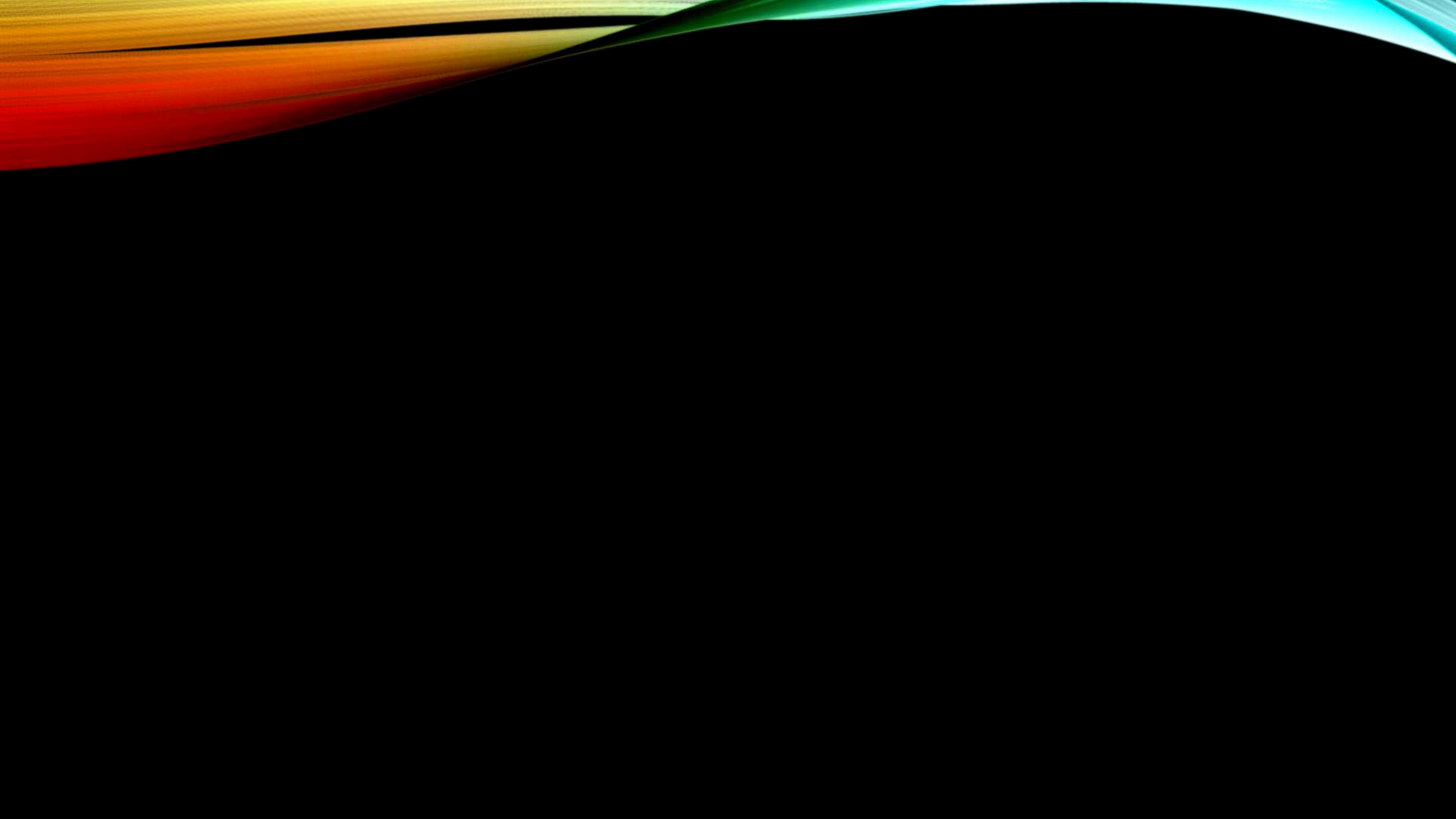


# APPLICATION OF ROBOTICS



# CURRENT SCENARIO OF ROBOTICS IN INDIA

- India is an upcoming potential market for industrial robotics industry with a worldwide market share of approximately 15 per cent.
- Industrial robots form an essential part of the current manufacturing sector of India. Without the use of robotics technologies or cost-effective production, a pillar of emerging Indian wealth would not be possible.
- Robotics and automation in many sectors would improve productivity, safety as well as the quality of the end product. Human operators can then take up more value added roles in the industry. Robotics and automation has the potential to revolutionize the industrial scenario.

# FUTURE OF ROBOTICS IN INDIA

- Robotics will capture industries like manufacturing, pharmaceutical, packaging and inspection. A bit of Robotics would also be seen in the healthcare sector primarily in the form of assistive and skill development technologies. The other promising sectors are defense and education.
- Considering that India is already a manufacturing hub catering to the whole world, the use of robots in every aspect of manufacturing will provide the necessary edge to companies. In turn this will propel the requirement of skilled manpower for this technology. Modern robotics engineers are confronted with the task of developing machines that interact with their creators in modes of increasing compatibility.

# MOST PREFERRED SECTORS FOR ROBOTICS

- Automotive,
- Atomic energy
- Defense,
- Space
- Metals
- Textiles
- Manufacturing
- Construction
- Education

# ADVANTAGES OF ROBOTS IN DAY TO DAY WORK

- Recent developments in the robotics world has made robots more user friendly, intelligent, and most importantly affordable.
- They are more precise and consistent than human workers.
- Robots have the ability to work around the clock since they do not require vacations, sick days, or breaks. They also make fewer mistakes than humans, saving companies time.
- Robots eliminate dangerous jobs for humans because they are capable of working in hazardous environments. They can handle lifting heavy loads, toxic substances, and repetitive tasks. This has helped companies to prevent many accidents, also saving time and money.

# MAJOR APPLICATION OF ROBOTS IN AUTOMOBILE

- **1. Collaborative Robots**

These collaborative robots are built to work together with other robots, on enormous assembly lines. Robots must collaborate between handling and welding robots to make such assembly lines function properly.

- **2. Robotic Painting**

Professional painters are difficult to find and the job is a highly toxic one. This makes it perfect for robots, because the paint job needs to be highly consistent over a large area of paint, and reducing the amount of wasted material can add up to quite a bit of savings over time.

- **3. Robotic Welding**

Robotic welding has been the top robotic application in the automotive sector for a long time, as every car needs a high number of welds before it's complete. Given the high value of the finished product, productivity from automation is enormous.



- **4. Robotic Assembly**

In many automotive plants, robots are assembling smaller components like pumps and motors at high speeds. Often, robots are performing tasks like windshield installation and wheel mounting to increase throughput.

- **5. Material Removal**

High consistency and repeatability make robots perfect for material removal processes like trimming and cutting. This could be in the form of cutting fabrics, trimming plastic moldings and die castings or even polishing molds.

- **6. Part Transfer and Machine Tending**

Pouring molten metal, transferring metal stamps, and loading and unloading CNC machines are all best completed by a robot as they are dangerous. When completed consistently with little downtime they can also be a source of major productivity



# APPLICATION OF ROBOTS IN ATOMIC ENERGY

- A new robot combines the skills and tools of multiple robots and offers new capacities to ease the tasks involved with nuclear dismantling. This new development complements the capacity for the use of robotics in nuclear cleaning and dismantling work.

# APPLICATION OF ROBOTS IN DEFENSE

- Defense robots are an increasingly common part of military campaigns, helping to keep soldiers safe and providing a tactical advantage in nearly any combat scenario. As the military continues to experiment and find success with different forms of defense robots.
- Field robots, another form of professional service robot, are also becoming common in defense applications. These defense robots perform a variety of functions, including:
  1. carrying heavy equipment;
  2. operating in dangerous situations to keep soldiers at a safer distance;
  3. and rescuing wounded soldiers in combat zones.

# APPLICATION OF ROBOTS IN SPACE

- Robots in space are devices which used to aid, augment and substitute for the astronauts to do difficult tasks such as the repairs in dangerous environments, and they capture videos and pictures, All the space robots are similar, they have the controller, the actuators, the sensors, the power supply, and the radio communications.
- Robotic spacecraft is a spacecraft with no humans on board, and they are under telerobotic control, they are designed to make the scientific research measurements is often called a space probe.
- Space probes can explore the places which are not accessible to the humans, they operate in the vacuum of the space, they withstand to exposure to the extremes of temperature and the radiation, and they can perform the programmed tasks over long periods without direct human supervision.

# APPLICATION OF ROBOTS IN METAL/CASTING/DIE CASTING

- The harsh conditions common to foundries, forge shops, steel mills, and many automotive plants are well-suited for robot automation. Foundry robots can perform a variety of applications, die-casting, gravity-casting, sand-casting, finishing, water or chemical cleaning, and forging.
- The harsh conditions common to foundries, forge shops, steel mills, and many automotive plants are well-suited for robot automation.
- Foundry robots increase safety, productivity and efficiency. Designed to work in hot, hazardous environments, they can withstand high levels of dust as well as exposure to harsh chemicals and high-pressure sprays.

# APPLICATION OF ROBOTICS IN CLOTHING/TEXTILES

- Apparel production is labor intensive. So, Increasing labor costs have been the most important driver of sewing automation within the last 30 years. Application of robotic automation in the textile and apparel industry provides so many benefits like labor savings, reduced cycle times, improved part quality, improved safety, increase productivity and efficiency.
- Apparel manufacturing industries have gained greater popularity in recent years owing to the popularity of ready-to-wear garments. Bulk production has reduced the cost of apparel and quality is maintained. The apparel industry is very diverse in nature and along with textile industries, it forms a complex combination of performing heterogeneous functions of transforming fiber into yarn and then to fabric.

# MANUFACTURING SECTOR

- An industrial robot is a robot system used for manufacturing. ... Typical applications of robots include welding, painting, assembly, pick and place for printed circuit boards, packaging and labeling, palletizing, product inspection, and testing; all accomplished with high endurance, speed, and precision.

# APPLICATION OF ROBOTS IN MANUFACTURING SECTOR

## 1. Arc Welding

- Arc welding, or robot welding, became commonplace in the 1980s. One of the driving forces for switching to robot welding is improving the safety of workers from arc burn and inhaling hazardous fumes.

## 2. Spot Welding

- Spot welding joins two contacting metal surfaces by directing a large current through the spot, which melts the metal and forms the weld delivered to the spot in a very short time (approximately ten milliseconds).

## 3. Materials Handling

- Materials handling robots are utilized to move, pack and select products. They also can automate functions involved in the transferring of parts from one piece of equipment to another. Direct labor costs are reduced and much of the tedious and hazardous activities traditionally performed by human labor are eliminated.



- 4. Machine Tending

Robotic automation for machine tending is the process of loading and unloading raw materials into machinery for processing and overseeing the machine while it does a job.

- 5. Painting

Robotic painting is used in automotive production and many other industries as it increases the quality and consistency of the product. Cost savings are also realized through less rework.

- 6. Picking, Packing and Palletizing

Most products are handled multiple times prior to final shipping. Robotic picking and packaging increases speed and accuracy along with lowering production costs.

- 7. Assembly
  - Robots routinely assemble products, eliminating tedious and tiresome tasks. Robots increase output and reduce operational costs.
- 8. Mechanical Cutting, Grinding, Deburring and Polishing
  - Building dexterity into robots provides a manufacturing option that is otherwise very difficult to automate. An example of this is the production of orthopaedical implants, such as knee and hip joints. Buffing and polishing a hip joint by hand can normally take 45-90 minutes while a robot can perform the same function in just a few minutes.
- 9. Gluing, Adhesive Sealing and Spraying Materials
  - Sealer robots are built with numerous arm configurations that enable the robot to apply adhesives to any type of product. The primary benefit in this application is increased quality, speed and consistency of the final product.

# APPLICATION OF ROBOTS IN CONSTRUCTION

- Increased Safety
- Higher Precision During the Construction Process
- Lower Cost
- Optimization of the Industry's Profile.
- Exoskeletons for Construction Workers
- Wired tested the Exoskeleton
- 3D Printing Robots.
- Many Different Self-Driving Trucks Are Being Tested Now

# APPLICATION OF ROBOTICS IN EDUCATION

- Educational robotics teaches the design, analysis, application and operation of robots. Robots include articulated robots, mobile robots or autonomous vehicles. Educational robotics can be taught from elementary school to graduate programs. Robotics may also be used to motivate and facilitate the instruction other, often foundational, topics such as computer programming, artificial intelligence or engineering design.

