A novel method for implementing Artificial Intelligence, Cloud and Internet of Things in Robots

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Abstract—**This paper describe about a new methodology to implement Artificial Intelligence, Cloud and Internet of Things in Robots. Now a days, Artificial Intelligence take a main part in the world into robotics. Almost all industries use robots for various works. They were using co-operative robots to make different kind of works. But there was some problem to make robot for multi tasks. So there is a need to create new methodology to made multi tasking robots. It will be done only by artificial intelligence and internet of things. Also connected to cloud can reduce cost. This paper describe the process to make a robot in a simplified manner.**

Keywords—*Robots; Internet of things; Artificial intelligence; Cloud; Robotics.*

I. INTRODUCTION

In the scientific world Human want to do works easily and efficiently. Human use some tools and machines to simplify his works. Previous century(20th century) the world scientists and technicians concentrate the computing field. Now the world highly concern about robotics and artificial intelligence field to improve the efficiency and increase profit. Currently our generation want to do all his favorite thing without commands. For this artificial intelligence and Internet of things highly helpful to produce such type of robots or machines. Building a robot is more complicated. This method could help to reduce the problem. Also this paper intend to help beginners of robot and other advanced robotic machine maker by some easy process to think and make robot easily. Making robots and connect it to other devices or things is a highly interdisciplinary one. So the explanation of some important terms are given below before explaining the method. Also my previous paper may useful to understand this concept[1].

II. SHORT EXPLANATION TO SOME TERMS

A. Robots

Robotics is based on two enabling technologies: Telemanipulators and the ability of numerical control of machines.

Telemanipulators were remotely controlled machines which usually consist of an arm and a gripper. The movements of arm and gripper follow the instructions (preset) the human gives through his controlling device. First telemanipulators have been used to deal with radio-active material.

Numeric control allows to control systems or machines very precisely in relation to a any given coordinate system. It was first used in 1952 at MIT and also lead to the first programming language for machines (called APT: Automatic Programmed Tools).[2]

Isaac Asimov, a robotic scientist proposed three fundamental laws to make a robot to a secure human and future generation. It is much more important to make a robots.

Isaac Asimov's "Three Laws of Robotics"

- A robot may not injure a human being or, through inaction, allow a human being to come to harm.

- A robot must obey the orders given to it by human beings, except where such orders would conflict with the First Law.

- A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.[3]

By applying these laws have inspired a great deal of work in agents and multi-agent systems already [4, 5, 6,7.

But the word "robot" came into the popular consciousness on January 25, 1921, in Prague with the first performance of Karel Capek's play, R.U.R. (Rossum's Universal Robots)[8].

B. Artificial intelligence

The first work that is now generally recognized as AI was done by Warren McCulloch and Walter Pitts (1943)[9]. AI currently encompasses a huge variety of subfields, ranging from the general (learning and perception) to the specific, such as playing chess, solving puzzles, proving some mathematical theorems, writing poetry, taking logical decision driving a car on a crowded street, and diagnosing diseases. AI is relevant to any intellectual task; it is really a universal field.

The term artificial intelligence was first coined by John McCarthy in 1956 when he held the first academic conference on the subject. But the journey to understand if machines could truly think began before that. In Vannevar Bush's seminal work. As he proposed a system which amplifies people's own knowledge and understanding. After five years Alan Turing wrote a paper on the notion of machines being able to simulate human beings and the ability to do intelligent things, such as play Chess . [10]

C. Internet of things

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management

[11]. However, in the past decade, the definition has been much more inclusive covering wide range of applications like health care, utilities, transport, etc. [12]. Although the definition of 'Things' has changed as technology evolved, the main goal of making a 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 (sensing) and interacts with the physical world (actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analytics, applications and communications. [13]

D. cloud(cloud computing or storage)

Cloud computing is a recently evolved computing terminology or metaphor based on utility and consumption of computing resources. Clouds could be classified as public, private or hybrid. Cloud computing relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network[14]. This term(cloud computing) coined in the year of 1950 and start rapid growth on late 1990's. Generally in business the term "moving to cloud" also refers to an organization moving away from a classical CAPEX model (buy the dedicated hardware and depreciate it over a period of time) to the modern OPEX model (use a shared cloud infrastructure and pay as one uses it).By this the profit of the company increases.

Cloud computing provides the facility to access shared resources and common infrastructure, offering services on demand over the network to perform operations that meet changing business needs. SaaS is a model of software deployment system where an application is hosted as a service provided to consumers across the Internet. Saas is generally used to refer to business software rather than consumer software, which falls under Web 2.0. [15]. when we think about cloud storage systems Amazon Elastic Compute Cloud and Simple Storage Solution are popularly known cloud storage solutions. The present needs of high-capacity networks, low-cost computers and storage devices and the adoption of hardware visualization, service-oriented architecture, led to a growth in cloud computing.

III. METHOD

This section described the process of this proposed method

A. Analyzing tasks

In this step the tasks which we want to implement to a robot or a machine is pointed out. It will be listed out the tasks need to implement to particular type of robots separately (if a collection of machines used).

B. Concept to make robot

The general concepts to make the robot as per the tasks listen in previous step is the next process in this method. It means when taking a ball is task, the dimension of the ball and the corresponding sensor requirement are assumed as a general concept. Also in non-humanoid robots like in car industries two robots are fit the two side of the door and then another robot screwed it. Here the robots hand like machine, Screw

driver, screws etc are considered in this process. Programming the sensors and other parts (like microprocessor, some chip sets etc.) are also could be considered in this process.

C. Concept via artificial intelligence

The artificial intelligence concept(may referred as term) make a robot to learn and think like a human-like being. All the additional hardware like sensors, ICs etc. ans the programming like to think and learn are analyzed and took necessary steps to implement those tasks to that robot. To explain this process take a previous example(taking a ball by a robot), if the ball was in the glass closed bottle, the robot must think the bottle must be opened before taking the ball. This is known as artificial intelligent thinking. Likely in non-humanoid robots as in previous example(to make door of a car), When other side of the door cannot be in the place(i.e. not taken by the robot), the other robot also just screwed the one side without knowing it. Here if the two robots have or haven't the door side must be know by the other robot by using any appropriate sensors.

D. Binding the concepts to make robot

In this process binding the two concepts(general and artificial) and connect all the hardwares and link the general concept programs and the artificial concept programs. In general there is no need to think about extra hardware requirements in this process. But in some cases extra hardwares like serial cables or some cable ports may be needed. Also necessary link programs will be written in this step.

E. Implementing cloud

Uploading the software to a cloud server and checking whether it will work correctly considered in this process. In other words, it will connected to a cloud. So the size of the robot is minimized. So, learning by the robot and transferring one system to other is easy. It means, when a robot 'A' learn from a person 'X'. When the person 'X' traveled to go other place (like foreign country). Person 'X' has no need to take a robot from his/her own place to another place. Person 'X' can use the other similar type robot by using the password or access key from the cloud server. So it is a another advantage when we implement programs to the cloud. Also it is very easy to transfer the learned things by a similar type of robots.

F. Make a robot

Assemble all the hardware parts and install all the necessary software to make a robot.

G. Make it to connect with other systems or robots

Finally, make the robot to connect other system or robots using infrared or blue tooth or some other wireless devices. Because of convenient and easiness wireless communication is preferred. In some cases there is may be the need to connect by cables(particularly when high speed connection required). In those situation may some extra hardware required. Also programming is also required to connect to other system. So, in this process there is a concern about both hardware and software. When we connect other system(things) to Internet as well as the robot by any way (i.e. wired or wireless), the robot can be accessed from smart phones, computer or other similar devices. All the necessary works to connect to Internet are done in this final process.

Finally we may check the whole system doesn't conflict Isaac Asimov's, "Three Laws of Robotics".
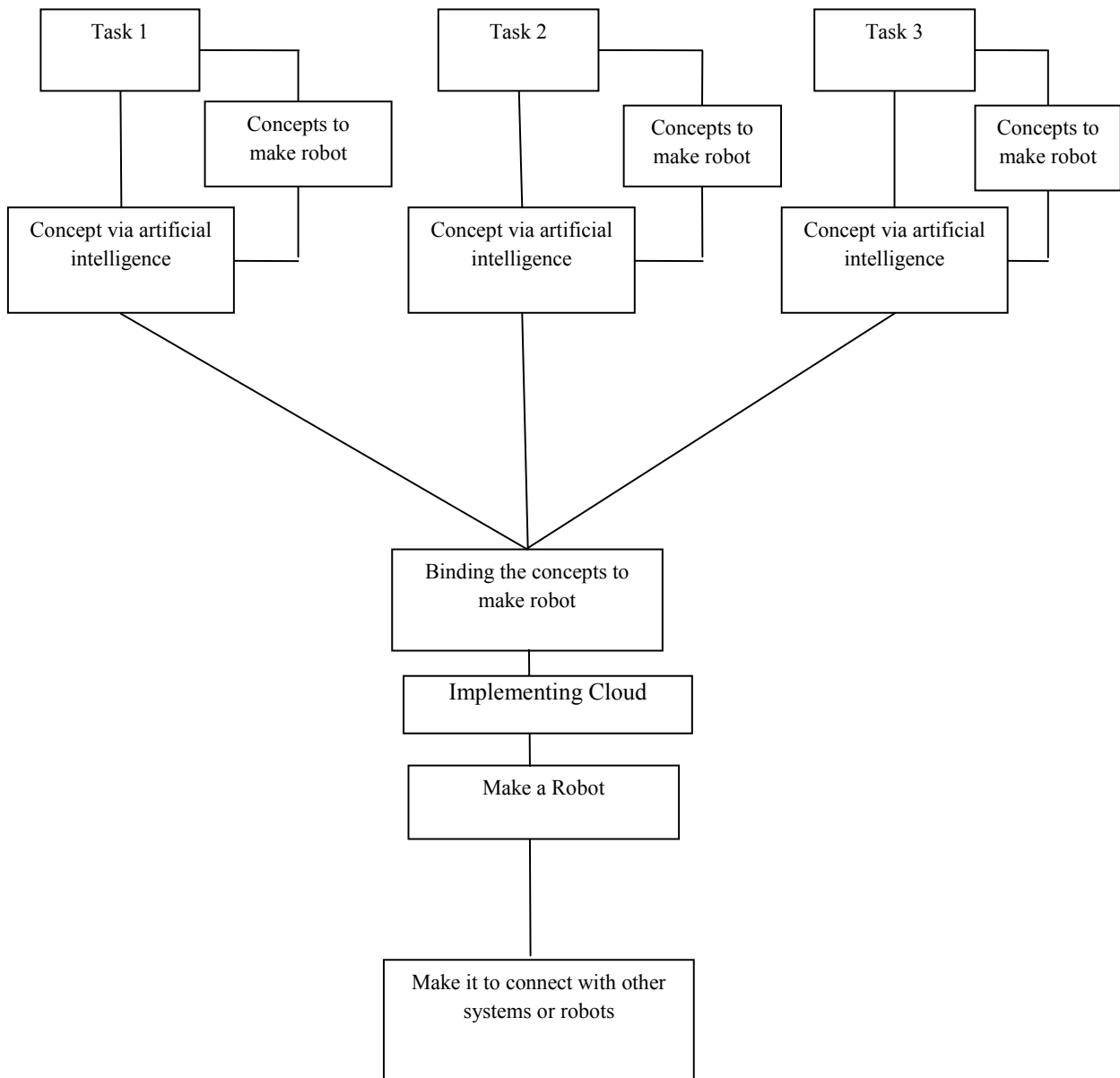
Task 1	Task 2	Task 3
Concepts to make robot	Concepts to make robot	Concepts to make robot
Concept via artificial intelligence	Concept via artificial intelligence	Concept via artificial intelligence

Binding the concepts to make robot

Implementing Cloud

Make a Robot

Make it to connect with other systems or robots

Fig. 1. Diagram explain the process to make a robot

IV. Conclusion

By using the above method one can made robots easily. This method also minimize the mental strain as well as reduce confusion between the tasks also reduced by the two separate conceptual thinking process(i.e. concept to make robot and concept via artificial intelligence).So, it is a better method for beginners to make a robot when high number of tasks implemented to it. In future, we may make some systems by using this method and try to find out if there is any problem by using this method.

Acknowledgment

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