MODULE 4
AUTOMATION USING ROBOTICS

Industrial Robot Applications

- Material Handling and Pick-and-Place Operations:
- Assembly and Disassembly:
- Welding and Joining:
- Painting and Coating:
- Machine Tending:
- Quality Inspection:
- Packaging and Palletizing:
- Material Removal and Finishing:
- Testing and Measurement:
- Food Processing:
- Pharmaceutical and Chemical Industry:
- Electronics Manufacturing:

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- Agriculture:
- Medical Applications:
- Aerospace Industry:
- Construction and Demolition:
- Defense and Military:
- Entertainment Industry:
- Logistics and Warehousing:
- Energy and Utilities:

Robot Accuracy and Repeatability

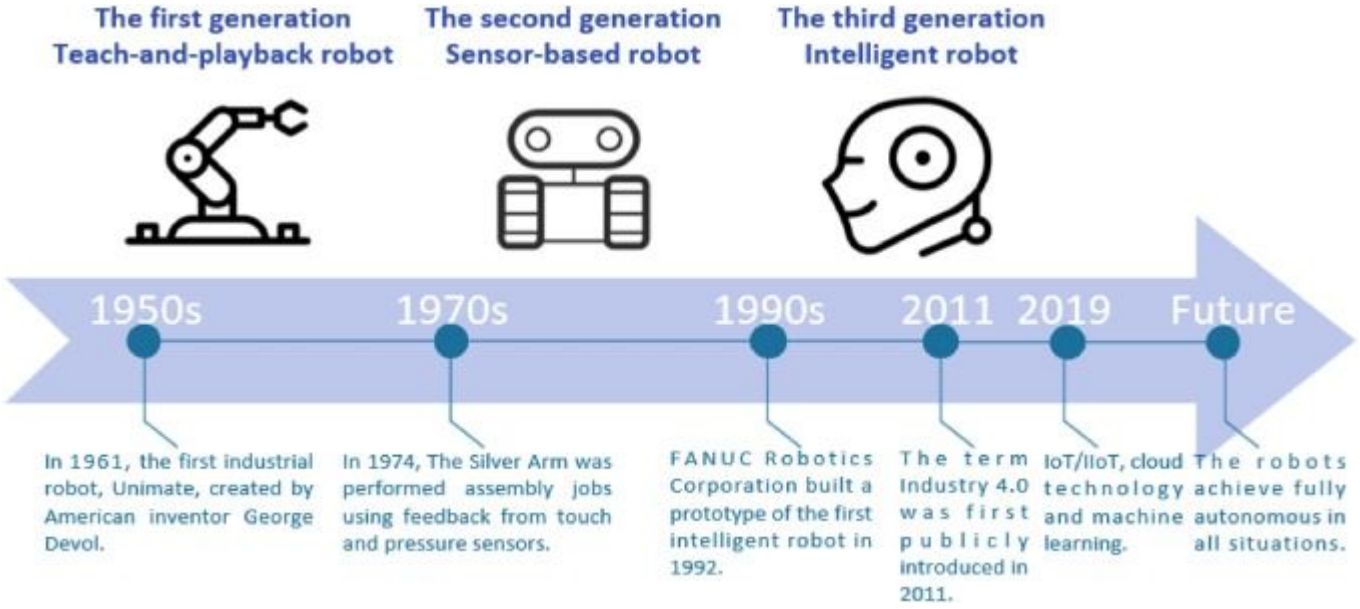
Accuracy

Repeatability

To assess and specify accuracy and repeatability, manufacturers and users typically use the following methods and standards:

1. Testing and Measurement:
2. ISO Standards:
3. Calibration:
4. Feedback Systems:
5. Maintenance and Preventive Measures:

Various Generations of Robots.



Robot Control Systems

Some common types of robot control systems:

- Open-Loop Control:
- Closed-Loop Control:
- Motion Control Systems:
- Path Planning and Trajectory Generation:
- Robot Operating Systems (ROS):
- Sensor Integration:
- Behavior-Based Control:
- Inverse Kinematics and Dynamics:
- Machine Learning and AI-Based Control:
- Human-Robot Interaction (HRI):
- Safety Systems:
- Real-Time Control: