

## Impact of Data Science, Machine Learning & Artificial Intelligence on Humans

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**Abstract:** Since the beginning of human life, we have been progressing mentally in an exceptional manner and it took millions of years to produce an intellect and mind, which processes information in such an exceptional and amazing way that today our species is considered most advanced and intellectual around the globe. Now, we leap towards the next step of evolution by trying to make systems that process information and produce results naturally like human beings. The process of making such systems has eventually started and we, humans have already built the first phase of Artificial Intelligence, i.e., Narrow Artificial Intelligence Systems that are capable of performing tasks, which fall under their domain easily and efficiently than humans, but we still have further stages to reach in terms of development and research. For General AI systems, development is still ongoing and we hope to achieve it someday. Then comes the concept of Super AI Systems, which is still a hypothetical concept for us, humans.

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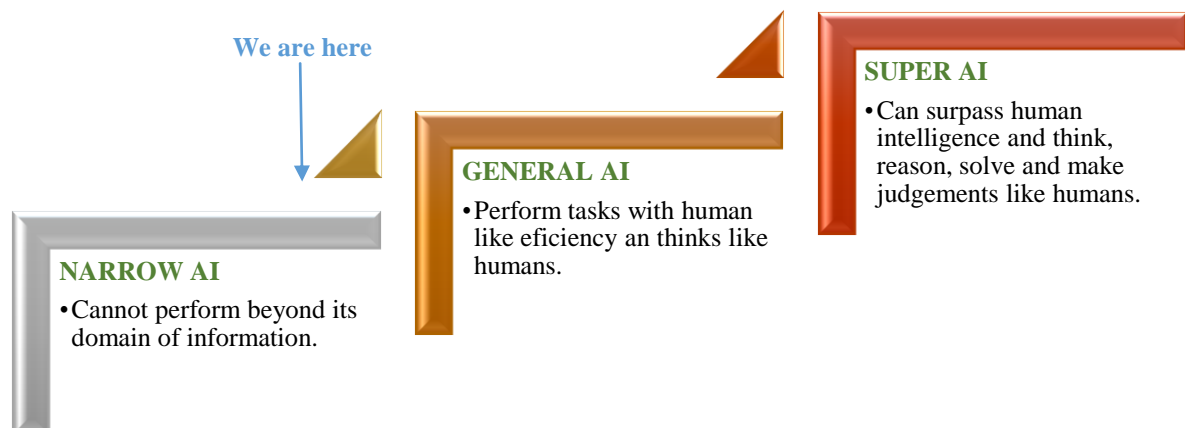


Fig. 1 Human position in the evolution cycle of AI

### I. Introduction to Data Science, Machine Learning and Artificial Intelligence

Let us take an example of the working of our mind in real world. Our mind first processes the world by gathering information, using eyes as a source of information to collect data. That information is then processed in our minds and we prepare a real world model of that information. Later on, we use the key points of our prepared model to make decisions in real life.

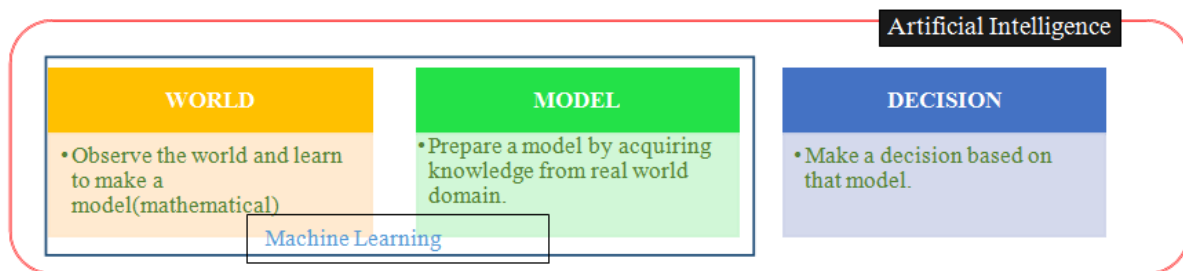
We can consider an example of a car, we see a car in real world and we make a mental model of car that contains variables like number of tires, body shape, and number of doors and so on. Later on we see a similar object and based on the information and the model our brain prepared, we make a decision that a particular object is a car or not?

The concept of Data Science, Machine Learning and Artificial Intelligence is almost similar to mental working of a human brain. We provide information based on videos, pictures, real world data and statistical data to create a model. Then we use that model to make real life decisions, but there's a catch, here like an original brain works, our model keep on learning from experiences to create a better working model (Supervised

Learning) using output as input for next iteration. Not only this but our model also learns from a wide range of data or data set provided by the user to the modelling machine (Unsupervised Learning).

Thus, we can differentiate the above three as:-

- **DATA SCIENCE:** - It refers to learn from real world observations and data, referred to as statistical data. Data can be in the form of images, videos, numbers, and tabular list and so on. Data Science takes data as input, finding problems in data and summarizes data and patterns mathematically.
- **MACHINE LEARNING:** -Machine Learning refers to automating the process of Data Science, i.e., it automates model building.
- **ARTIFICIAL INTELLIGENCE:** -Based on the above two criteria, AI refers to making decisions according to the model built by our automation and debugging processes.



**Fig. 2** Machine learning as a sub domain of AI

## II. AI Systems and their Effects on Humans

As per the previously mentioned factors and results of this project report, we can conclude that AI can be both a boon and a bane for human society. Not only will it make humans more dependent on itself but it will also suffice technological development and take it to a new era.

Now, let us have a look on some of the advantages and disadvantages of AI and how will they effect human lives.

### Advantages:-

- High accuracy and fewer errors.
- High speed and reliability.
- Act as a digital assistant in the areas of crisis and development.

### Disadvantages:-

- High cost.
- No emotions.
- No creativity.

As we can see above, that AI systems may excel humans in terms of speed and accuracy but lack emotional and creative attitude that is responsible to make a good AI. A good AI or we can call it General AI is capable of formalizing best plans and decisions in terms of market analysis and life or death situations which may include the use of AI in Military and Medical Science. Yes, AI can be an integral part of human society but managing an AI and the stages that come within that period will decide the further reach of AI industry. Future developments will decide that AI will make this world a better place or will it hinder the balance of peace and trust given to us, by machines.

AI can be categorized based on:

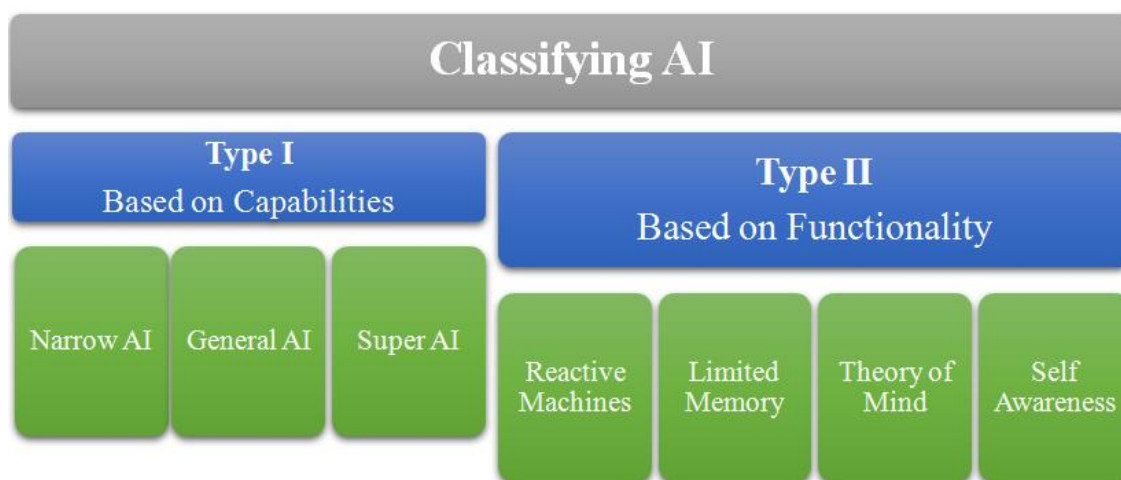
### CAPABILITIES

- **Narrow AI:** Cannot perform beyond its domain like Google Assistant, Siri etc. Some of the fields of applications of Narrow AI are already in use like Chess playing bots, self-driving cars, image recognition software etc.
- **General AI:** They can perform intellectual tasks with efficiency and they are smart and capable of thinking like humans. They are still under research but do not exist until date.

- **Super AI:** These machines surpass human intelligence. They can think, reason, solve problems and make judgements. It is still a hypothetical concept.

#### FUNCTIONALITY

- **Reactive Machines:** Basic AI that do not store past experiences and focusses on current scenario like Google's AlphaGo, IBM's Deep Blue System etc.
- **Limited Memory:** They store past experiences for short period like Self-driving cars.
- **Theory of mind:** They can understand human emotions but they are not developed until date.
- **Self-Awareness:** This is very similar to Super AI and it is the future of AI. It's a hypothetical concept which is still to be researched,



**Fig. 3** Classifying Artificial Intelligence based of capabilities & functionalities

In this particular research study, I put up a Google form to get a glimpse of what public thinks of AI and if it should be implemented or not? I formulated eight questions to get a glimpse of user's knowledge on AI systems and what they think of the future of Artificial Intelligence.

### III. Method of Research

In this section, we will have a look on the objectives of this research study. The main point of this study is that it is a factually grounded an informative research rather than normative, prescriptive or emotive research. The data shown in below sections was collected by online surveys and questionnaires using Google forms to get an on point and graphical data based on views of the target audience. The data I received from the target audience was analyzed by Regression theorems, Linear and Logistical Measures using Python as a tool to get a direct viewpoint of the audience and their views on modernization of AI.

#### Research Design

Research conducted in this scenario is quantitative by nature. The survey consists of the following phases:

- Conducting a survey
- Making appropriate form.
- Sharing link to friends, family, teachers and students of MET.
- Analyzing the survey.
- Getting results by logistic and Linear Regression approach.
- Determining the result.

#### Target Audience

The target audience in my research consists of the members and staff of MET Mumbai, students of MET, family members and friends from the fields of research and tech including some military personnel and people from the fields of science and technology, both practicing and studying.

### **Sample Framework**

The sample framework for my research consists of almost all fields including Science and Technology, Military, Finance, Gaming, Health Care and Social Media. I gathered accurate and precise data from personnel working under each of these fields.

### **Sample Size**

The sample size for my research is One Hundred and Seven respondents. There are no borrowed samples from any other survey. This survey consists purely of only 107 people.

### **Technique of Sampling**

In the act, process or technique of selecting a representative part of population for the sole purpose of determining characteristics and parameters of the effect of AI on human population. I devised an idea to sample the data I got from the survey by using Pearson's Coefficient with Linear and Logistic Regression Techniques using Python to my advantage.

First, let us review the use of data by humans from the beginning of time. We used to store data in written formats in the form of tablets, and then humans started making paper to do so. This process was tedious and required many people to process information from the provided data. It took a lot of time to process a large amount of data into information. Thus, the process of devising information from data was tedious and inefficient.

Then came the first of computers, which made large calculations on data easier. They did not have much storage and RAM but they were still efficient than humans. It still required a large space and a lot of people to store and operate on such huge machines and not everyone could use them. As technology advanced, these machines got smaller and in today's date, they can fit in our pockets. Now the age of internet was upon us and data became global. Huge chunks of data is now stored on servers and Data Centers or Data Marts in various databases. This made operating on data an easy approach and now one can operate on a very huge dataset using scripting languages.

Then came the age of Artificial Intelligence and Big Data. Now we can make machines that can learn from the big data provided by various social networking sites, behaviors of people, easy made surveys and many scientific techniques that help us to operate, classify and make clusters of data according to our needs. This data is then fed to a working models, neural networks, natural language processors and computer vision with the help of Data Science and Machine Learning techniques like Supervised Learning, Unsupervised Learning, Ensemble Techniques and Recommendation Systems to make decisions and this whole process is termed as Artificial Learning.

Provided all this knowledge and skill set we need to consider that Artificial Intelligence still make our lives easier and efficient but it also hinders the balance of Data Security and privacy of the user. User's private data should not be used or maybe used till some extent to get benefit of AI but the risk of emotional and creative intelligence not being a part of AI still hovers on our heads, well, you can call it a devil's halo of some sort, if seen from that perspective.

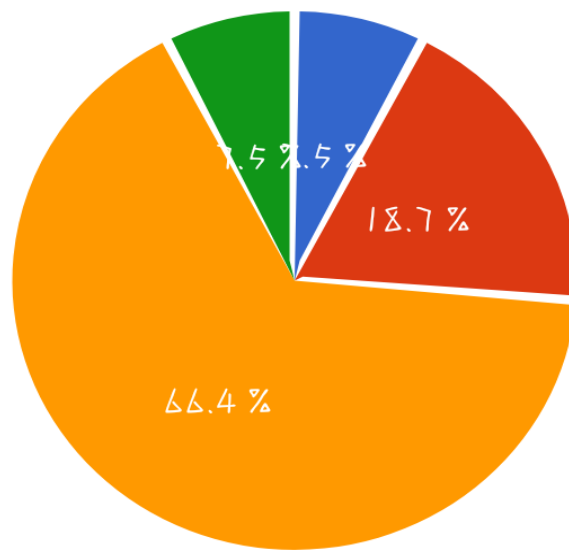
## **IV. Results and Discussion**

I have created a survey from various ethical sources, that is, our society to get a glimpse of what people think of AI and will its implementation be a boon or a bane for our society.

There is no common scale for the graphs shown below due to the vastness of this topic. I have marked the scales of each graph, within the graphical representation of data.

### **Do you think Data Science and Machine Learning are related?**

The graph below shows what people think about the relation of data science and machine learning. According to experts Data Science refers to statistics and ML refers to statistics is the correct option and this is the most chosen option accounting for 66.4% of the total users. This means that a large part of participating audience knows the correct and exact definition of the basics of AI and 18.7% audience have a good knowledge of the concepts or Data Science and Machine Learning. Rest of the audience can be considered inaccurate in these concepts and 7.5% each was either unsure or considered them one and the same thing.

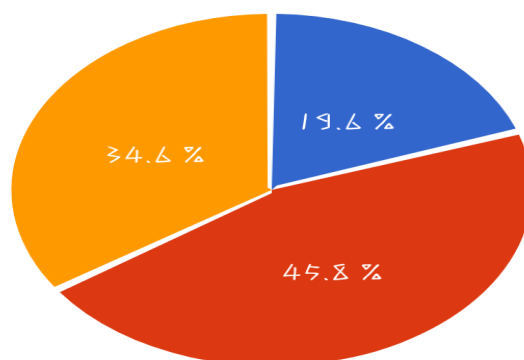


- Both are the same. [8]
- Both are closely related. [20]
- Data Science refer to statistics and ML refers to automation. [71]
- None of the above. [8]

Fig. 4 Graph showing audience poll on relation between Data Science and Machine Learning.

**Is peeking into user's private data should be considered ethical for the objective of making a General AI?**

We can see in the graph below that peeking into user's private data is considered unethical by 45.8% of the audience while 34.6% can understand the pace of technology and consider it ethical and deserving to share their private data for the ease of life provided by technological advancements. Only 19.6% agreed to share their data if possible to make a good AI system that can make lives easier and this percentage truly believe in the accuracy and security, but it may also be considered that they are unaware of the risks this will pose to them.

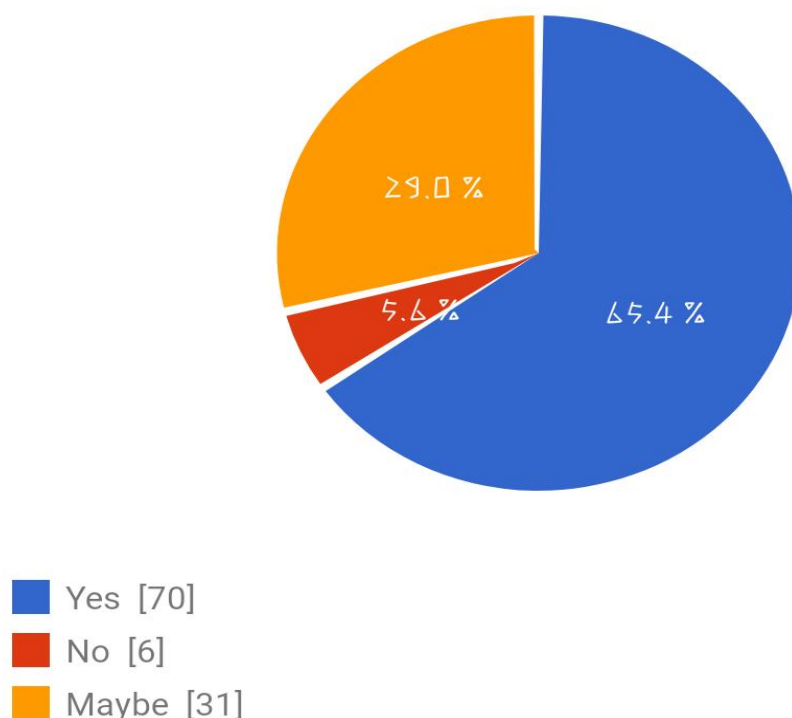


- Yes [21]
- No [49]
- Maybe [37]

Fig. 5 Graph showing audience poll on Data Privacy with respect to AI.

**Do you think that AI will improve future in various aspects of tech as (Healthcare, Finance, and Data Security?)**

As we can see in the graph provided on the next page that a lot of people (65.4%) are sure that AI will not pose a serious threat to our future and is likely to increase the efficiency of work and will tend to modernize our future. Still 29% of people are unsure about the impact of AI because they may think that AI can distort the balance between data privacy and data publicity. Rest of 5.6% are unsure about AI being part of our near future maybe because they don't trust technology as an advancing factor but a mere threat to human society



**Fig. 6** Graph showing audience poll on the impact of AI in future.

**What according to you is a better automation process:**

**(1) Model that takes O/P as input for the next observation.**

**(2) Model that takes statistical data from real world to find patterns in it and give specific O/P.**

This question contains check boxes and both of the boxes can be checked by the audience. We can see that a lot of people prefer first and second model and have checked both the boxes.

Still, a large number of people prefer a model that can take previous input as next output because it indulges real world data into its domain and is referred to as Supervised Learning technique in Machine Learning. This type of learning can be used in classification problems and categorization problems. It can also be used in Linear and Logistic Regression problems, Support Vector Machines and much more.

Little less users preferred the second model, which takes data specifically entered by the user and works under that domain. This helps keep things private and works as per user's needs. It also works on real world data but doesn't learn from past experiences. It is called unsupervised learning technique.

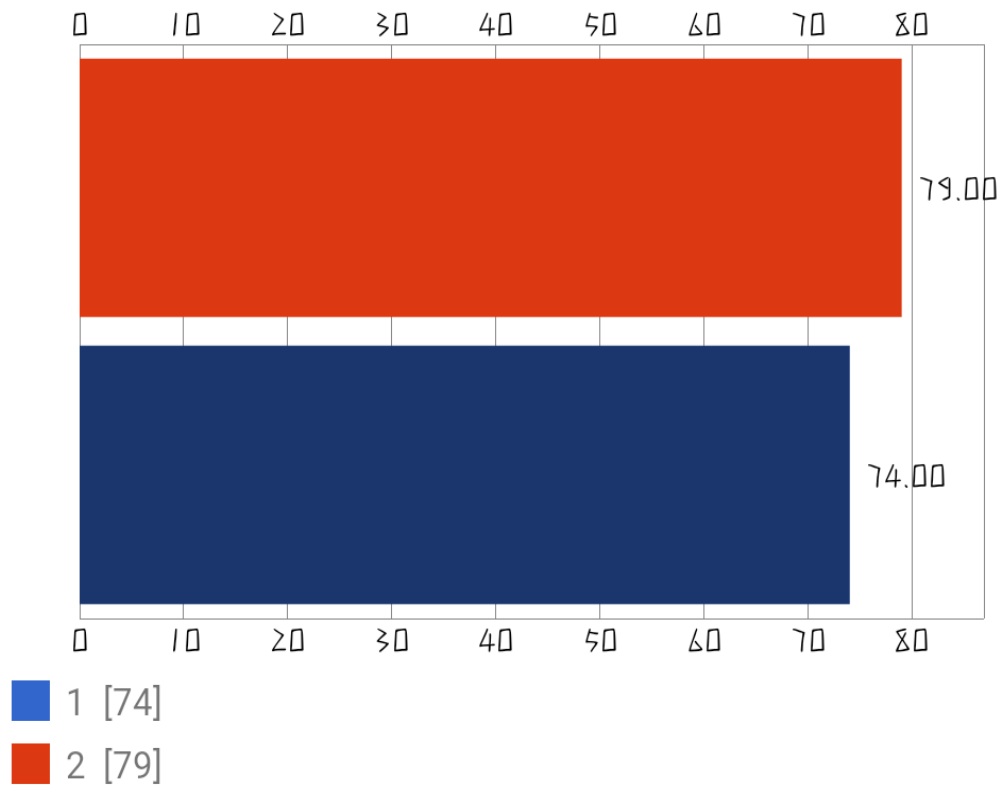


Fig. 7 Graph comparing supervised and unsupervised learning from user’s view.

**Do you think that real world data will match experimental data based on mathematical equations?**

In some cases real world data might match mathematical data which is based on various equations like :

Name	Implicit Equation
Straight Line	$ax + by + c = 0$
Circle	$x^2 + y^2 = r^2$
Parabola	$y - x^2 = 0$
Ellipse	$(x^2 / a^2) + (y^2 / b^2) = 1$
Hyperbola	$(x^2 / a^2) - (y^2 / b^2) = 1$

Table 1 Various forms of equations in a 2-D plane

58.9% people opted for an error by such means because these equations work on the principle of no distortion by external forces but in real world there might be some cases or external forces acting on a model which might give a different reading based on the graphical model.

11.2% people don’t trust mathematical models and are not sure about working of AI in rel world applications logically rest 29.2% strongly believe that AI can act as an accurate piece of tech and can enhance human lives positively.

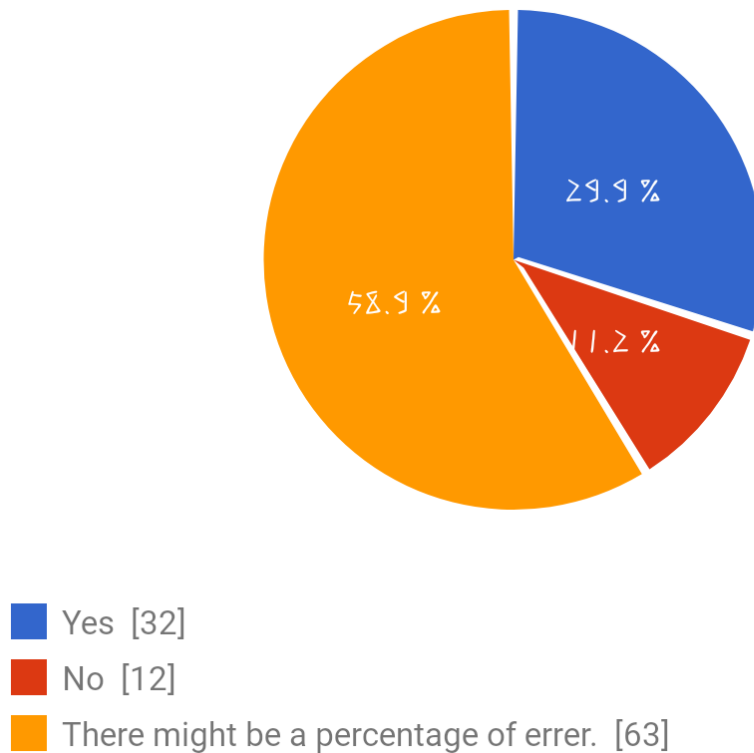


Fig. 8 Graph showing mathematical and real world data from audience's view.

**Keeping the positive (fast, reliable, accurate) and negative (emotionless and no creativity) aspects of AI in mind, which areas must use ML and AI to boost performances in their sectors.**

This is the second last question of my survey and it shows that most of the people think that AI can be used in military and can save lives. Military is still using AI in Satellite imagery and robotics to keep capsulitis to minimum but hostage situations can be a tricky aspect here. Then comes Astronomy, which uses AI efficiently and effectively and makes the most of it as it requires calculus of celestial bodies and finding their orbits based on gravitational fields of particular planets or asteroids. Then third in the descending order is healthcare, people are a little unsure about it as we can notice from the graph given below because AI may makes it accurate and easier for doctors but entrusting human lives to AI sounds a bit tricky.

Most of the people are unsure about using AI as Data Security, in Social Media and Finance because this includes playing with user's private and personal data and may impose a huge risk to user's privacy. Thus, we can conclude that AI can be used in every field to make it easier for humans but it will still pose a threat to human kind because it lacks emotions.



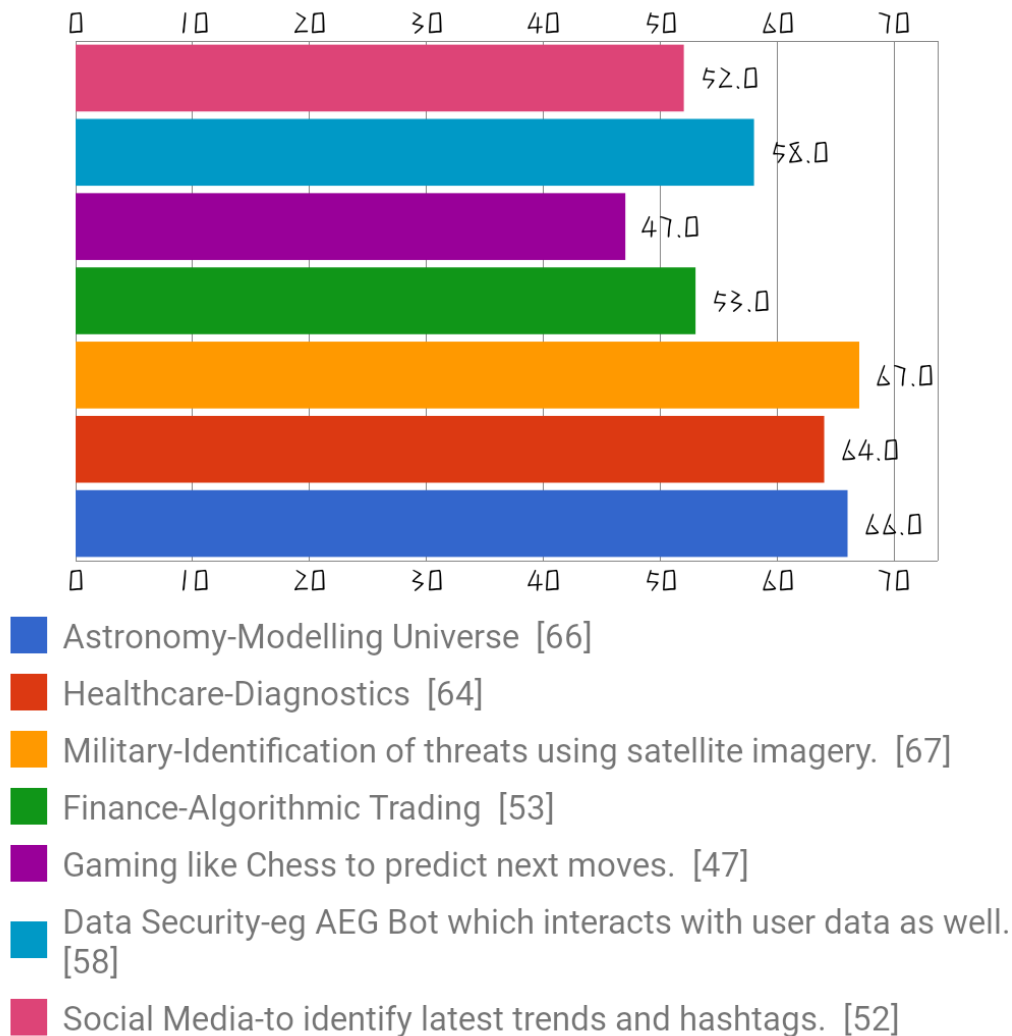


Fig. 9 Graph with user's viewpoint, showing impact of AI in different domains.



Fig. 10 Various applications of AI from visual perspective.

**Future Enhancements of Artificial Intelligence**

○ **Politics**

USA and China are the pinnacle of AI industry and will be using AI to get a political viewpoint of the world from different aspects.

○ **Jobs**

People may lose jobs due to the increasing trend of automation of the AI industry and unemployment might be a key effect of AI on human lives.

○ **Transparency**

AI will provide full transparency to the world and the flow of national economy, which might reduce corruption.

○ **AI Assistants**

Lots of AI assistants are developed but we might see enhancements and AI bots coming to life in near future to perform minor tasks such as sitting in ticket counters or vending machines etc.

○ **Businesses**

AI can turn the tide in business using algorithmic trading as a key weapon to increase business profits exponentially.

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