

ROBOTICS

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- 'ROBOTA'- CZECH WORD
- MEANING- 'COMPULSORY LABOUR'
- FIRST USED BY PLAYWRITE KAREL CAPEK IN HIS PLAY 'R.U.R'
- 'ROBOTICS' WAS FAMILIARISED & PROMOTED BY NOVELS & HOLLYWOOD FILMS & INSPIRED MANY SCIENTISTS
- SUBSEQUENTLY MANY RESEARCHES ON ROBOTS STARTED THROUGHOUT THE WORLD

HISTORY OF ROBOTICS:

- ANCIENT GREEKS WERE OBSESSED WITH AUTOMATION
- IN MOST GREEK STORIES, EVENTS PERTAINING TO CREATION OF INTELLIGENT & STRONG MECHANICAL SERVANTS THAT COULD MOVE WITH OWN POWER ARE COMMON
- ‘VULCAN’ & ‘HEPHAESTUS’ ARE THE MOST FAMOUS MECHANICAL SERVANTS
- 450 B.C.-GREEK MATHEMATICIAN ARCHYTAS POSTULATED A MECHANICAL BIRD CALLED “THE PIGEON”-PROPELLED BY STEAM
- ANCIENT ROBOTS-WATER CLOCKS,MUSICAL AUTOMATS, KITCHEN APPLIANCES,ETC

YEAR	INVENTOR (OR) INVENTING FIRM	INVENTION
1495	LEONARDA DA VINCI	LEONARD'S ROBOT
1738	JACQUES DE VAUCANSON	A ROBOT DUCK THAT CAN MOVE, FLAP ITS WINGS & QUAKE
1822	CHARLES BABBAGE	PROTOTYPE OF "DIFFERENCE ENGINE"
1898	NIKOLA TESLA	REMOTE CONTROLLED ROBOT BOAT
1956	JOHN McCarthy	COINED THE TERM "ARTIFICIAL INTELLIGENCE"(AI)
1962	MASSACHUSETTS INSTITUTE OF TECHNOLOGY(MIT)	FIRST INDUSTRIAL ARM ROBOT
1966	MIT	FIRST AI PROGRAM "ELIZA"
1976	SHIGEO HIROSE	SOFT GRIPPER ROBOT

1977	KENNEDY SPACE FLIGHT CENTRE	VOYAGERS 1 & VOYAGERS 2
1989	MIT	“GENGHIS”-A WALKING ROBOT
1993	CARNEGIE MELLON UNIVERSITY	“DANTE”-8 LEGGED ROBOT
1997	NASA	“ROVERS” LANDS ON MARS
1999	SONY	“AIBO”-A ROBOTIC PET
2000	HONDA	ASIMO
2001	FDA	ROBOTS TO TREAT TUMOURS
2004	NASA	“OPPORTUNITY” LANDS ON MARS

USES OF ROBOTS: SPACE EXPLORATION

- **ROBOTS ARE WIDELY USED IN SPACE EXPLORATION**
- **THEY ANALYSE HEAVENLY BODIES & PLANETS**
- **SEND PICTURES & INFORMATION TO HUMAN OPERATORS**
- **THEY ARE FITTED WITH SOPHISTICATED DEVICES TO SENSE EVEN THE POSSIBILITY OF UNDERGROUND WATER IN THE ALIEN PLANETS**
- **THESE ARE PHYSICALLY WELL-BUILT TO MEET THE CHALLENGES OF ALIEN PLANET**

INDUSTRY

- PRESENTLY OVER 25,00,000 ROBOTS ARE USED IN THE INDUSTRIAL WORLD OF JAPAN
- ROBOTS WORK FASTER THAN HUMANS
- CAN DO REPETITIVE WORK THAT IS ABSOLUTELY BORING TO HUMANS
- THEY NEED NOT BE PAID & DON'T EAT, DRINK AND SLEEP AS HUMANS
- MOREOVER THEY WORK ACCURATELY
- ALL THESE RESULTS IN CHEAPER PRODUCTS
- HENCE ROBOTS ARE WIDELY USED IN THE INDUSTRIES OF AUTOMOBILE ETC.,

MEDICINE

- DELICATE & COMPLEX SURGERIES ARE BEING CARRIED OUT BY ROBOTS
- DOCTORS AND ENGINEERS HAVE SUCCEEDED IN DEVELOPING BIONIC LIMBS
- ROBOTS CAN EVEN CARRY OUT A PRECISE HOLE IN THE ORDER OF ONE 100TH OF AN INCH ON THE SKELETON
- ROBOTS CAN MAKE MEDICINES MUCH QUICKER

MILITARY & POLICE

- ROBOTS HELP POLICE IN BOMB DISPOSALS
- MILITARY CAN USE ROBOTS IN LOCATING LANDMARKS OF ENEMIES
- THEY CAN ENTER IN THE ENEMY'S TERRITORY AND GATHER INFORMATION

ENTERTAINMENT

- IN MOST OF THE DEVELOPED NATIONS, HOTEL FUNCTIONS, CORPORATE EVENTS, SHOPPING MALLS, PARTIES.
- FUND RAISERS ARE BEING PERFORMED BY MUSIC ROBOTS THEREBY DRAWING LARGE CROWD

TOYS WITH EDUCATIONAL VALUES

- MANY CHILDREN AVOID STUDYING WITH THEIR TEACHERS AND PARENTS CHASING THEM
- BUT IN U.S.A. ROBOTS ARE BEING USED TO TEACH CHILDREN IN A PLEASANT WAY
- AND CHILDREN PAY MORE ATTENTION TOWARDS THEM THAN THEIR ADULTS
- HENCE ROBOT TOYS ARE DOING BRISK BUSINESS OUT THERE

HOW ROBOTS WORK

- IT IS AN ELECTRO-MECHANICAL DEVICE
- ITS STRUCTURE IS FORMED BY LINKAGES OF CHAINS
- THE LINKAGES ARE FOUND OVER CYLINDRICAL STRUCTURES
- ROBOT ARMS ARE INSPIRED FROM THE HUMAN HANDS
- THE FINAL LINKAGE IS MOUNTED WITH THE END-EFFECTOR
- BASED ON THE KIND OF WORK, THE END-EFFECTOR MAY BE A WELDING DEVICE OR A MECHANICAL HAND
- JOINTS OF THE ARMS ARE DRIVEN BY ELECTRIC MOTORS
- WITH THE HELP OF CAMERA, SENSORS GIVE INFORMATION ABOUT THE ENVIRONMENT, END-EFFECTOR POSITION AND THE ROBOT'S POSTURE
- THIS INFORMATION IS PROCESSED TO CALCULATE THE APPROPRIATE ANGLE, VELOCITY, ACCELERATION & SIGNAL THAT IS TO BE GIVEN TO THE ARMS
- EACH JOINT IN THE ARM HAS A SERVO OR FEEDBACK CONTROLLER
- UNTIL THE CALCULATED ANGLE IS REACHED, EACH JOINT IS MOVED BY ITS CONTROLLER
- FOR OBSTACLE AVOIDANCE THE ROBOT NEEDS MULTIPLE SENSORS AND CONTROLS LIKE ULTRA-SONIC OR INFRA-RED SENSORS

CURRENT DEVELOPMENTS

PASSIVE DYNAMICS AND BIOMORPHIC ROBOTICS

- BOTH THE ABOVE MENTIONED DEVELOPMENTS HELP IN MANUFACTURING WALKING ROBOTS

WING ROBOTICS

- RESEARCH IS GOING ON FOR THE WINGED ROBOTS FOR SPYING AND OTHER PROCESSES
- INSECT ROBOTS WHICH CAN FLY ARE ALSO UNDER STUDY

DANGERS & FEARS

- IN FUTURE ROBOTS MAY BE DEVELOPED INTO THOSE WITH INTELLIGENCE AND STRENGTH
- IT IS FEARED THAT IF THESE TRAITS EXCEED THAT OF HUMANS, THEN THERE IS A POSSIBILITY OF DANGER FROM ROBOTS TO HUMANS
- ROBOTS MAY THINK THEMSELVES AND DEVELOP MOTIVATION OF DESTROYING HUMAN RACE
- EVEN AN ACCIDENTAL FALL OF THE ROBOT COULD CAUSE SERIOUS INJURIES TO HUMANS AS THEY ARE HUGE & STRONG
- EVEN AT PRESENT INDUSTRIAL ROBOTS ARE SEPARATED COMPLETELY FROM THE ENVIRONMENT OF HUMAN WORKERS
- SOME SUGGEST THAT DEVELOPING A ROBOT WITH CONSCIENCE MAY BE HELPFUL

Reference

- “ROBOTICS” control, sensing, vision and intelligence BY Ks-Fu, Rc-Gonzalez, CSG Lee.
- “Fundamentals of Robotics” analysis and control BY Robert J.Schilling
- “Introduction to robotics” mechanics and control BY John J.Carig
- “Robot Technology Fundamentals” BY Jes

CONCLUSION

ARTIFICIAL INTELLIGENCE IS A FAST MOVING TECHNOLOGY THAT COULD LEAD TO A LOT OF OPPORTUNITIES FOR EDUCATION, JOBS AND INCREDIBLE FUTURE.

STILL, THERE IS A THREAT TO HUMANS-EVEN A WRONG INTERPRETATION OF ACTIONS MAY LEAD TO HUGE LOSS TO HUMAN RACE. WHEN ROBOTS START TO THINK THEMSELVES, THEY MAY EVEN TRY TO DESTROY HUMANS.

BUT ROBOTS, WHEN USED IN A CONTROLLED MANNER HELP US IN MANY ASPECTS.