*Journal of Advances and Scholarly Researches in Allied Education*
*Vol. 16, Issue No. 3, (Special Issue) March-2019, ISSN 2230-7540*

# A Survey: Needs of Artificial Intelligence & Internet of Things in Modern-Era Human Life

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***Abstract – Now a days Internet is most widely used in all kinds of the information systems. This network is available almost anywhere, anytime, for anyone and can access on many devices like (Computer, Smart-phones, Tablets, Smart-TV, Smart-Watches, Smart-Car & many Electronic Devices etc.). People start thinking to connect the Internet to almost all devices for daily use, so they can communicate with each other by taking simple decisions for helping them in their life. Such idea is called the Internet of Things (IOT).***

***The next step is adding the Artificial Intelligence (AI) to Internet of Things (IOT) systems. Artificial Intelligence is increasingly used in daily life. Artificial Intelligence (AI) is an effective science which employs strong enough approaches, methods, and techniques to solve critical real-world based problems. This paper gives overview of Artificial Intelligence (AI), Internet of Things, Techniques used in AI, and it's Application Areas. This paper also explains the role of AI & IOT in Modern-Era E-commerce businesses.***

***Keyword: Internet, Artificial Intelligence (AI), Internet of Things (IOT), E-Commerce, Radio Frequency Identifier (RFID), Machine Learning, Natural Language Processing (NLP) etc.***

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## I. WHAT IS ARTIFICIAL INTELLIGENCE (AI)

The Computer Science branch concerned with making computers behave like Human is known as Artificial Intelligence (AI). The term "Artificial" means not natural and "Intelligence" means detailed information. Artificial Intelligence (AI) is "the ability of a machine to understand the problems, apply knowledge, acquire, evaluate and adapt to new situations."

An Artificial Intelligence (AI) having characteristics like, it can learn new concepts or task, can give reason and draw useful conclusions, can understand natural language, perceive visual scene, and also perform the tasks which require human type of intelligence. So we can say Artificial Intelligence (AI) is the study that seeks to explain and emulate intelligent behavior in terms of computational processes that make it perceive, reason, and act.

Figure 1.1 illustrates the functioning of an Artificial Intelligence system.

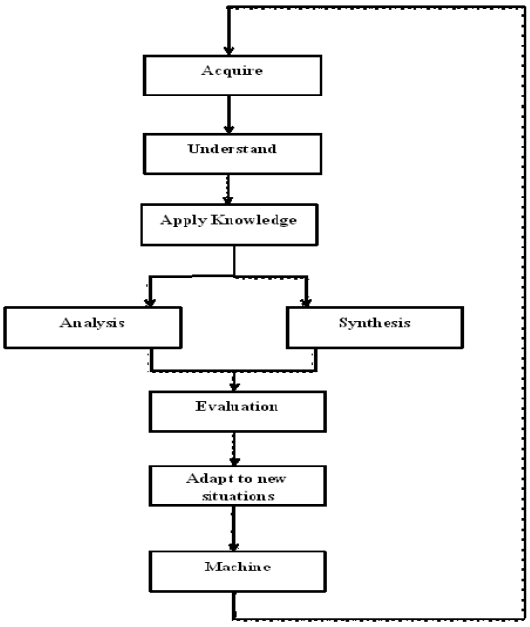


**Figure 1.1 An Artificial Intelligence System**

Thus, AI is study and design of intelligent agents, in which system perceives problem solving environment and takes actions to get the chances of success. In simple manner, AI is the study

concerned with building machine that simulates the Human behavior.

### *A. What is Intelligence*?

Intelligence is related with the task of higher mental processes that involve the behaviors like Learning, Understanding ambiguity, Creativity, Solving problems, Reasoning, Inference, Pattern Recognition, Classification, Induction, Building analogies, Optimization, Natural Language Processing (NLP), and Drawing conclusion from Knowledge and many more.

### *B. What is an Artificial Device*?

Artificial means "not real or natural" i.e. made by Human. To make machine or device artificially intelligent, we have to build machines that simulate human behavior.

### *C. Approaches to Artificial Intelligence*

#### *i. Hard or Strong AI*

Strong AI used to create machine that can truly reason and solve the problems. These AI maintains that suitably programmed machines are capable of cognitive mental states.

#### *ii. Soft or Weak AI*

Weak AI deals with the creation of some form of computer based artificial intelligence (software) that can't truly reason and solve the problems, but can act as if it is intelligent.

#### *iii. Applied AI*

Applied AI aims to produce commercially feasible "smart" systems such as, a security system which recognize the faces of people who are allowed to enter into a building.

#### *iv. Cognitive AI*

Computers are used to check the theories about how the human mind works through the use of computational models. For example, how we recognize faces and other objects, or about how we solve the abstract problems.

### *D. Artificial Intelligence Languages*

Many programming languages are used to develop the Artificial Intelligence System. Some of these are as follows:

i. LISP (List Processing)

ii. Prolog (Programming in Logic)

iii. Various high level languages like C, C++, and Java etc.

iv. Smalltalk

## II. WHAT IS INTERNET OF THINGS (IOT)

Advent of the Internet-of-Things will allow us to optimize equipment and resource usage, enabling increased efficiencies in automation and enabling new and more cost efficient business model. Internet of Things (IOT) is the network of physical objects or "things" like electronic chips, software, sensors and connectivity to enable it to get the greater value and services by communication between connected devices and service providers.

The Internet of Things is a vision, in which objects become part of the Internet, where every object is uniquely identifiable and accessible on the Web. These objects may directly or indirectly collect process or exchange data via data communications network. This concept can be described by a simplified equation:

**Physical objects + sensors and microprocessors = IOT**

The Internet of Things is all objects in everyday life, which are equipped with wireless identifiers and so that they can communicate with each other and be managed by a computer.


**Figure 2.1 Internets of Things (IOT)**

Internet of Things is a concept, where clearly identifiable and smart objects can communicate with each other in a defined environment to make autonomous decisions by analyzing and processing the data collected from the environment. The environment can be the Internet or only a portion (e.g. local area network and the devices used only at home). Additionally, there may be mentioned also that the interconnected devices provide the user with various number of applications and services which enable it to communicate with them.

To start talking about specific aspects concerning system architecture based on the IOT, namely (in Figure 2.2):

- Anytime
- Anyplace
- Anything

This means for example, that every item included in the Internet of Things has a unique identifier in the particular environment in which it occurs and it is available anytime, anywhere and with anything.

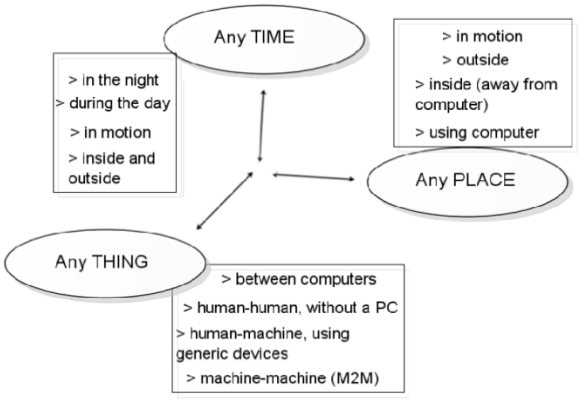


**Figure 2.2 Schema Presentation of IOT Communication**

***► ARCHITECTURE OF INTERNET OF THINGS (IOT)***

Architecture of IOT Consists of following layers shown in below Figure 2.3:

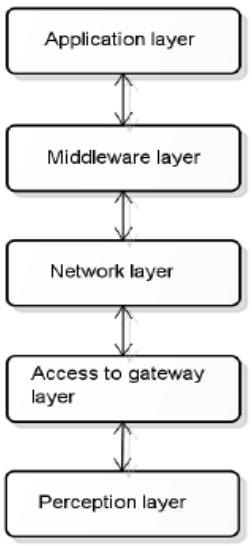


**Figure 2.3 Architecture of IOT**

The first layer, perception layer, just is primarily responsible for the collection of data from the environment. Another, a new access to gateway layer supports the communication network layer. Both these two layers are responsible for management of data in exchange infrastructure. The main idea of adding a new layer is to transfer the data directly between the intelligent objects. This second layer is a communication bus between objects and network gateway. Another newly-added layer is called middleware layer. The main purpose of this layer is to increase the flexibility of the interface between the hardware and the software. Information coming from network layer is transmitted to the middleware layer, which is a certain abstraction from both the upper and lower layers. It can be compared to API in the context of the issue of appropriate interfaces for application layer in data management.

## III. APPLICATION AREAS OF AI & IOT IN MODERN-ERA

The following are the application areas of IOT & AI:

**A.** To buy Fruits and Vegetables, one would check the refrigerator to see which items are out of stock. With Artificial Intelligence and IOT, sensor capabilities can be added. This is done with the help of special sensors so the fridge can communicate with the person and list the items which are not available. Using this concept, IOT BUCKET is connected with a wireless display device fitted with an inbuilt RFID (Radio frequency Identification) technology. When one goes to the supermarket to purchase groceries, this Bucket will tell what the items to be purchased are. Parallel, the objects must have an RFID tag attached to it, where the prices are calculated simultaneously. This would ensure the person has sufficient money to buy items.

**B.** Consider a Diabetic Person, where constant monitoring of sugar levels is needed. The patient can wear a wireless insulin monitor, a smart phone with insulin monitoring app together with the device can assist in monitoring the insulin level.

**C.** Preventive health-Google X Nanoparticles: Google x is researching the use of nanoparticles. By swallowing a pill these are released into the bloodstream. These particles can detect and diagnose diseases, impending heart attacks or other diseases based on the changes in the body. A wearable wristband gives the readings of the nanoparticles.

**D.** Detecting Body Movements by Atlas Wearable fitness band measures heart rate and calculates the calories burnt. It is

machine –learning algorithms helps to classify one's exercise routine. It distinguishes between pushups and squats effortlessly. These datasets can be extended further to understand movements like walking, sitting or interaction with others that would give clues about the energy level and mood.

**E.** Emotion Measurement Consumers' emotions can be assessed using Brand Emotions. Brand Emotions helps to measure how consumers feel about a brand, their experience, quality and marketing. Emotional reactions of participants are visualized using Brand Emotions. It allows brands to maximize their experience, target products and services at the right time. The capability of the device to sense emotion and machine learning ability measures physiological information captured through wearable devices.

**F.** ENORASIS project in Farming ENORASIS uses network of sensors in the fields to determine the amount of water that is needed by the crops. These sensors collect soil conditions and environmental factors to quantify water added to the fields. This model combines weather conditions and sensor data about the crops and creates a detailed daily irrigation plan best suited for each plant. It assists the farmers to decide whether extra irrigation would yield profits or incur loss.

**G.** Other areas of application:

- Brain-machine interfaces (Emotive)
- Classifying DNA sequences
- Information retrieval & search engines (Google, Yahoo, Bing)
- Protein prediction (Noble Research Lab)
- Speech and handwriting recognition (Google Translate)
- Text categorization (Gmail, Outlook)

## IV. USE OF AI & IOT IN NEW ERA OF E-COMMERCE BUSINESS


**Figure 4.1 AI & IOT in E-commerce Business**

Figure 4.1 illustrates the various E-commerce businesses through IOT & AI Techniques:

***A.*** ***Online Stores:*** This is the e-commerce platform for buying and ordering goods, a platform that is becoming increasingly customized through the use of data analytics tools.

***B.*** ***Social Media:*** This remains key channel for engagement between brands and customers and for building brand awareness and customer loyalty. Social media sites are also becoming online selling platforms.

***C.*** ***Mobile Communications:*** Smartphones and Tablets are used for engagement with brands and as a source of information through mobile applications. These applications are also increasingly being used for consumers to buy products directly from online stores.

***D.*** ***Supermarket and Foods*****:** As with supermarkets, the main benefit of online shopping for consumers is to save shopping time. Customers can order goods from the comfort of their home by using smartphones and mobile internet – from almost anywhere in the world.

***E.*** ***Fashion:*** The fashion retail presence on the internet through e –commerce has been the first move towards multi-channel platforms. These e-commerce platforms are linked to the brand's presence on

social networks such as Facebook and LinkedIn. There are also social e-commerce platforms such as Magento and shop-building platforms. However, social media plays a key role in terms of engagement of customers with product marketing. Now days in fashion industry, Instagram and Pinterest are gaining strong momentum.

## V. OPEN ISSUES

Major areas of concern include:

***A.*** ***Security-*** This includes authentication of the entity which is being conveyed. In IOT, wireless devices are used to connect and thus authenticity must be provided.

***B.*** ***Data Integrity-*** All the data in IOT is conveyed through wireless media. There are chances of theft or hacking in the path.

***C.*** ***Data Storage Complexity-*** Machine learning and IOT would make our lives more comfortable, but the main issue lies in storage of all the data. Integrity of the stored data must be maintained.

***D.*** ***Expensive-*** The devices with which IOT works are very expensive. The initial cost for proper working of any idea would be high and not easily affordable.

## VI. CONCLUSION

Artificial Intelligence (AI) & Internet of Things (IOT) is a new emerging trend, the future of mobile technology and coupled with Machine Learning increases the usefulness of the Internet. It makes communication between smart-phones equipped with touch screens to unattached objects. This concept of AI & IOT will be adopted by many, and the future shows lots of possibilities and discoveries in this area. AI & IOT will change the lives of many, where the input and support of people is needed. The presented paper investigated the usefulness of Artificial Intelligence and Internet of Things in the concept of Modern-era Human Life.

## ACKNOWLEDGMENT

The authors would like to acknowledge the reviewers for their valuable comments, which contributed to the clarity of the research and in particular for their suggestions for the statements of applications.

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