SmallSEOTools

# PLAGIARISM SCAN REPORT

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## A brief history of space exploration
Human beings have always been curious of what exists beyond Earth. Though many famous mathematicians, astronomers and scientists like- Galileo Galilei, Edmond Halley, Christiaan Huygens , Albert Einstein and many more, had already contributed in providing theories about the unexplored space (which are still unchallenged), it was only in 1957 when the satellite Sputnik, developed by the Soviet Union, was launched and successfully placed in the Earth's orbit. Thus began the space race. Since then, many satellites and space probes have been launched for data collection and space exploration. Today, nearly 3000 satellites are orbiting the Earth.
## Evolution of technology
Beginning in the mid-1960s , the US defence agency designed and built a network of computers, known as ARPANET, after which researchers began to assemble the network of
networks that form the modern Internet. With the evolution of computers and AI in particular, it is very much possible today to not only use satellites for large data
collection, but also to send rovers to planets, and launch space probes to explore farther into outer space.
## Present technology for communication in space
At present, radio telescopes (used to receive data) feature specialized antenna and radio receivers, which are employed to detect information transmitted as radio waves, by satellites placed on the Earth's orbit by robotic spacecrafts (space probes). In radio communication systems, data is relayed across space using radio waves. At the sending end, the information to be sent is converted by transducers to a time varying electrical signal called the modulation signal.
One of the foremost notable developments came in 1946 with the introduction of the technique called astronomical interferometry, which suggests combining the signals from multiple antennas so as to simulate a larger antenna, in order to achieve higher resolution.
There are DSN (Deep Space Network) locations setup by space organizations like NASA. These sites are almost evenly spaced around the planet, so that we never lose sight of a spacecraft even when the Earth turns.

## How does a Space Telescope receive images?
Space probes are generally designed to capture and transmit images as data. Cameras on many telescopes and space probes use charge-coupled device (CCD), which collects the light that is emitted by or reflected off objects. The CCD is a thin wafer of silicon, divided into hundreds of thousands of tiny light-sensitive squares. Each square corresponds to a pixel in the final image, and more pixels contribute to a more detailed image. The light sensitive squares on the CCD that line up with bright objects in the field of view will collect more photons, making those pixels appear brighter in the resulting image. This brightness is measured in greyscale, ranging from 0 (black) to 255 (white). Thus the recorded image in the telescope is black and white. To measure color, different filters can be placed in the light path of the telescope, where each filter is designed such that it allows only certain wavelengths (colors) of light to pass. Multiple images of the same object are captured by using a variety of filters, after which the images are combined by scientists to make a comprehensive colored picture.
Some of the notable exploration missions include The Voyager Program by NASA, in which two robotic interstellar probes, Voyager 1 and Voyager 2 were launched in 1977 to explore the distant planets in our solar system. As of 2021, the two Voyagers continue to be in operation, gathering and transmitting useful data to Earth.

## AI and ML in space exploration

With the growth of AI and the emerging need of automated systems, AI and ML have become an integral part of the engineering and research wing of space organizations around the world. Some of the recent projects by ISRO have made massive use of AI technologies.

In 2019, ISRO launched Chandrayaan 2 spacecraft into the Earth's orbit as part of the second lunar mission, using Geosynchronous Satellite Launch Vehicle Mark-III (GSLV Mk - III) as the launch vehicle to carry the spacecraft. The spacecraft comprised of the Orbiter, the Lander - Vikram and the Rover - Pragyan. Pragyan is a six-wheeled robotic automibile, and is able to conduct in-situ payload experiments. It's powered by AI tools and frameworks, uses solar power for its functioning, and can communicate only with the Lander.

The ISRO's Mars Orbiter Mission (MOM), also known as Mangalyaan, launched in 2013, and has extensively used automation that has allowed the spacecraft to revive contact with the Earth's receiver even when communication blackouts occurred lasting a few minutes have occured .

## Future of AI in space technology

Even though the future of AI itself cannot be commented upon, it can be observed how AI has been extensively used in recent years, be it in improving navigation systems, global communication or simplifying exchange and processing of data. Though it is estimated that only about 4% of visible universe has been explored so far, nevertheless, with emergence of new technologies and ongoing efforts, researchers are expecting to understand the silence of space someday.

| Sources | Similarity |
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| Department of Space / ISRO - India AI<br><br>... launch vehicle, which carried the spacecraft, comprised of the Orbiter, the Lander Vikram and the Rover Pragyan. The Pragyan Rover was placed strategically ...<br><br>https://indiaai.gov.in/government/department-of-space-isro | 4% |