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## IMPORTANCE OF ARTIFICIAL INTELLIGENCE IN INDUSTRIES- A REVIEW

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### ABSTRACT

*In those days humans are considered to be the vital element in Industries starting from planning till execution of various tasks to be carried in production operations. But there are some extreme threats faced by labours during improper supply and demand even though they are well prepared enough. In a chaotic situation one cannot predict the exact supply and demand of materials for starting the production. In order to overcome the problem the assistance of artificial intelligence is required. Artificial intelligence is the computer system which smartly takes decision in much better way rather than natural intelligence of humans. Artificial intelligence is said to be autonomous system which takes decision on its own without any logical influence. Artificial intelligence takes decision based on probabilistic sensor input. Use of AI is much beneficial to mankind in terms of efficient thinking and planning. The ultimate meaning of AI is robotics which requires the human intelligence to process tasks as same like humans. Hence in this paper the detailed survey was carried out to study the characteristics of AI and its usages.*

**KEYWORDS:** *Artificial Intelligence, Natural Intelligence, Autonomous system, Machine learning .*

### 1. INTRODUCTION

Artificial Intelligence is nothing but cognitive machine learning environment. In Cognitive machine learning everything was pre-programmed into the systems based on the situations it will react emotionally like human beings. In the beginning 1950's AI has the capability to do the tasks as similar to normal humans. But due to technological advancement the capability of AI (Artificial Intelligence) has enhanced a larger amount. Today's AI (Artificial Intelligence) is considered to be quick responsive than earlier AI in 1950's. The artificial intelligence will improve its speed and decision making ability while solving complex problems. This concept was introduced during mid of Second World War particularly in manufacturing and logistics applications. Artificial intelligence is a technology which helps to improve the efforts taken by humans. So artificial intelligence is fast and responsive in executing all tasks it strongly supports the human beings.

Use of AI (Artificial Intelligence) will free the human labor during production operations. So that it will perform the human's job. Even in today's scenario AI (Artificial Intelligence) is integrated in unmanned production in order to take speedy decisions to complete the major activities. So main aim of AI (Artificial Intelligence) is to support humans in various possible cases.

The AI (Artificial Intelligence) system used to handle several cases like material handling, production and logistics. Use of AI (Artificial Intelligence) maximizes the chances of getting victory for the industrial organizations. As an overall AI (Artificial Intelligence) recreates the intelligence of humans by means of computation methods with infinite memory space. AI (Artificial Intelligence) is a tool to human society to tackle many

challenges not only in manufacturing industries also in many applications like hospitals, food industries etc. Hence in this paper the concept of AI (Artificial Intelligence) is focused on Industrial applications.

### 2. OBJECTIVES OF ARTIFICIAL INTELLIGENCE:

- Understand in a general way how a neural network is designed and trained.
- Know the components of a formal system.
- Understand how depth first, breadth first, and bi-directional searches are performed.
- Use evaluation functions to expedite the search process.

### 3. LITERATURE REVIEW

AI (Artificial Intelligence) formally introduced in 1956 which was proposed by Alan Turing. It has the ability to learn, understand and speak to humans effectively.

Copeland (2000) has defined AI (Artificial Intelligence) into four components as given below:

- a) **Learning:** It can be done by simply by trial and error method.
- b) **Reasoning:** It can see what to do and act based on the given information.
- c) **Problem solving:** Developing heuristics or algorithms to solve problems.

- d) Perception:** analyse, sense and reacting to environment.
- e) Language understanding:** It is said to be the basic requirement of AI (Artificial Intelligence). The level of understanding could be spoken language, signs or signals.

**Raghvendra priyan (2013) [1]** he proposed two basic ideas about AI (Artificial Intelligence) first studying the thought process of human beings. Second it deals with mapping the thought processes with machines. One of the main advantages in speech recognition was feeding input to the system by means of voice signals and obtaining output very precisely within a short period of time. AI (Artificial Intelligence) tries to reproduce the human behaviour by means of computing. So it is the field of computer science which performs simulation of machines.

Amanda .A.Sullivan et al (2017) [2] in this article the author explains about KIBO robotics kit offers a playful and tangible way for young children to learn computational thinking skills by building and programming a robot. KIBO is specifically designed for children ages 4-7 years old and was developed by the Dev Tech research group at Tufts University through nearly a decade of research funded by the National Science Foundation. KIBO allows young children to become engineers by constructing robots using motors, sensors, and craft materials. Children also become programmers by exploring sequences, loops, and variables. Through programming KIBO, children engage with computational thinking skills and ideas including algorithms, modularity, and control structures. Unlike other programming interfaces for children, the KIBO robot is programmed to move or to respond to sensor input by using tangible programming blocks—no computer, tablet, or screen-time required. This paper provides an overview of the design features of KIBO and a synthesis of the research that has been done throughout the development of this kit. It provides examples of curriculum for playfully engaging young children with computational thinking using KIBO.

**Arun Kumar (2017) [3]** this work tells about the machine vision system in artificial intelligence. In industries machining learning is used in preventive maintenance area in order to detect or inspect the fault present in the system or machines based on that initial warning will be given to the machines about the present condition of machines. So that human workers will be well prepared enough to tackle the problem.

**Daniel F. Garcia (2016) [4]** this article tells about the future smart factories run by autonomous robots. There is different vision systems incorporated in robots such as photogrammetric, stereo vision, structured light, time of flight and laser triangulation. This work analyses the time and accuracy of inspection, safety etc.

**Fadi al Khoury (2017) [5]** This paper studies the safety concerns related to learning systems within autonomous driving and applies a safety monitoring approach to a collision avoidance scenario. Experiments are performed using a simulated environment, with a deep learning system supporting perception for vehicle control, and a safety monitor for collision

avoidance. The related operational situations and safety constraints are studied for an autonomous driving function, with potential faults in the learning system introduced and examined.

**Khaled M. Alhawiti (2015) [6]** in this work importance of speech recognition systems was narrated by the author. Speech recognition system is one of the most widely used methods in today's technological development. It creates an opportunity to interact and communicate with automated machines. Speech recognition method is based on the natural language spoken by human beings. It observes the language spoken by the person based on that further action will be taken by the computer or machines.

**S.A.Oke (2008) [7]** in the last two decades artificial intelligence has improved more in the area of manufacturing and service systems. In today's fast growing world artificial intelligence has become the most important need in all life of human beings. Starting from small mobile app to larger machines artificial intelligence has found its own entry.

**Michael Shneier (2015) [8]** this article describes the information about mobile robots and its significant usages in industries. Mobile robot is a device which takes decision on its own without the command of humans. It is autonomous vehicle which moves from one place to another place without having any obstacles in the path. AGV (Automated Guided Vehicles) is one of the most commonly used devices in industries utilized for material loading and unloading.

**Fie –Yue Wang et al (2016) [9]** in this paper, we study how to test the intelligence of an autonomous vehicle. Comprehensive testing is crucial to both vehicle manufactories and customers. Existing testing approaches can be categorized into two kinds: scenario-based testing and functionality-based testing. We first discuss the shortcomings of these two kinds of approaches, and then propose a new testing framework to combine the benefits of them. Based on the new semantic diagram definition for the intelligence of autonomous vehicles, we explain how to design a task for autonomous vehicle testing and how to evaluate test results. Experiments show that this new approach provides a quantitative way to test the intelligence of an autonomous vehicle.

From the above literature it was noted that different authors or philosophers have told their view about artificial intelligence and its usages in various application like machine vision system, speech recognition system and autonomous applications in automotives etc. also some authors have given information about the usages of artificial intelligence in industries like manufacturing and service organizations. From the above all it was observed that artificial intelligence has occupied its place more for technological development also it supports humans in difficult cases or hazardous areas. The latest work carried out by many people is nothing but usage of artificial intelligence in autonomous vehicles. The main value addition from the literature is that knowing the various diversified applications of artificial intelligence and its nature in the area of automotives, space craft etc.

#### 4. APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN MANUFACTURING INDUSTRY:

In this case study the concept of artificial intelligence is mainly focused on production scheduling problems in industrial environment. Production scheduling means scheduling multiple numbers of jobs and machineries so that we have to minimize the completion time of the job. This is considered to be the main challenge present in the problem. In case of human beings scheduling the jobs and machines requires systematic planning and execution of tasks even if some small problem or manual error occurs due to humans entire thing will become complex. So in such places use of Artificial intelligence is highly demanded in industrial environment. As per literature review production scheduling is broadly classified into single machine scheduling, flow shop scheduling and Job shop scheduling. In each of the scheduling problems there were certain measures of performance which demands algorithms with exponential steps to obtain the respective optimal solutions.

For example in single machine scheduling problem, minimizing mean flow time comes under combinatorial category. In flow shop as well as job shop Scheduling problem minimization of make span makes that problem into combinatorial category. For any combinatorial problem devising exact algorithm to give optimal solution will end up with exponential steps which will run into even more than 100 years. To solve such problems one should device Meta heuristics to obtain near optimal solution. Artificial Intelligence Algorithm is one such Meta heuristics which mimics human neurons by solving a problem for its best solution. So AI algorithm can be used to solve the following production scheduling problems as mentioned below

- To minimize mean tardiness in single machine scheduling problem with single processor.
- To minimize make span of the single machine scheduling problem with parallel processor.
- To minimize the make span of job shop scheduling problem.
- To minimize the sum of the weighted earliness/ tardiness of the single machine scheduling problem.

From the above application it is observed that artificial intelligence performs faster than human beings. Hence use of heuristics or algorithm will try to reduce the problem solving time within stipulated hours. In this paper simple algorithm was developed for scheduling jobs with m number of machines. The steps for the algorithm are as explained below:

##### 4.1. Algorithm Illustration:

Step 1: Input the data

- a. Number of Jobs
- b. Number of Machines
- c. Process sequence for jobs
- d. Job process times

Step 2: Arrange the jobs as per the importance of job process times by despatching rules of scheduling

Step 3: load the jobs as per arranged process sequence in the machines.

Step 4: Note down the job completion time after assigning and completion of jobs in the machines.

Step 5: Obtain the output

Make span time for the given batch of jobs.

##### 4.2. Flow chart:

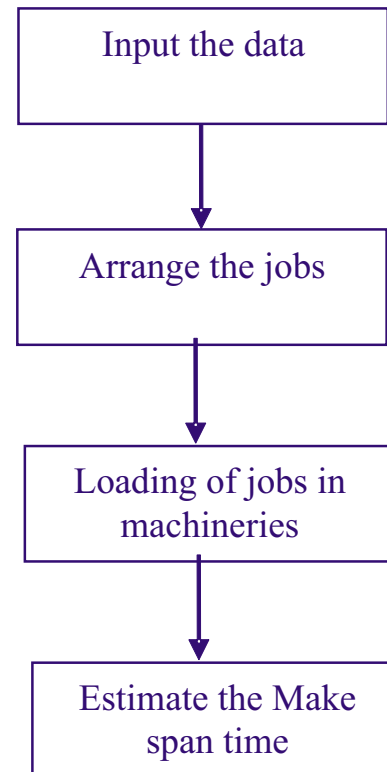


Fig1. Flow mechanism of algorithm

#### 5. CONCLUSION

However artificial intelligence has got its own dimensions with respect to technological advancements but at the same time there is no such massive improvement in Indian manufacturing industries. The main thing is not attaining adoptability with the modern advancements. In some areas fully manual operations are carried out with the help of labour. But in future there will be advancements in artificial intelligence which cannot be resisted by humans. So human beings must prepare themselves to face the future of artificial intelligence. Hence in this paper case study was addressed based on the applications of artificial intelligence in the area of scheduling jobs and machines in production environment. Also the simple algorithm steps are formulated to explain the procedure for scheduling the jobs and machines with the aid of algorithm. Hence most of the mechanical systems will be functioned with artificial intelligence applications.

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