].

V. WHY COGNITIVE COMPUTATION IN IOT

Internet of things has become part of human life in all the applications. People turned to be smart workers, by using the smart devices. Smart phones, smart Television, smart home appliances and many other security alert devices are some examples[9]. Cognitive computation plays a vital role in Internet of things for the following reasons.

- The learning process of cognitive computation has brought down the rate and scale of data generation in Internet of things
- Internet of things gathers the information from various sensors and data collecting devices. The cognitive computation has provided a way to merge and analyze various data types from multiple sources.

Cognitive computation allows the devices to move to the world by incorporating the machines with human like behavior.

VI. HOW COGNITIVE IOT IS ECO FRIENDLY

Internet of things is the single largest source of data in the world with connected devices and sensors. Mobile network is one of the ever growing examples.

Artificial Intelligence has brought automation. Cognitive computation brought sense to the Internet of things. The Cognitive IoT, where the IoT devices are provided with the human like capability to understand, learn and reason are able to take harmless decisions in an environment[10]. Thus provides an eco friendly technology.

Eco friendly computation is named as green computing and research is going on Green computing in terms of computer systems. Now the Cognitive IoT supports the Green computation concept.

VII. CONCLUSION

Cognitive IoT is a big step in improving the accuracy and efficiency of more complex IoT devices. The IoT devices are sensor driven, which are induced with human like awareness by the concept of cognitive computation. Cognitive IoT make the devices to understand things and interact with the environment.

The concept of machine environment interaction allows the devices to take decisions in such a way that it will not cause any harm to the ecosystem. Thus the cognitive IoT is a big leap in technological evolutions that focus on sustainability. The future is foreseen with the slogan 'Let us live and allow the others to live'.

VIII. REFERENCES

1. Kothari, M.: Experience the magic of internet of things automation (IoT). Feb 2017. <https://thenextweb.com/contributors/internet-of-things-automation-iot/>.
2. Banafa, A.: Internet of things: opportunities and challenges. <https://www.bbvaopenmind.com/en/internet-of-things-opportunities-and-challenges/>.
3. EmnaMezghani, Ernesto Exposito, and Khalil Drira, "A Model-Driven Methodology for the Design of Autonomic and Cognitive IoT-Based Systems: Application to Healthcare", IEEE TRANSACTIONS ON EMERGING TOPICS IN COMPUTATIONAL INTELLIGENCE, VOL. 1, NO. 3, JUNE 2017.
4. R.C. Johnson, "Darpa Puts Thought into Cognitive Computing," EE Times, 9 Dec. 2002; www.eetimes.com).
5. Sathi, A.: Cognitive (Internet of) Things: Collaboration to Optimize Action. Palgrave Macmillan (2016)
6. Srivastava, B., Marecki, J., Tesauro, G.: In: 2nd Workshop on Cognitive Computing and Applications for Augmented Human Intelligence, in conjunction with International Joint Conference on Artificial Intelligence (IJCAI), Buenos Aires, Argentina. July 2015.
7. Kelly, J.E.: Computing, cognition, and the future of knowing. IBM Research. Oct 2015
8. J.G. Taylor, "Cognitive computation," Cogn.Comput, vol.1, pp.4-16 (2009)
9. Kelley, J.: Smart Machines: IBM's Watson and the Era of Cognitive Computing. Columbia Business School Publishing.
10. Pearson, N.: How to boost competitive advantage with cognitive computing