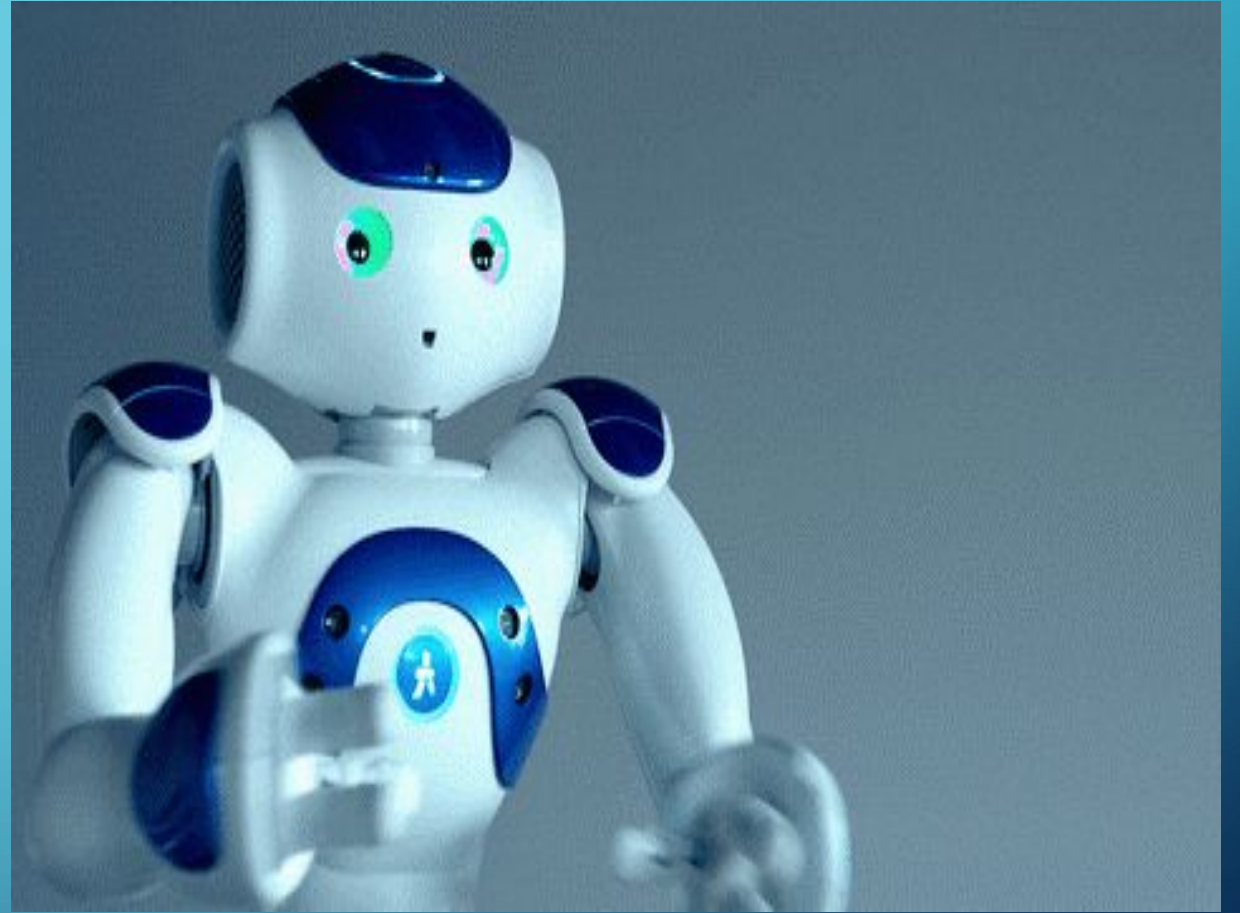


ROBOTICS



Prof. Poonam Zala,
Asst. Professor,
Computer Department
Umiya Arts and Commerce College.

Welcome

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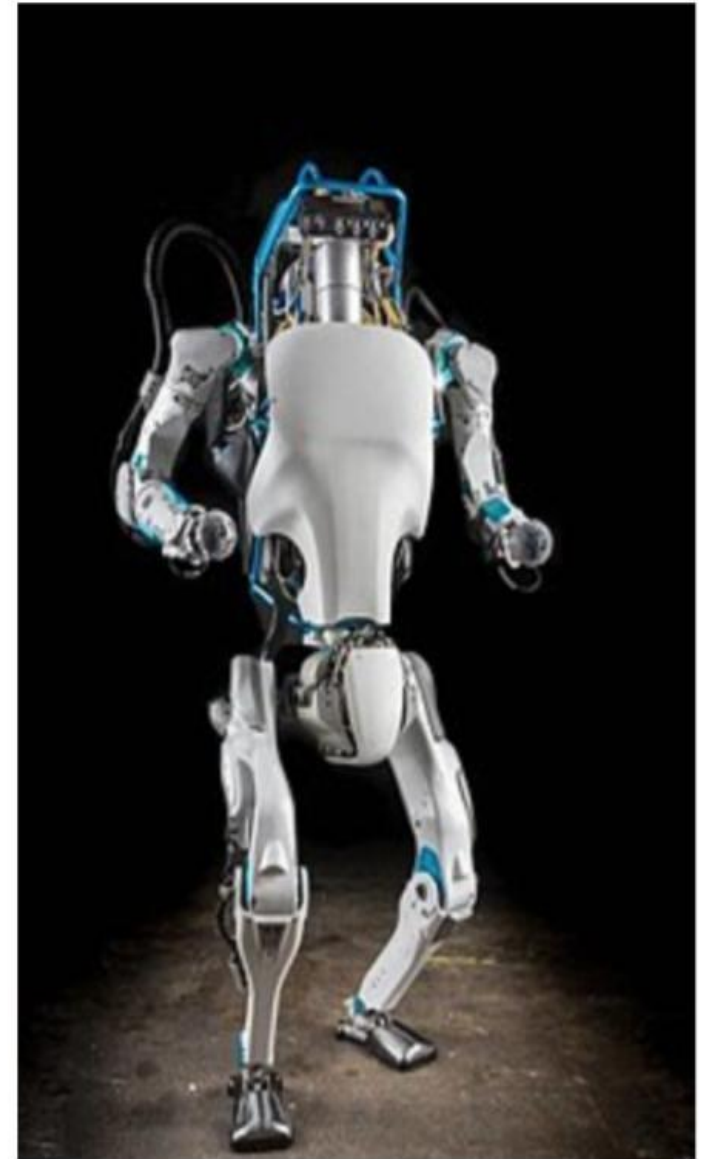
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INTRODUCTION:

A ROBOT IS A MACHINE- ESPECIALLY ONE PROGRAMMABLE BY A COMPUTER CAPABLE OF CARRYING OUT A COMPLEX SERIES OF ACTIONS AUTOMATICALLY. ROBOTS CAN BE GUIDED BY AN EXTERNAL CONTROL DEVICE OR THE CONTROL MAY BE EMBEDDED WITHIN. ROBOTS MAY BE CONSTRUCTED ON THE LINES OF HUMAN FORM, BUT MOST ROBOTS ARE MACHINES DESIGNED TO PERFORM A TASK WITH NO REGARD TO THEIR AESTHETICS.

ROBOTS CAN BE AUTONOMOUS OR SEMI-AUTONOMOUS AND RANGE FROM HUMANOIDS SUCH AS HONDA'S ADVANCED STEP IN INNOVATIVE MOBILITY(ASIMO) AND TOSY'S TOSY PING PONG PLAYING ROBOT (TOPIO) TO INDUSTRIAL ROBOTS, MEDICAL OPERATING ROBOTS, PATIENT ASSIST ROBOTS, DOG THERAPY ROBOTS, COLLECTIVELY PROGRAMMED SWARM ROBOTS. BY MIMICKING A LIFELIKE APPEARANCE OR AUTOMATING MOVEMENTS, A ROBOT MAY CONVEY A SENSE OF INTELLIGENCE OR THOUGHT OF ITS OWN. AUTONOMOUS THINGS ARE EXPECTED TO PROLIFERATE IN COMING DECADE, WITH HOME ROBOTICS AND THE AUTONOMOUS CAR AS SOME OF THE MAIN DRIVERS.



Atlas (2016), a bipedal humanoid robot

HISTORY

EARLY BEGINNING:

MANY ANCIENT MYTHOLOGIES, AND MOST MODERN RELIGIONS INCLUDE ARTIFICIAL PEOPLE, SUCH AS THE MECHANICAL SERVANTS BUILT BY THE GREEK GOD HEPHAESTUS, THE CLAY GOLEMS OF JEWISH LEGEND AND CLAY GIANTS OF NORSE LEGEND, AND GALATEA THE MYTHICAL STATUE OF PYGMALION THAT CAME TO LIFE. SINCE CIRCA 400 BC, MYTHS OF CRETE INCLUDE TALOS, A MAN OF BRONZE WHO GUARDED THE ISLAND FROM PIRATES.

IN ANCIENT GREECE, THE GREEK ENGINEER CTESIBIUS "APPLIED A KNOWLEDGE OF PNEUMATICS AND HYDRAULICS TO PRODUCE THE FIRST ORGAN AND WATER CLOCKS WITH MOVING FIGURES. IN THE 4TH CENTURY BC, THE GREEK MATHEMATICIAN ARCHYTAS OF TARENTUM POSTULATED A MECHANICAL STEAMOPERATED BIRD HE CALLED "THE PIGEON". HERO OF ALEXANDRIA, A GREEK MATHEMATICIAN AND INVENTOR, CREATED NUMEROUS USER-CONFIGURABLE AUTOMATED DEVICES, AND DESCRIBED, AND DESCRIBED MACHINES POWERED BY AIR PRESSURE, STEAM AND WATER.

THE 11TH CENTURY LOKAPANNATTI TELLS OF HOW THE BUDDHA'S RELICS WERE PROTECTED BY MECHANICAL ROBOTS, FROM THE KINGDOM OF ROMEVISAYS; UNTIL THEY WERE DISARMED BY KING ASHOKA.



Al-Jazari – A Musical Toy

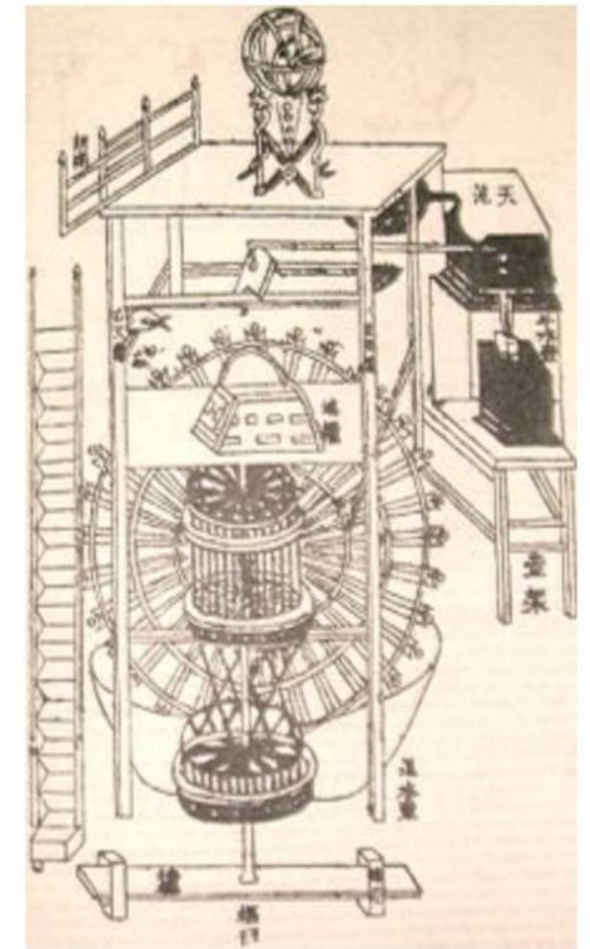
SAMARANGANA SUTRADHARA, A SANSKRIT TREATISE BY BHOJA(11TH CENTURY), INCLUDE A CHAPTER ABOUT THE CONSTRUCTION OF MECHANICAL CONTRIVANCES(AUTOMATA), INCLUDING MECHANICAL BEES AND BIRDS, FOUNTAINS SHAPED LIKE HUMAN AND ANIMAL, AND MALE AND FEMALE DOLLS THAT REFILLED OIL LAMPS, DANCED, PLAYED INSTRUMENTS, AND RE-ENACTED SCENES FROM HINDU MYTHOLOGY.

IN RENAISSANCE ITALY, LEONARDO DA VINCI(1452-1519) SKETCHED PLAN FOR A HUMANOID ROBOT AROUND 1495. DA VINCI'S NOTEBOOKS, REDISCOVERED IN THE 1950S, CONTAINED DETAILED DRAWING OF A MECHANICAL KNIGHT NOW KNOWN AS LEONARDO'S ROBOT, ABLE TO SIT UP, WAVE ITS ARMS AND MOVE ITS HEAD AND JAW. THE DESIGN WAS PROBABLY BASED ON ANATOMICAL RESEARCH RECORDED IN HIS VITRUVIAN MAN. IT IS NOT KNOWN WHETHER HE ATTEMPTED TO BUILD IT. ACCORDING TO ENCYCLOPEDIA BRITANNICA, LEONARDO DA VINCI MAY HAVE BEEN INFLUENCED BY THE CLASSICAL AUTOMATA OF AL-JAZARI.

ORIGIN OF THE TERM 'ROBOT'

'ROBOT' WAS FIRST APPLIED AS A TERM FOR ARTIFICIAL AUTOMATA IN THE 1920 PLAY R.U.R. BY THE CZECH WRITER, KAREL CAPEK. HOWEVER, JOSEF CAPEK WAS NAMED BY HIS BROTHER KAREL AS THE TRUE INVENTOR OF THE TERM ROBOT. THE WORD 'ROBOT' ITSELF WAS NOT NEW, HAVING BEEN IN THE SLAVIC LANGUAGE AS ROBOT , A TERM WHICH CLASSIFIED THOSE PEASANTS OBLIGATED TO COMPULSORY SERVICE UNDER THE FEUDAL SYSTEM.

ENGLISH PRONUNCIATION OF THE WORD HAS EVOLVED RELATIVELY QUICKLY SINCE ITS INTRODUCTION. IN THE U.S. DURING THE LATE '30S TO EARLY'40S THE SECOND WAS PRONOUNCED WITH A LONG "O" LIKE "ROWBOAT".



Su Song's astronomical clock tower showing the mechanical figurines which chimed the hours.

EARLY ROBOT

IN 1928, ONE OF THE FIRST HUMANOID ROBOT, ERIC, WAS EXHIBITED AT THE ANNUAL EXHIBITION OF THE MODEL ENGINEERS SOCIETY IN LONDON, WHERE IT DELIVERED A SPEECH. INVENTED BY W.H. RICHARDSIN, THE ROBOT'S FRAME CONSISTED OF AN ALUMINIUM BODY OF ARMOUR WITH ELEVEN ELECTROMAGNETS AND ONE MOTOR POWERED BY A TWELVE-VOLT POWER SOURCE. THE ROBOT COULD MOVE ITS HANDS AND HEAD AND COULD BE CONTROLLED THROUGH REMOTE CONTROL OR VOICE CONTROL.

WESTINGHOUSE ELECTRIC CORPORATION BUILT TELEVOX IN 1926; IT WAS A CARDBOARD CUTOUT CONNECTED TO VARIOUS DEVICES WHICH USERS COULD TURN ON OFF.IN 1939, THE HUMANOID ROBOT KNOWN AS ELEKTRO WAS DEBUTED AT 1939 NEW YORK WORLD'S FAIR . IN 1928,JAPAN,S FIRST ROBOT , GAKUTENSOKU ,WAS DESIGNED AND CONSTRUCTED BY BIOLOGIST MAKOTO TO NISHIMURA.



W. H. Richards with "George",
1932

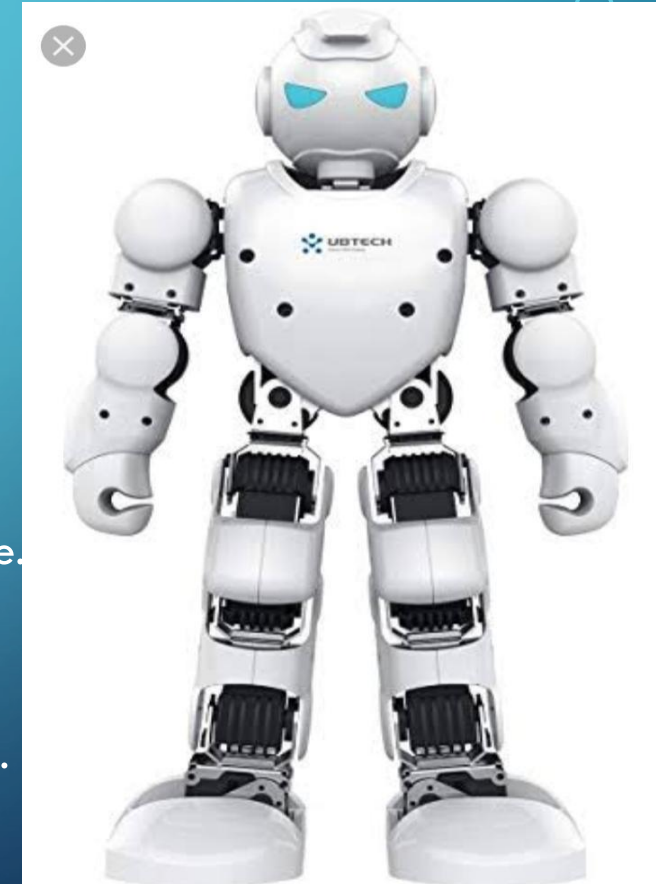
PROS AND CONS

- Pros:

1. Relieves strenuous work.
2. Makes up for low staffing.
3. Social Robot offer simulated companionship.
4. Equipment can easily be fixed or replaced when broken.
5. Helpful for elder people serves as companions.
6. Making life increasingly effortless for families
7. Faster and more accurate

- Cons:

1. Loss of human contact
2. Higher risk of confusion for residents with Dementia
3. Replaced good jobs in the field.
4. Technology and repairs are Expensive.
5. Dangerous leaving them alone.
6. Might not react well with other robots.
7. Might scare people or pets around you.



FUTURE DEVELOPMENT AND TRENDS

VARIOUS TECHNIQUES HAVE EMERGED TO DEVELOP THE SCIENCE OF ROBOTICS AND ROBOTS. ONE METHOD IS EVOLUTIONARY ROBOTICS, IN WHICH A NUMBER OF DIFFERING ROBOTS ARE SUBMITTED TO TESTS. THOSE WHICH PERFORM BEST ARE USED AS A MODEL TO CREATE A SUBSEQUENT "GENERATION" OF ROBOTS. ANOTHER METHOD IS DEVELOPMENT ROBOTICS, WHICH TRACKS CHANGE AND DEVELOPMENT WITHIN A SINGLE ROBOTICS, WHICH TRACKS CHANGE AND DEVELOPMENT WITHIN A SINGLE ROBOT IN THE AREAS OF PROBLEM-SOLVING AND OTHER FUNCTION. ANOTHER NEW TYPES OF ROBOT IS JUST RECENTLY INTRODUCED WHICH ACTS BOTH AS A SMARTPHONE AND ROBOT AND IS NAMED ROBOHON.

MANY FUTURE APPLICATION OF ROBOTICS SEEM OBVIOUS TO PEOPLE, EVEN THOUGH THEY ARE WELL BEYOND THE CAPABILITIES OF ROBOTS AVAILABLE AT THE TIME OF THE PREDICTION. AS EARLY AS 1928 PEOPLE WERE CONFIDENT THAT SOMEDAY ROBOT WOULD:

1. CLEAN PARTS BY REMOVING MOLDING FLASH.
2. SPRAY PAINT AUTOMOBILES WITH ABSOLUTELY NO HUMAN PRESENS
3. COOK FAST FOOD AND WORK IN OTHER SERVICE INDUSTRIES.
4. MAKE ELECTRIC CABLE HARNESS.
5. SHEAR SHEEP.



TYPES OF ROBOT

1. MOBILE ROBOT:

MOBILE ROBOT HAVE THE CAPABILITY TO MOVE AROUND IN THEIR ENVIRONMENT AND ARE NOT FIXED TO ONE PHYSICAL LOCATION. AN EXAMPLE OF A MOBILE ROBOT THAT IS IN COMMON USE TODAY IS THE AUTOMATED GUIDED VEHICLE OR AUTOMATIC GUIDED VEHICLE. AN AGV IS A MOBILE ROBOT THAT FOLLOWS MARKERS OR WIRES IN THE FLOOR, OR USES VISION OR LASERS. AGVS ARE DISCUSSED LATER IN THIS ARTICLE. MOBILE ROBOTS ARE USUALLY USED IN TIGHTLY CONTROLLED ENVIRONMENTS SUCH AS ON ASSEMBLY LINES BECAUSE THEY HAVE DIFFICULTY RESPONDING TO UNEXPECTED INTERFERENCE. ROBOTS CAN ALSO BE FOUND IN MILITARY APPLICATIONS.

2. INDUSTRIAL ROBOTS:

INDUSTRIAL ROBOT USUALLY CONSIST OF A JOINED ARM AND AN END EFFECTOR THAT IS ATTACHED TO A FIXED SURFACE. ONE OF THE MOST COMMON TYPE OF END EFFECTOR IS A GRIPPER ASSEMBLY.

“AN AUTOMATICALLY CONTROLLED, REPROGRAMMABLE, MULTIPLE, MANIPULATOR PROGRAMMABLE IN THREE OR MORE AXES, WHICH MAY BE EITHER FIXED IN PLACE OR MOBILE FOR USE IN INDUSTRIAL AUTOMATION APPLICATION.”



A pick and place robot in a factory

3. SERVICE ROBOT

MOST COMMONLY INDUSTRIAL ROBOT ARE FIXED ROBOTIC ARMS AND MANIPULATORS USED PRIMARILY FOR PRODUCTION AND DISTRIBUTION OF GOODS. THE TERM "SERVICE ROBOT" IS LESS WELL-DEFINED. THE INTERNATIONAL FEDERATION OF ROBOTICS HAS PROPOSED A TENTATIVE DEFINITION, "A SERVICE ROBOT IS A ROBOT WHICH OPERATES SEMI-FULLY AUTONOMOUSLY TO PERFORM SERVICE USEFUL TO THE WELL-BEING OF HUMAN AND EQUIPMENT, EXCLUDING MANUFACTURING OPERATION. "

4. EDUCATIONAL ROBOTS

ROBOTS ARE USED AS EDUCATIONAL ASSISTANTS TO TEACHERS. FROM THE 1980S, ROBOTS SUCH AS TURTLES WERE IN SCHOOLS AND PROGRAMMED USING THE LOGO LANGUAGE. THERE ARE ROBOTS KITS LIKE LEGO MINDSTORMS, BIOLOID, OLLO FROM ROBOTICS, OR BOTBRAIN. EDUCATIONAL ROBOTS CAN HELP CHILDREN TO LEARN ABOUT MATHEMATICS, PHYSICS, PROGRAMMING, AND ELECTRONICS. THERE HAVE ALSO BEEN ROBOTS SUCH AS THE TEACHING COMPUTER, LEACHIM.



5. MODULAR ROBOT

MODULAR ROBOTS ARE A NEW BREED OF ROBOTS THAT ARE DESIGNED TO INCREASE THE UTILIZATION OF ROBOTS BY MODULARIZING THEIR ARCHITECTURE. THE FUNCTIONALITY AND EFFECTIVENESS OF A MODULAR ROBOT IS EASIER TO INCREASE COMPARED TO CONVENTION ROBOTS. MODULAR ROBOTICS TECHNOLOGY IS CURRENTLY BEING APPLIED IN HYBRID TRANSPORTATION, INDUSTRIAL AUTOMATION, DUCT CLEANING AND HANDLING.

6. MILITARY ROBOT

SOME EXPERTS AND ACADEMICS HAVE QUESTIONED THE USE OF ROBOTS FOR MILITARY COMBAT, ESPECIALLY WHEN SUCH ROBOTS ARE GIVEN SOME DEGREE OF AUTONOMOUS FUNCTION. ONE RESEARCHER STATES THAT AUTONOMOUS ROBOT MIGHT BE MORE HUMAN, AS THEY COULD MAKE DECISION MORE EFFECTIVELY.



A U.S. Marine Corps technician prepares to use a telerobot to detonate a buried improvised explosive device near Camp Fallujah, Iraq.

ROBOTS IN SOCIETY

AS ROBOTS HAVE BECOME MORE ADVANCED AND SOPHISTICATED, EXPERTS AND ACADEMICS HAVE INCREASINGLY EXPLORED THE QUESTIONS OF WHAT ETHIC MIGHT GOVERN ROBOTS' BEHAVIOR, AND WHETHER ROBOTS MIGHT BE ABLE TO CLAIM ANY KIND OF SOCIAL, CULTURAL, ETHICAL OR LEGAL RIGHTS. ONE SCIENTIFIC TERM HAS SAID THAT IT IS POSSIBLE THAT A ROBOT BRAIN WILL EXIST BY 2019. OTHERS PREDICT ROBOT INTELLIGENCE BREAKTHROUGHS BY 2050. RECENT ADVANCES HAVE MADE ROBOTIC BEHAVIOR MORE SOPHISTICATED. THE SOCIAL IMPACT OF INTELLIGENT ROBOTS IS SUBJECT OF A 2010 DOCUMENTARY FILM CALLED PLUG & PRAY.

VERNOR VINGE HAS SUGGESTED THAT A MOMENT MAY COME WHEN COMPUTER AND ROBOTS ARE SMARTER THAN HUMANS. HE CALLS THIS "THE SINGULARITY". HE SUGGESTS THAT IT MAY BE SOMEWHAT OR POSSIBLY VERY DANGEROUS FOR HUMANS. THIS IS DISCUSSED BY A PHILOSOPHY CALLED SINGULARITARIANISM.



An [android](#), or robot designed to resemble a human, can appear comforting to some people and disturbing to others^[106]

RELATIONSHIP TO UNEMPLOYMENT

FOR CENTURIES, PEOPLE HAVE PREDICTED THAT MACHINES WOULD MAKE WORKERS OBSOLETE AND INCREASE UNEMPLOYMENT, ALTHOUGH THE CAUSE OF UNEMPLOYMENT ARE USUALLY THOUGHT TO BE DUE TO SOCIAL POLICY.

A RECENT EXAMPLE OF HUMAN REPLACEMENT INVOLVES TAIWANESE TECHNOLOGY COMPANY FOXCONN WHO, IN JULY 2011, ANNOUNCED A THREE-YEAR PLAN TO REPLACE WORKERS WITH MORE ROBOTS. AT PRESENT THE COMPANY USES TEN THOUSAND ROBOTS BUT WILL INCREASE THEM TO A MILLION ROBOTS OVER A THREE YEAR PERIOD.

THE WORLD BANK'S WORLD DEVELOPMENT REPORT 2019 PUTS FORTH EVIDENCE SHOWING THAT WHILE AUTOMATION DISPLACES WORKERS, TECHNOLOGICAL INNOVATION CREATES MORE NEW INDUSTRIES AND JOBS ON BALANCE.



LAWS OF ROBOTICS

LAW ONE:

A ROBOT MAY NOT INJURE HUMANITY OR THROUGH INACTION, ALLOW HUMANITY TO COME HARM.

LAW TWO:

A ROBOT MAY NOT INJURE A HUMAN BEING OR THROUGH INACTION, ALLOW A HUMAN BEING TO COME TO HARM, UNLESS THIS WOULD VIOLATE A HIGHER ORDER LAW.

LAW THREE:

A ROBOT MUST OBEY ORDER IT BY HUMAN BEING, EXCEPT WHERE SUCH ORDER GIVEN IT BY HUMAN BEING, EXCEPT WHERE SUCH ORDERS WOULD CONFLICT WITH A HIGHER ORDER LAW.

LAW FOUR:

A ROBOT MUST PROTECT ITS OWN EXISTENCE AS LONG AS SUCH PROTECTION DOES NOT CONFLICT WITH A HIGHER ORDER LAW.



INDIAN ROBOTS

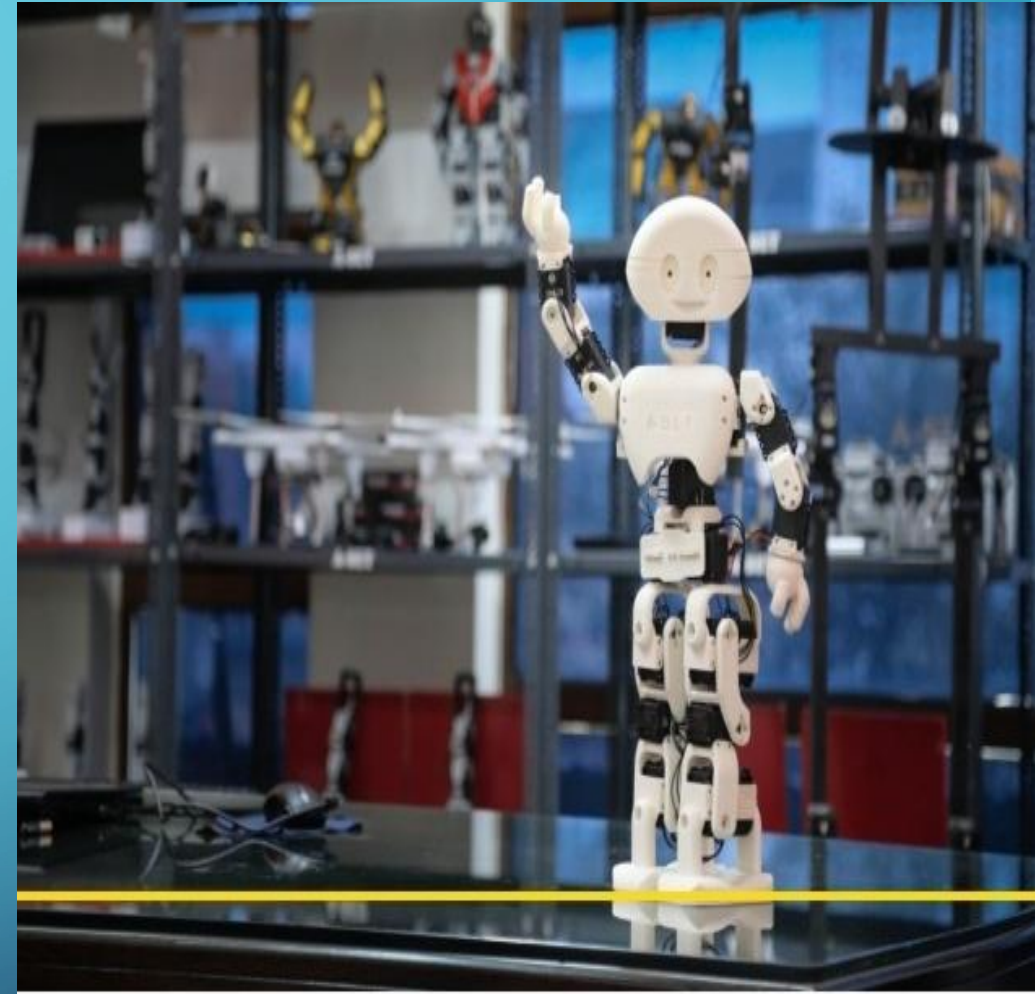
HUMANOID ROBOTS HAVE BEEN GAINING POPULARITY IN INDIA FOR QUITE SOME TIME NOW. ALTHOUGH THE COUNTRY IS STILL CATCHING UP WITH THE DEVELOPMENT IN ARTIFICIAL INTELLIGENCE AND ROBOTICS AS COMPARED TO OTHERS, INDIAN STARTUP, AS WELL AS THE GOVERNMENT, ARE WORKING AT A RAPID PACE TO INTEGRATE NEW AGE TECHNOLOGIES. ACCORDING TO AN IFR RESEARCH, ROBOTS SALES IN INDIA INCREASED BY 27 PERCENT TO A NEW PEAK OF 2,627 UNITS IN INDIA- ALMOST THE SAME AS IN THAILAND. ANOTHER SURVEY CLAIMS THAT INDIA RANKS THIRD IN IMPLEMENTING ROBOTICS AUTOMATION.

LET US TAKE A LOOK AT A FEW NOTEWORTHY HUMANOID ROBOTS THAT ARE DESIGNED AND DEVELOPED IN INDIA



MANAV

- ❑ Manav is India's first 3D-printed human robot.
- ❑ The two kilo, two-feet tall robot has an inbuilt vision and sound processing capability which allow him to walk, talk and dance-just in human response to human commands.
- ❑ Developed by Delhi's A-SET training and Research institute.
- ❑ Manav can also play activities like push up, headstand and can also play football.
- ❑ It uses an open-source code so that it can also taught to learn and respond like human child.
- ❑ The part of Manav are all made in India, the outer frame of the robot is made of plastic and was 3D printed from A-SET's own 3D printing venue, Buildkart Retail.



MITRA

- ❑ The five feet tall humanoid robot is made of fiberglass and is programming to great customer using contextual help, autonomous navigation and facial and speech recognition.
- ❑ It also has touch screen on its chest which can be used to interact where speech is not possible.
- ❑ It can work for eight hours in single charge, it can speak multiple language.
- ❑ The humanoid robot was launched by Prime minister Narendra Modi and Ivanka Trump, Daughter of U.S. President Donald Trump
- ❑ Developed by Bengaluru-based robotics start up Invento Robotics.
- ❑ Mitra was also showcased at an annual technology conference Slush 17 in Helsinki, Finland.



ROBOCOP

- ❑ Hyderabad-based AI and ML startup H-Bots Robotics has developed a police robot to assist in handling law, order, and traffic management.
- ❑ The life-sized robot, which was developed last year in Hyderabad, is equipped with cameras and an array of different sensors like ultrasonic, proximity and temperature sensors.
- ❑ The robot is designed to protect and secure places like malls, offices, airports, signal posts and other public spaces and can take care of security.
- ❑ The Robocop can diffuse bombs too.
- ❑ The best version robot is made in India using all Indian components.



IRA

- IRA- Intelligent Robotic Assistant.
- It works for HDFC Branch.
- It would essentially help branch staff in servicing customers.
- Developed in partnership with Asimov Robotics, a start up based in Kochi.
- It was made to greet the customer, guide them to relevant counter in the branch such as cash deposit, foreign exchange, loans, among others.
- The bank also announced the launch of IRA 2.0.
- It has features such as voice recognition and face recognition, which is enable using technologies such as AL and ML.



DRDO'S DAKSH

- This made-in-India robot is primarily designed to detect and recover Improvised Explosive Devices(IEDs)
- Developed by Defence Research and Development Organisation (DRDO).
- The robot was inducted by Indian Army around 2011. and 20 Daksh robots are already being used by the Indian Army.
- It can be operated from a distance of 2.5 KM and can handle car explosives with its high- calibre shotgun.
- It was upgraded in 2015.
- The new Daksh is made of aluminium alloy which has reduce the weight and has become three- time faster, compared to the older version, which was made of steel

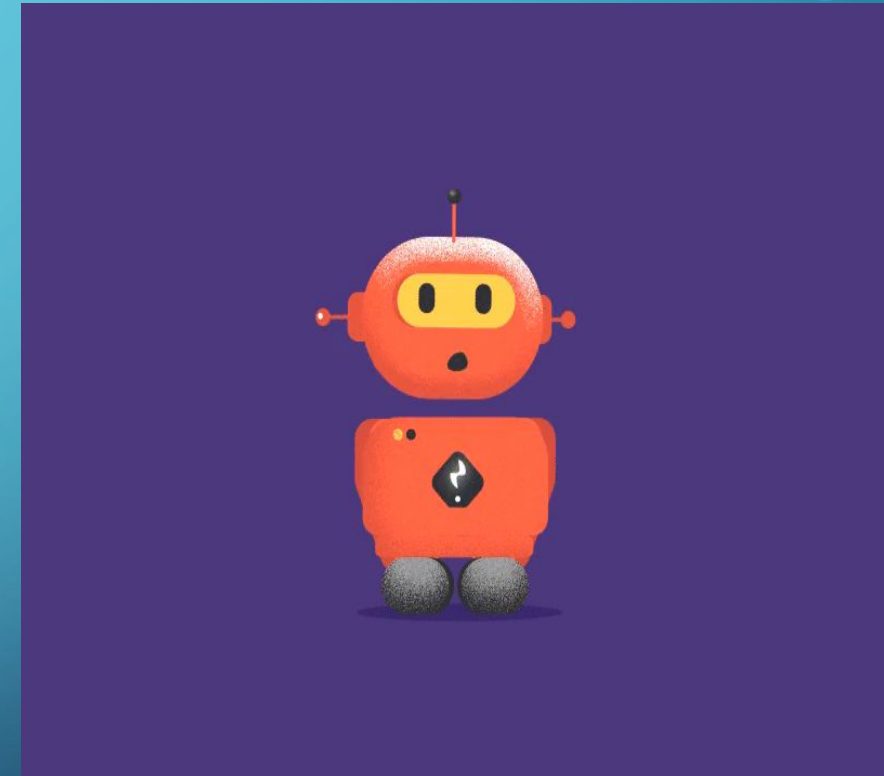


CONTEMPORARY USES

AT A PRESENT, THERE ARE TWO MAIN TYPES OF ROBOTS, BASED ON THEIR USE: GENERAL- PURPOSE AND AUTONOMOUS ROBOTS AND DEDICATED ROBOTS.

GENERAL- PURPOSE AUTONOMOUS ROBOTS

- ❑ General-purpose autonomous robots can perform a variety of function independently.
- ❑ They may recognize people or object, talk, provide, companionship, monitor environmental quality, respond to alarms, pick up supplies and perform other useful tasks.
- ❑ Humanoid robots are still in a very limited stage, as no humanoid robot can, as of yes, actually navigate around a room that it has never been in.
- ❑ Thus, humanoid robots are really quite limited, despite their intelligent behaviors in their well-known environments



FACTORY ROBOTS

1. CAR PRODUCTION:

OVER THE LAST THREE DECADES, AUTOMOBILE FACTORIES HAVE BECOME DOMINATED BY ROBOTS. A TYPICAL FACTORY CONTAIN HUNDREDS OF INDUSTRIAL ROBOTS WORKING ON FULLY AUTOMATED PRODUCTION LINES, WITH ONE ROBOT FOR EVERY TEN HUMAN WORKERS. ON AN AUTOMATED PRODUCTION LINE, A VEHICLE CHSSIS ON A CONVEYOR IS WELDED, GLUED, PAINTED AND FINALLY ASSEMBLED AT A SEQUENCE OF ROBOT STATION.

2. PACKAGING

INDUSTRIAL ROBOTS ARE ALSO USED EXTENSIVELY FOR PALLETIZING AND PACKAGING OF MANUFACTURED GOOD, FOR EXAMPLE FOR RAPIDLY TALKING DRINK CARTONS FROM THE END OF A CONVEYOR BELT AND PLACING THEM INTO BOXES, OR FOR LOADING AND UNLOADING MACHINING CENTERS.

3. ELECTRONICS

MASS PRODUCED PRINTED CIRCUIT BOARDS ARE ALMOST EXCLUSIVELY MANUFACTURED BY PICK-AND-PLACE ROBOTS, TYPICALLY WITH SCARA MANIPULATORS, WHICH REMOVE TINY ELECTRONIC COMPONENTS FROM STRIPS OR TRAYS, AND PLACE THEM ON TO PCBS WITH GREAT ACCURACY.



UNPRECEDENTED, DANGEROUS, DULL OR INACCESSIBLE TASKS

1. SPACE PROBES

ALMOST EVERY UNMANNED SPACE PROBE EVER LAUNCHED WAS A ROBOT. SOME WERE LAUNCHED IN THE 1960S WITH VERY LIMITED ABILITIES, BUT THEIR ABILITIES TO FLY AND LAND IS AN INDICATION OF THEIR STATUS AS A ROBOT. THIS INCLUDES THE VOYAGER PROBES AND THE GALILEO PROBES, AMONG OTHER.

2. TELEROBOTS

TELEOPERATED ROBOTS, OR TELEROBOTS, ARE DEVICES REMOTELY OPERATED FROM A DISTANCE BY A HUMAN OPERATED RATHER THAN FOLLOWING A PREDETERMINED SEQUENCE OF MOVEMENTS, BUT WHICH HAS SEMI- AUTONOMOUS BEHAVIOR. THEY ARE USED WHEN HUMAN CANNOT PRESENT ON SITE TO PERFORM A JOB BECAUSE IT IS DANGEROUS, FAR AWAY, OR INACCESSIBLE. HUNDREDS OF ROBOTS SUCH AS IROBOTS'S PACKBOT AND THE FOSTER-MILLER TALON ARE BEING USED IN IRAQ AND AFGHANISTAN BY THE U.S MILITARY TO DEFUSE ROADSIDE BOMBS OR IMPROVISED EXPLOSIVE DEVICES IN AN ACTIVITY KNOWN AS EXPLOSIVE ORDNANCE DISPOSAL



AUTOMATED FRUIT HARVESTING MACHINE

1. DOMESTIC ROBOTS

DOMESTIC ROBOTS ARE SIMPLE ROBOTS DEDICATED TO A SINGLE TASK WORK IN HOME USE. THEY ARE USED IN SIMPLE BUT OFTEN DISLIKED JOBS, SUCH AS VACUUM CLEANING, FLOOR WASHING, AND LAWN MOWING. AN EXAMPLE OF A DOMESTIC ROBOT IS A ROOMBA.

2. MINING ROBOTS

MINING ROBOTS ARE DESIGNED TO SOLVE A PROBLEM CURRENTLY FACING THE MINING INDUSTRY, INCLUDING SKILLS SHORTAGES, IMPROVING PRODUCTIVITY FROM DECLINING ORE GRADES, AND ACHIEVING ENVIRONMENTAL TARGETS. ONE OF THE WORLD'S LARGEST MINING CORPORATION, RIO TINTO, HAS RECENTLY EXPANDED ITS AUTONOMOUS TRUCK FLEET TO THE WORLD'S LARGEST, CONSISTING OF 150 AUTONOMOUS KOMATSU TRUCK, OPERATING IN WESTERN AUSTRALIA.



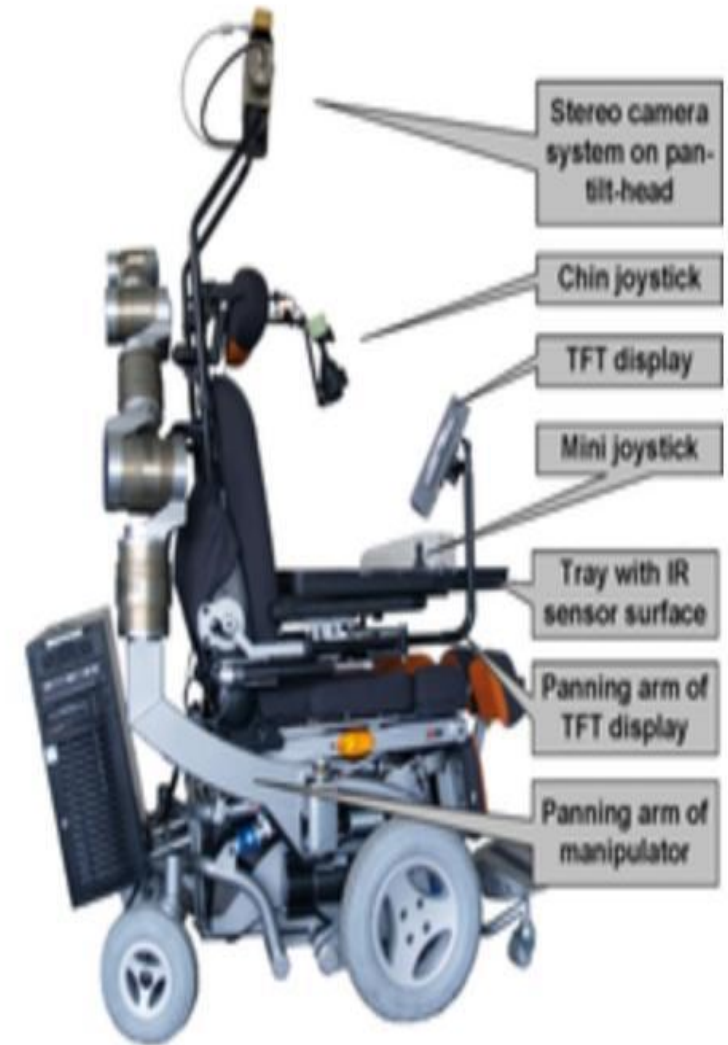
The Roomba domestic vacuum cleaner robot does a single, menial job

HEALTHCARE

1. HOME AUTOMATION FOR THE ELDERLY AND DISABLED

ROBOTS USED IN HOME AUTOMATION HAVE DEVELOPED OVER TIME FROM SIMPLE BASIC ROBOTICS ASSISTANTS, SUCH AS THE HANDY 1, THROUGH TO SEMI-AUTONOMOUS ROBOTS, SUCH AS FRIEND WHICH CAN ASSIST THE ELDERLY AND DISABLED WITH COMMON TASKS.

FRIEND IS A SEMI-AUTONOMOUS ROBOTS DESIGNED TO SUPPORT DISABLED AND ELDERLY PEOPLE IN THEIR DAILY LIFE ACTIVITIES, LIKE PREPARING AND SERVING A MEAL. FRIEND IS MAKE IT POSSIBLE FOR PATIENTS WHO ARE PARAPLEGIC, HAVE MUSCLE DISEASES OR SERIOUS PARALYSIS, TO PERFORM TASKS WITHOUT HELP FROM OTHER PEOPLE LIKE THERAPISTS OR NURSING STAFF.



The Care-Providing Robot FRIEND

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THANKS FOR WATCHING