

AI for Everyone



A MEITY, NEGD & NASSCOM INITIATIVE



MINISTRY OF
ELECTRONICS &
INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA



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As Artificial Intelligence technologies are becoming more and more advanced, we are also reaching a critical juncture in human history. It is clear that the ones who will leverage these technologies, whether small businesses, large enterprises or even nation-states, will gain the upper hand in the coming decades, while the others may perish.

One way to address this challenge is to provide fundamental insight into these technologies and their capabilities today. INDIAai - The National AI Portal of India has created this booklet with this idea in mind. This booklet aims to inform and inspire the non-techies amongst us, especially children of all ages and adults. With the oversight of experts, we designed this booklet as a primary introduction to AI so that a person of any age and background can comprehend the basics.

Team INDIAai



Meena and Appu



Once upon a time there lived a little girl named Meena. She was very intelligent, kind and loved by everyone in her neighbourhood.

She was such a brilliant student that the biggest school in her town allowed her to study without fees.

But Meena wasn't rich like other children. Her father was ill for many years and it was her mother who worked many laborious jobs that kept the family going.

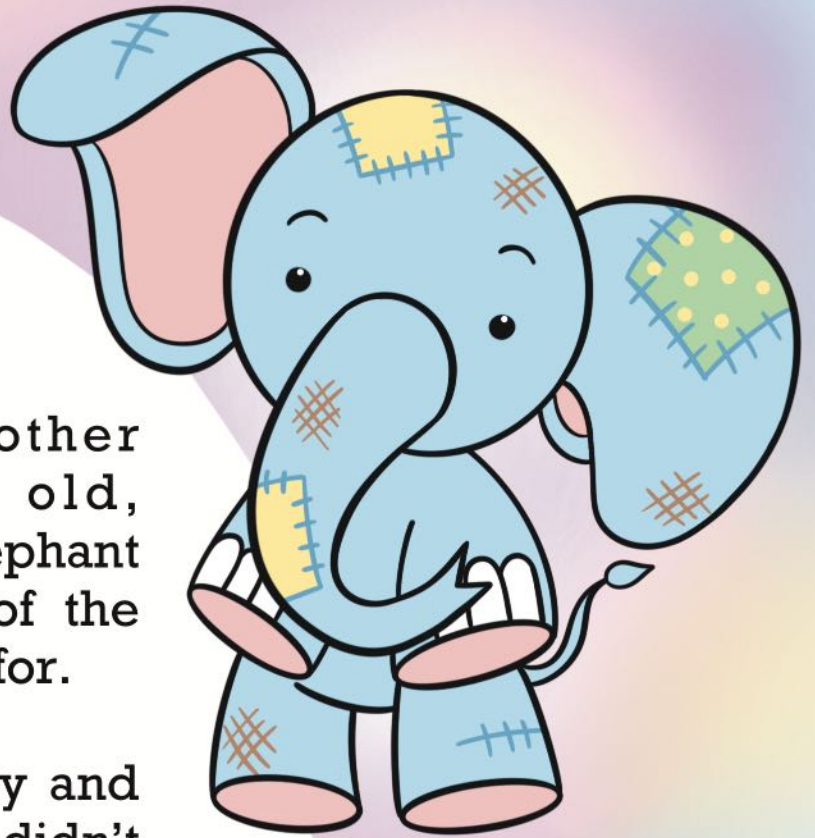


One day her mother brought her an old, thrown away toy elephant she found at one of the houses she worked for.

Meena loved the toy and named it Appu. It didn't matter to her that it was old and in bad shape.

She was so happy and took it to her school to show it to her friends. But the rich kids at her school laughed at her. They mocked her that she will never be able to get a new toy in her life.

Heartbroken, Meena cried all night.





However, seeing Meena's situation a Devi (fairy) appeared.

She asked Meena, "What happened?"

Meena tells the Devi that everyone mocked her because of her old toy and asked the fairy to help her fix it.

The Devi felt impressed by Meena, as she only asked for help to fix her doll and not anything new.

She touched the doll and blessed it. She told Meena that her toy now has a super power and it is up to Meena to make it special.





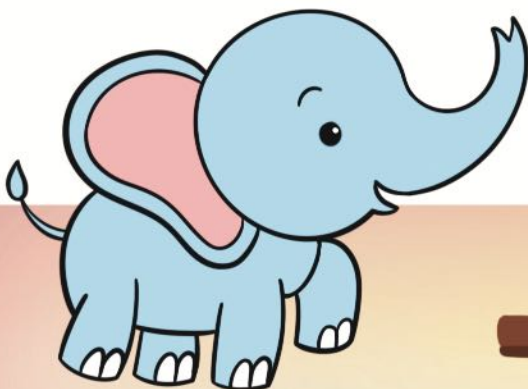
Days passed by and one day Meena started to hear Appu singing a famous TV ad. Meena was surprised. She wondered why it is only singing TV ads.

The smart and curious Meena soon found out that it was learning from everything it heard regularly.



Soon she showed Appu how to walk. It failed first. Appu kept falling down. So, Meena started to give Appu chocolates every time it took a few steps correctly.

When Appu didn't walk correctly, she gave him a little pinch on his ear. Soon after observing how other animals walked and also for the love for chocolates, Appu started walking.



Initially, Appu was so bad at walking around the house. Every time he walked, he bumped into Meena's cat and scared her.

To fix that Meena decided to train Appu on what a cat is. She showed Appu her cat and told him this is a cat and not to harm it. But Appu then started to scare other cats in the area.



Meena realised that she needed to teach Appu what an actual cat is.

She grabbed all the photos and pictures of cats and other animals she can from newspapers, magazines and posters. She made two piles of all the pictures. One with the cats and the other without cats. And she started teaching Appu with each picture saying which is a cat and which is not a cat. Soon Appu learned all about cats.

One day Meena had an idea. She wanted to teach Appu Hindi, as Appu had learnt English from TV and YouTube.

Meena collected copies of all her favorite books in English and then the same copies in Hindi. She then started to read both of them page by page. Soon Appu began to understand and speak Hindi.



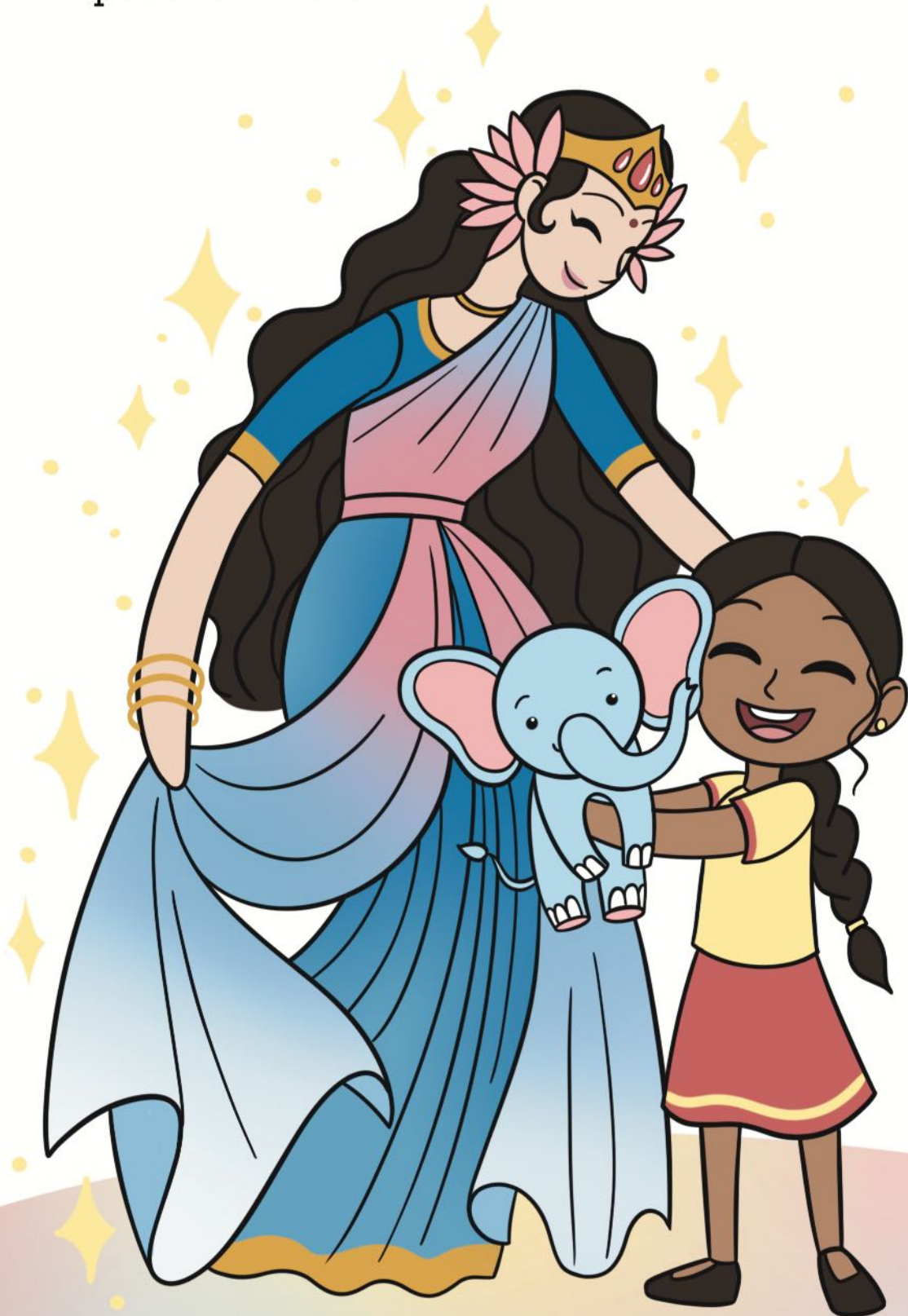
Very soon Appu became Meena's best friend.

Appu's magical abilities made the kids who once mocked her feel bad for their actions. They apologized to Meena and admired her as Appu learned many new things every day.



After a few days the Devi arrived to check on Meena.

Meena thanked her for making her toy magical. But the Devi told Meena that it was all her smart work that made the magic, and all the Devi did was give the toy the power of AI to learn.



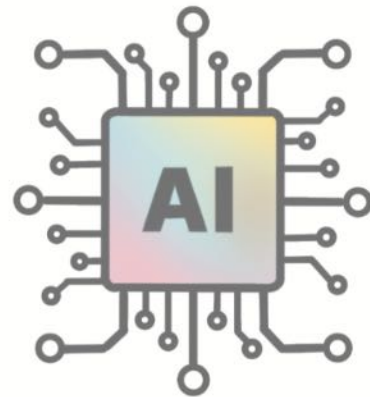
AI Concepts and Definitions

Appu's superpower in the story is called Machine Learning, where a machine can perform many human abilities with algorithms and data. We are still far from creating toys like Appu, which can perform many cognitive skills. But today, we have tools and technology that can perform one function well. It could be recognising cats, translating text, or enabling cars to drive themselves. We call them Narrow AI.

Soon we will be able to create AI as intelligent as us humans, called Artificial General Intelligence or AGI. And someday, we may even develop machines many times smarter than us, called Artificial Super Intelligence.

What is AI?

AI is the ability of a computer or machine to do things or make decisions just like a person, just like what Meena's Appu did. AI makers want to create systems similar to us that can do things creatively, answer logically and learn new things.



What is algorithm and data?

An algorithm is a set of guidelines that describes how to perform a task. Think of it like a recipe. Data is a collection of information gathered by observation, questioning or measurement.

There are many streams of AI today and the most prevalent one called is Machine Learning

What is machine learning?

Machine learning (ML) is a part of AI. Its main idea is that computer systems can learn from the data they get from doing tasks and having experiences in the past. Remember how Meena taught Appu to walk and recognise cats? That is Machine Learning, the cat and animal pictures and the books she used to train Appu are data sets.

Data sets can be any collection of information, such as a large number of cat pictures.

- There are three kinds of machine learning: supervised, unsupervised, and reinforcement.

Supervised Learning is when an AI system can predict based on the data it already has. Appu learned about cats through supervised learning

Unsupervised Learning is when an AI system does something unexpected. For example, it finds patterns in data.

Reinforcement Learning is a part of AI in which a machine learns something in a way that is similar to how people learn. Take the machine as an example. Let's say it's a student. In this situation, the hypothetical student learns from their mistakes over time. Appu learned to walk through reinforcement learning and robotics.

- **Deep Learning** is a type of machine learning where the system uses a network similar to human brain called “neural networks” to process data and make predictions.

Natural language processing (NLP)

Natural language processing (NLP) is a branch of computer science that tries to make computers read and listen to natural languages and understand them. NLP by AI platforms lets people have conversations, like messaging apps and chatbots. Meena used NLP to teach Appu Hindi.

Robotics

Robotics is the study of making machines look and act like people. Now, robots can sometimes behave like people, but can they also think like people? Artificial intelligence comes into play here! AI makes it possible for robots to act smartly in certain situations.

Computer Vision

Computer Vision is the ability through which computers or systems understand things from digital images or videos. It is almost like making machines see the world like we do.

How can you learn to make Artificial Intelligence systems?

Here are the things you need to know to learn about artificial intelligence:

Maths: You need to know maths and have good skills before you start. Maths has helped Artificial Intelligence engineers do their best work and use their skills to the fullest extent. Understanding things like linear algebra, probability, multivariate calculus, vectors, and analytical geometry are important.



Statistics: Statistics is an essential part of getting useful information from data, spotting trends, and understanding how well a model works. So it is important to have a basic understanding of statistics.



Programming language basics: You will need to know the basics of a programming language. Python or R programming are good choices, but that's not a requirement. But it is essential because most classes build on what you already know.



Analytical Skills: Problem-solving skills are analytical skills. They are traits and qualities that let you think logically and rationally about problems and find the best way to solve them.

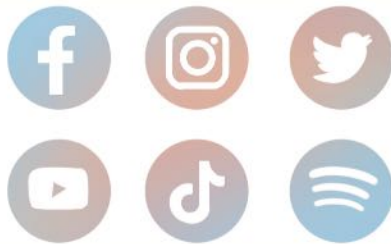


Remember, to use AI in any other jobs, you don't need to create AI systems.

How AI is used today

So, we now know what AI is but what are some of the common uses of AI today?

Travel and Navigation : You might have used maps on phones to guide you to your destination at some point in your life. AI helps you to find faster routes and predict the time needed based on traffic.



Social Media Feeds : Whatever you see in social media, YouTube, and music apps are influenced by AI. These systems learn based on what are the things you like and watch more and shows you more of the similar things.

Security and Surveillance : You might have seen cameras kept in public places or even in someone's homes to ensure protection. Some of these cameras in big cities function with the help of AI by using technologies such as facial recognition and object and location recognition. AI helps to monitor the videos from various cameras kept in public places to find criminals to ensure safety of the people.



Voice Assistants : Voice assistants in our phones like Siri, Alexa, and Google Assistants are some of the common examples of AI. They use NLP to communicate with us.

Healthcare : With the help of AI, it has become easier to diagnose diseases such as cataract and cancers. Early diagnosis of diseases saves lives. AI is also helping us with diagnosis in places where there are a very few hospitals and doctors.



How AI is helping our country

AI in Defense : India, uses AI in defense, developing drones, unmanned vehicles and other weapons. The use of AI in defense is strengthening the defense sector in India as a whole.



Road Safety : India's Road and Transport ministry has been using AI to control road accidents. They were placing cameras and other surveillance means based on AI for monitoring any negligence that causes accidents and other security concerns roads.



Education : India uses AI to maximize student achievements and improve the productivity of teachers. For example, adaptive-learning technology could base recommended content for students on past success and engagement with the material.



Crisis Response : Using AI for crisis response enables fighting specific crisis-related challenges, such as responses to natural and human-made disasters, in search and rescue missions and the outbreak of diseases. For instance, using AI on satellite data to map and predict the progression of wildfires and thereby optimize the response of firefighters.



Security and Justice : Using AI for security and justice involves challenges in society, such as preventing crime and other physical dangers, tracking criminals, mitigating bias in the police force, etc.



Space Research : From deploying Chandrayaan to other space research initiatives, there is a presence of AI in the activities of ISRO. For example, there are AI-enabled monitoring systems for forest conservation, geospatial technology-based services, multi-tracking radars etc., developed by ISRO with the help of AI.



Sustainable Development : The UN Sustainable Development Goals (SDG) are among the best known and most frequently cited societal challenges. Governments worldwide have been using AI meet many of the SDGs.



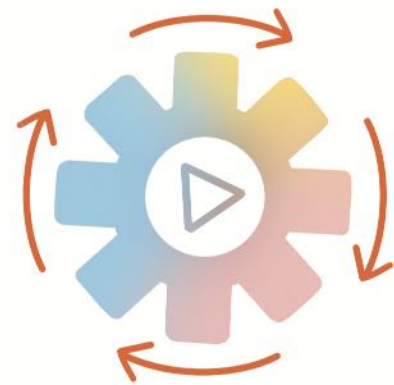
How AI will impact the future

Take a look at our favorite devices like our phones, laptops, and personal computers. Today many of them unlocks by recognizing your fingerprint or face, right? It uses face filters to detect and identify the owner of the device and then it allows us to use our device. We all use these technologies, but we were not aware that this AI technology is called the “facial recognition technique.” So, AI is everywhere around us and we have to know about them.

There are multiple other ways in which AI will have a huge impact, and these include:

Automation

Imagine a machine in a factory that manufactures cars in the same way over and over again. AI has the capability to learn from the things which it sees and it can perform the task very fast. Many tasks such as packing goods, data entry, and machine maintenance required people to do it in a similar manner. Now, companies are using AI to do these repetitive tasks and free people to do other productive tasks for better business growth.



Self-driving cars

In the movie “Tarzan: The Wonder Car” - people watched how a car can run without a driver. And now with the help of AI, there are cars that do not need any human to drive. The vehicle with the help of AI will understand what is going on around it and based on this information, it can move safely on the roads. Take, for example, in February 2022, Cruise started offering driver-less taxi rides to the general public, in San Francisco in the US.



AI improves social media

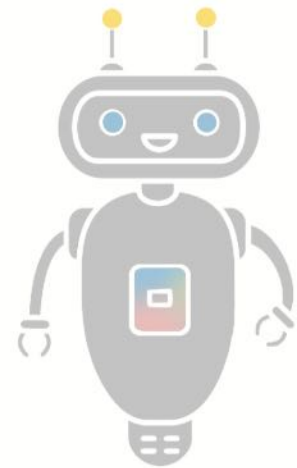
The use of Facebook, Instagram, Snapchat, Koo and WhatsApp is increasing. People automatically get updates on new videos, show different posts and recommend connecting with people. All these things happen due to AI technology as it understands whatever you have seen in the past, learns from them and then gives suggestions to help users.



Robots for help

In the classroom, a single teacher is not able to look after each child. In future, we will have robots that will talk like us, move, listen, and connect with students to help them solve their problems. Robots will cook food for you, clean your homes, water your plants, and can even play songs to dance to at home.

The elderly people don't need to visit a doctor, in future, for a check-up with a basic stethoscope, we'll have smart robots for this. They will communicate with patients, assess their conditions, and determine whether additional appointments are necessary.



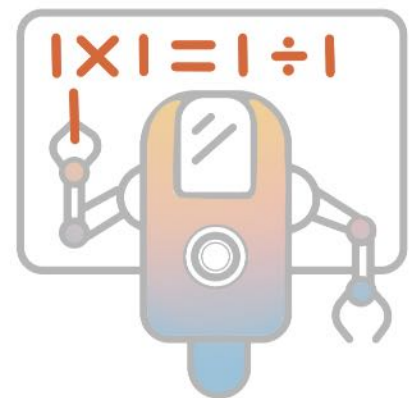
AI makes travelling easier

While travelling in cars or cabs, we use GPS technology. The AI-based technology helps in finding the shortest route, it informs us about the traffic on the road and asks us to avoid the route while it finds another route to reach our destination. Cab service providers such as Uber and Ola use this technology and it will further improve. So, in future, we will save a lot of time and fuel while travelling in our cars with the help of AI.



AI is a good teacher

AI can fix the guardian meeting, take attendance, check copies and find mistakes for each and every child in the class. All these works will be done by AI, so teachers will be free to teach students, and take help from AI to understand which student is weak in which area. This will help teachers to improve the performance of students. Also, AI can make good interacting videos with animations to make chapters easy for students.



We hope that now you all have gained a fair idea about what AI is and what it can do.

Now it's time for you to stop waiting and start making small but regular efforts to learn AI skills.

Kickstart your AI journey for a better India.

Learn more about AI at INDIAai
<https://indiaai.gov.in/>



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