Title: Revolutionising Industrial Processes using Motors in Automation

Date: 22/04/2023

Objective : This report summarizes a presentation on motors in automation delivered by an industry expert. Thespeaker provided valuable insights into the significance of motors in automation systems, highlighting their functionality, types, applications, and the benefits they bring to industrial processes. The presentation emphasized the pivotal role motors play in driving machinery, enabling precise control and movement. The report provides a comprehensive overview of the key points discussed by the speaker, shedding light on the importance of motors in automation and their impact on enhancing efficiency and productivity in various industries.

IEEE participants :3   Non IEEE participants:25

1. Introduction:

The presentation began by introducing the crucial role of motors in automation. Our guest speaker for this session was Mr. Yogesh Gopinath Gholap. The author received B. E. degree in 'Electronics Engineering' from Vivekanand Education Society's Institute of Technology, University of Mumbai, Maharashtra in 2009. Further he completed his M.Tech degree in Electrical Engineering in Indian Institute of Technology Bombay in 2016. He is currently pursuing Ph.D in Electrical Engineering from Indian Institute of Technology Bombay. He is currently working on "Security in Cyber Physical System" as "Prime Ministers Research Fellow" Awardee. He has worked as execution and commissioning engineer in Siemens India Ltd, with experience in PLC, SCADA, OTN network commissioning. He has teaching experience of over 10 years as assistant professor in Don Bosco Institute of Technology, University of Mumbai, where he had been faculty advisor for IEEE-RAS and in-charge of Robotics Club & School of Automation. His research interests include embedded system design, electronic instrumentation, signal processing, robotics, mechatronics, industrial automation and control system, IoT, and cyber security.

The speaker emphasized that motors are responsible for converting electrical energy into mechanical motion, making them vital components in driving machinery in automated systems. They enable precise control, movement, and automation, thereby revolutionizing industrial processes.

2. Functionality and Types of Motors:

The speaker delved into the functionality and types of motors commonly used in automation systems. They explained that motors can be broadly categorized into the following types:

   a. **AC Motors:** Alternating Current (AC) motors, including induction motors, synchronous motors, and servo motors, were discussed. The speaker highlighted their simplicity, reliability, and ease of control, making them widely adopted in automation applications.

b. **DC Motors:** Direct Current (DC) motors, known for their precise control, high starting torque, and compact size, were also emphasized. The speaker explained their suitability for robotics, precision positioning systems, and low-voltage environments.

c. **Stepper Motors:** The speaker highlighted stepper motors and their unique ability to provide incremental motion through a series of steps. This characteristic makes them suitable for applications requiring precise positioning and control.

3. <u>Applications of Motors in Automation:</u>

The presentation explored the diverse range of applications in which motors play a pivotal role in automation systems. The speaker discussed the following key applications:

a. Manufacturing and Robotics: Motors are extensively used in manufacturing processes, driving assembly lines, robotic arms, and automated machinery. They enable precise movement, increasing efficiency and productivity.

b. Conveyor Systems: Motors power conveyor belts, facilitating the efficient transportation of goods across manufacturing plants and warehouses.

c. Automotive Industry: Motors find widespread application in the automotive industry, powering assembly line operations, robotic systems, and electric vehicles. They contribute to automation and energy efficiency.

d. CNC Machines: Motors provide controlled movement in Computer Numerical Control (CNC) machines, ensuring precise machining and cutting operations.

4. Benefits of Motors in Automation:

The speaker emphasized the numerous benefits that motors bring to automation systems. The key advantages discussed include:

a. Increased Efficiency: Motors enable precise control and automation, reducing human error and enhancing overall process efficiency.

b. Enhanced Productivity: Automation with motors facilitates the automation of repetitive tasks, resulting in increased production output and reduced cycle times.

  c. Energy Savings: Advanced motor control techniques, such as Variable Frequency Drives (VFDs), enable energy-efficient operation by reducing power consumption during low-demand periods.

  d. Improved Safety: Automation with motors minimizes human involvement in hazardous or strenuous tasks, enhancing worker safety and reducing workplace accidents.

  e. Cost Savings: Automation with motors reduces labor costs, lowers maintenance requirements, and optimizes resource utilization, resulting in long-term cost savings.
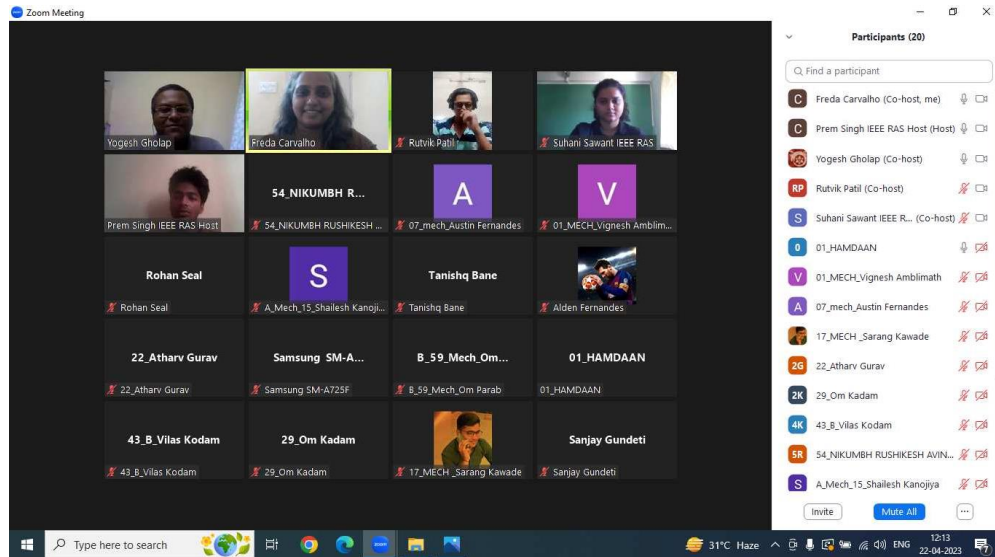
5. Conclusion:

In conclusion, the speaker's presentation shed light on the significant role motors play in automation systems. Motors are the driving force behind machinery, enabling precise control, movement, and automation. They find widespread applications in manufacturing, robotics, conveyor systems, the automotive industry, and CNC machines. By harnessing the benefits of motors, such as increased efficiency, enhanced productivity, energy savings, improved safety, and cost savings, industries can optimize their manufacturing and production processes.
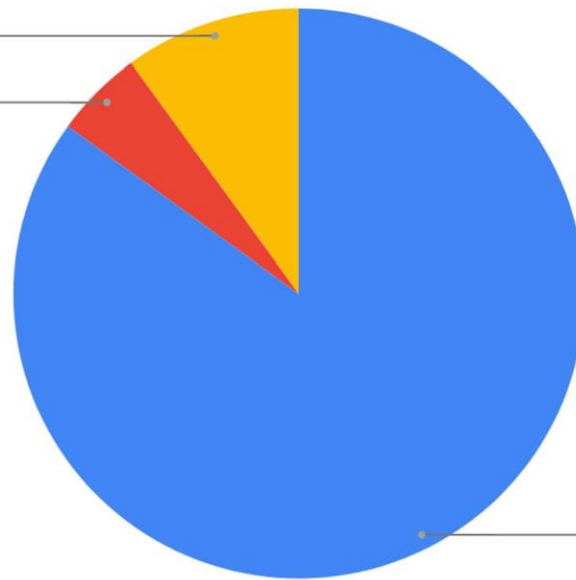
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