

# An Overview on Artificial Intelligence and its Applications

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**Abstract:** This is a complete study of how AI actually works in different sectors and how it is reducing the efforts of the people and giving them a healthy lives and reducing the mortality rate at a very rapid speed so that people are living luxurious and healthy lives. Also it is telling about how it will work in future.

**Keywords:** Artificial Intelligence, Data Science, Machine Learning, Robotics

## 1. INTRODUCTION

The father of Artificial Intelligence named John McCarthy said that “AI is the science and engineering of making intelligent machines, especially intelligent computer programs or systems”.

Artificial Intelligence is a method of making a computer or a software think smartly – to “think” like a human used to and respond in the same way that a human used to respond.

AI is all about understanding how the human brain thinks, learns, decides, and works when struck with a problem. The conclusions of this study are used as a basis for developing intelligent software and systems. The best thing about an Artificial Intelligent system is that how it is solving any problem. When any system is created as an Artificial intelligent system then it has some

features that can help to learn and solve problems, just like a human mind.

To simplify, some of the activities, computers are designed with artificial intelligence for :

- Learning
- Planning
- Problem solving

The objectives of artificial intelligence are learning, reasoning, perception and machines are connected using a cross-disciplinary approach that is based on mathematics, computer science, psychology, and much more.

For example, the computers that play chess, self-driving cars are based on the concept of artificial intelligence. Their functionality includes observing the outcomes of actions they take, that will impact the final results. With respect to self-driving cars, the system considers all the external data and computes it to act in a way that stops the collision [1].

Overall, this is a large field for the interaction between the Human Intelligence and Machine Intelligence.

“Whenever I hear people saying AI is going to hurt people in the future I think, yeah, technology can generally always be used for good and bad and you need to be careful about how you build it ... if

you're arguing against AI then you're arguing against safer cars that aren't going to have accidents, and you're arguing against being able to better diagnose people when they're sick."



Figure 1: Snapshot of Artificial Intelligence

## 2. FIELDS OF ARTIFICIAL INTELLIGENCE

**Data Science:** As we all know that data is increasing at a very rapid rate these days. So it is very important to manage and analyse the data that is what Data Science is .It actually helps you to manage your data helps analyse it and also gives the meaning to the data which is to be managed and analysed.

**Machine Learning:** It is one of the emerging and uplifting technology in the current scenario, in which actually deals with the prediction of data and categorize the distinct data in a given dataset. It is made by complex mathematical skills and concepts in order to build an entire system.

**Neural Networks and Cognitive Science:** It is the Branch or Science of an Artificial Intelligence in which it actually deals with the coding of the neurons of a Human Brain into a machine. By using the Machine Learning and Neural Networks together many complex tasks can be eased and can be automated.

**Image Processing and Multimedia Analysis:** In Image Processing and **Multimedia** Analytics all the Multimedia Programs can be analysed by the encoding and decoding of such data and can

conclude what the data may contain and the information it wants to convey to the user. This is Useful for Smart Purposes like Image Scanning and providing outputs according to the understanding based on the content of the image.

**Robotic and Embedded Systems:** This Field plays a very vital role in the Artificial Intelligence .What it actually does is that it uses the Hardware and Software Products and Combine them together in order to make a system with its own Intelligence .The Real Example of this concept is a Robot which in today's world is used to reduce the human efforts and ease the lives of the Humans by providing Automation so that Humans can lead a Luxurious and Efficient Life [2].



Figure 2: Scope of Artificial Intelligence

## How is AI being used in HR & Recruitment?

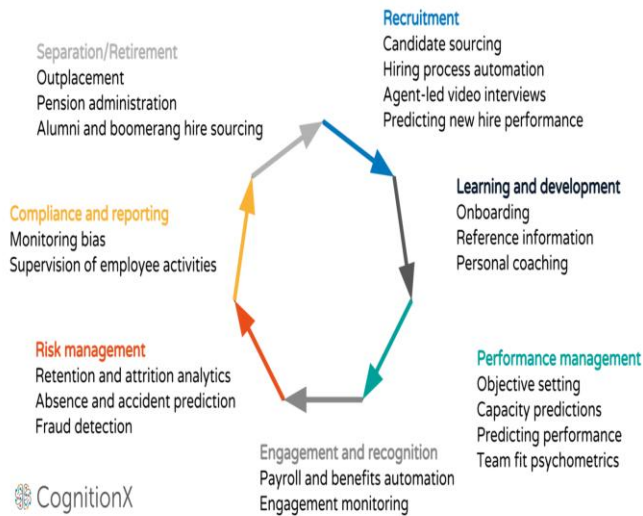


Figure 3: Usage of Artificial Intelligence in HR

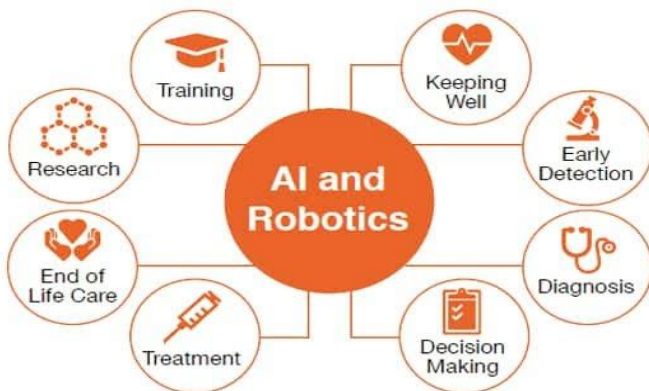


Figure 4: Various areas of Artificial Intelligence

### 3. IMPACTS OF ARTIFICIAL INTELLIGENCE IN EVERYDAY LIFE

When we talk about Artificial Intelligence, it is easy to imagine a very beautiful and wonderful future which will be amalgamation of the science and fiction where robots will be all over the globe and will be helping the Humans for the reduction of the complex tasks and the globe will be able to perform and implement all those which are seen to be impossible now a days. But AI is actually a way to

enable people to complete more tasks by collaborating with smart or intelligent software.

We need to think of it as providing a more human face to the technology: Technology that is able to learn from the vast amount of data which is available in the modern world; Technology that can understand and can respond or react to our language and The Technology that can see and interpret the world the way that we used to do. Although we are trying to create a Technology which can think like us and can understand every aspect of the Life that human learns and get affected from those experiences.

There are some scenarios where technology is playing a huge and vital role in our daily lives:

- This technology is useful in environment like at a construction site where specialized tools needed by people are spread out, sometimes across multiple floors. Using cameras already fitted at that place, this technology can identify a specific tool as well as the closest authorized person who can deliver it saving everyone's time and keeping the workflow. With AI the digital and physical worlds have come together to make everyone more safe, secure, and productive.
- Spam filters in our email inbox and Smart email categorization that we experience with Gmail are AI-powered.
- E-commerce web application sites use AI neural networks to quickly return a wide list of the most relevant products as well as personalized recommendations on the home page, bottom of item pages and through e-mail to increase their revenue tremendously.
- Whenever we use Google/Apple Maps for navigating or calling an Uber or booking a flight ticket, we are actually using AI.

- AI is behind many of Google’s products and is a big priority for the company. The banking and finance industry heavily believes on artificial intelligence for things like customer service, fraud protection, chatbots, investment.[3]



Figure 5: Vision of Artificial Intelligence



Figure 6: Artificial Intelligence Facts

Specific AI use case adoption worldwide 2017

Adoption of specific artificial intelligence (AI) use cases in 2017, by category

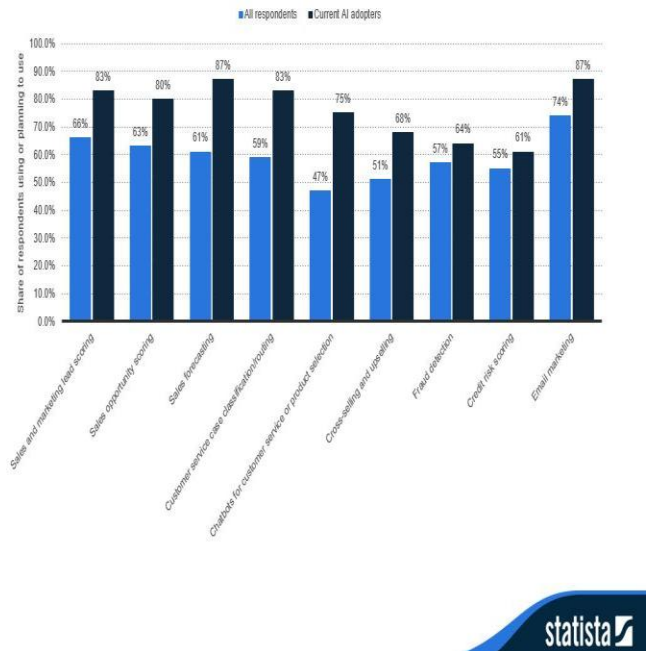


Figure 7: Statistics of Artificial Intelligence Use Cases (2017)

#### 4. AI IN HEALTHCARE: A CASE STUDY

For those of you who would like to have a hands-on experience of how these technologies work, we have created a program to check if a microscopic image of a cell is infected by malaria or not using a simple Convolutional Neural Network or a CNN Code: We need to go through some code in order to get the desired output through some predictions done on the basis of datasets.

Dataset: It is the collection of data on which some prediction can be made to have some desired output.

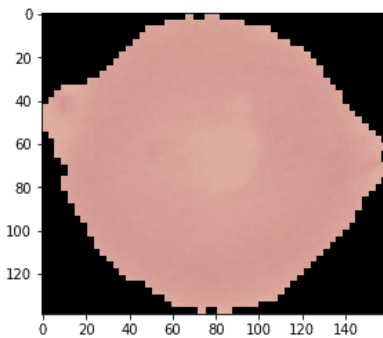
Dependencies to be considered, these are some of the necessary packages which need to be installed to work with AI.



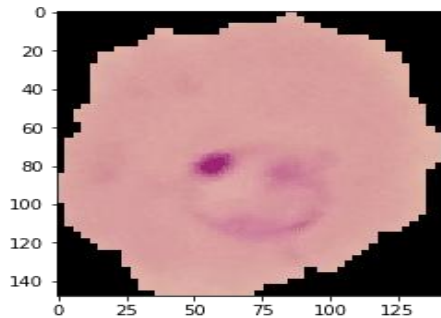
Figure 8: Artificial Intelligence in Healthcare Analytics

Consider an image of an uninfected and parasitized cell:-

An uninfected cell :-



A parasitized cell :-



As we can see, the parasitized cell varies from the uninfected cell by the presence of a purple substance. Our objective is to train a classifier to distinguish between infected and uninfected cells.

Suppose in our dataset, we have in total 27,558 images. The infected and uninfected images are distributed equally. As CNN is a medical term so we will work with it, imaginatively.

Suppose there are two main parts in a CNN

- Convolutional filters
- Fully connected layers

Convolution filters are like eyes. They capture the details or features of an image. For example, in the case of a flower, they capture complex features about the shape, colour, etc. These features are captured by considering a terminology called a convolution filter over an image.

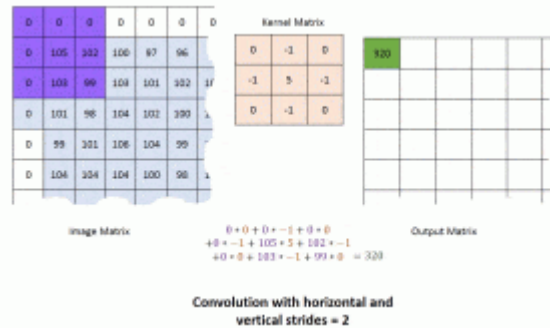


Figure 8: Convolution Filters

Then these features are passed on to the fully connected layers. Fully connected layers process these features. This network comprises many connections among unit cells or neurons. The final output is used to predict the class.

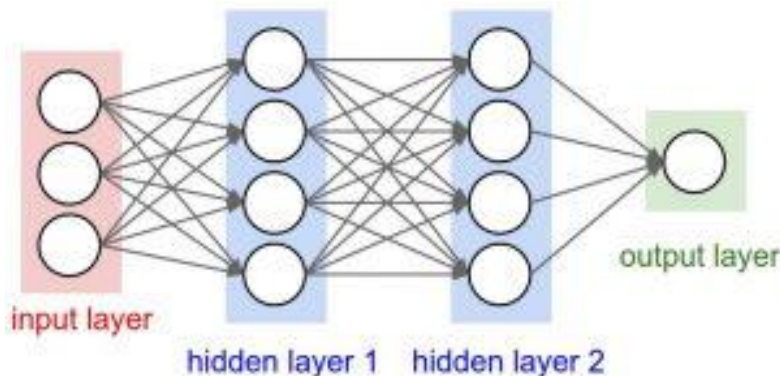


Figure 9: Layer Representation

We train a model and then test it on a validation set. Here are our results:

```
Validation:
Size of classes: [2767.0, 2744.0]
Accuracy of the network on 552 validation images: 93 %
Accuracy of validation Parasitized : 91 %
Accuracy of validation Uninfected : 96 %
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Our accuracy on this set is 93% on an average which is great for a simple network [4]. Here we are focusing on how AI works, in order to clarify the disease and providing some suggestions for that disease on the basis of Symptoms.



Figure 10: Artificial Intelligence Assistance

## 5. FUTURE SCOPE OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is the application of human intelligence by machines. In this the machines are made to be working to think like a human, to learn like a human, and to solve the reasonings to provide the solutions. Sophia the AI Robot, is one of the unexpected example of this. It became clear that is AI will fit in every sphere of our life. Listed below are the different fields where AI will make changes in future.

**Cyber Security:-** Cybersecurity is the main aspect for today's digital world, there are still some problems about the impact of AI. Not just the

corporates but also the government sectors are also trying to master in AI and Machine Learning for the protection of data and creating more opportunities in the respective field. AI will help a lot in securing the data as it will be able enough to use its intelligence in a certain way that it can distinguish between the Fake Human and the Original.

AI allows you in the detection of threat and crashes and can even resolve them without the involvement of the humans.

**Face Recognitions:-** The launch of iPhone X with face recognition feature was a step towards AI's scope in future. Governments and security forces will use this feature to track down the criminals and to identify the citizens. In future, face recognition can move from physical structure to emotional analysis.

In this AI just recognise the faces and captures the images of the unknowns and interpret them which helps to catch the culprit right handed.

For example, it might become possible to detect whether a person is stressed or angry, which is actually a quite interesting field. It also detects the face expression which helps to know the mood of the person and some AI helps to remove Nostalgia.

**Data Analysis:-** AI works in the field of Data Analysis where it deals with the datasets in order to handle it or manage it to have desired outputs. This enables businesses to target the right customers for any product. An example of this is the partnership between IBM and Fluid. Fluid, a digital retail company uses Watson – an AI created by IBM for insightful product recommendation to its customers.

**Robotics:-** Robotic Process Automation is the application of machine learning to automatize

the tasks which are based on some rules. It will help people to focus on the critical works of their job while leaving the routine works to machines. Automation can deal with the data entry to complete process completion. The reach of AI is also expected to go over certain jobs or tasks that are risky or health-hazardous like bomb diffusion and welding.



Figure 11: Artificial Intelligence usage in an area of Robotics

**Transportation:-** This is the vast field where AI is going to be implemented, which will lead to self-driven cars with complete automation and Machine Learning is ensuring that these automated vehicles operate smoothly and efficiently. By these automated cars the rate of accidents will be decreased in a huge amount and they will be so smart and efficient to handle the emergencies and will keep the human secure in every circumstances. It will also help in reducing the time consumption in transportation.

**Voice Recognition:-** AI is also working in the field of voice recognition where the voice of any human or voice emitting from any device can be easily recognised through Alexa or Siri, where voice recognition is done after interpreting the voice on the basis of some previous information which has been provided to the machine at the time of learning. This

will lead to the reduction of manual works and we can directly access any system by just providing the verbal instructions. For example, we need to play any song, to open or close the fan or any electronic devices which will be handled by the intelligence of the machine. Hence in such a way we can ease the work of human by providing automations through voice recognitions [5].

## 6. CONCLUSIONS

The paper discussed an overview of artificial intelligence, its related fields. Moreover, future scope and its impact have also been discussed. The motivation behind writing the research paper is to highlight the importance of artificial intelligence and its usages. The future work is to work more progressively in an emerging area of artificial intelligence for the welfare of society and the related environment.

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