SCAN ME

IFR INFOGRAPHIC

IFR International Federation of Robotics

AI IN ROBOTICS

Trends, Challenges, Commercial Applications

BENEFITS OF AI

AI is accelerating the next wave of robotics.

While it is not new to robotics, it now becomes more capable and accessible,

Integrating AI into robotics enhances capabilities, increases efficiency and improves adaptability.

INDUSTRIES AT THE FOREFRONT

- Logistics and warehousing
- Automotive Industry
- Electronics
- General manufacturing industries
- Service sector

MACROECONOMIC TRENDS

- ECONOMIC AND SOCIAL PRESSURE
- LABOR SHORTAGES
- INVESTMENT AND STRATEGIC IMPORTANCE
- SAFETY AND GOVERNANCE
- CYBERSECURITY

SAFETY AND SECURITY ASPECTS

- CYBERSECURITY
- DATA PRIVACY AND PROTECTION
- TRANSPARENCY, ACCOUNTABILITY
- AI MODEL INTEGRITY
- PHYSICAL SAFETY & HUMAN INTERACTION RISKS

HOW AI IS SUPPORTING ROBOTICS

COMPUTER VISION

Enables robots to see and interpret visual data for object recognition, sorting, barcode reading, and real-time production monitoring.

SUPERVISED LEARNING

Uses labeled data for defect detection, predictive maintenance, quality inspection, and process optimization.

NATURAL LANGUAGE PROCESSING

Allows robots to understand and respond to spoken or written commands in human–robot interaction.

SENSOR FUSION & SLAM

Combines data from LiDAR, cameras, and other sensors to enable navigation and mapping in warehouses and factories

REINFORCEMENT LEARNING

Supports motion and path planning, grasping, and adaptive control through trial-and-error learning in dynamic environments.

GENERATIVE AI

Enables robots to generate code for entire functions based on natural language instructions

AI IS RESHAPING WORK

SHIFT IN WORK ROLES
Increasing demand for digital and cognitive skills.

WORKPLACE TRANSFORMATION
Reshaping teamwork and decision-making

BOOSTING PRODUCTIVITY AND GROWTH

CONTINUOUS RESKILLING AND UPSKILLING NEEDED

ADDRESSING SUSTAINABILITY

- Enabling the **Green Transformation**
- Addressing & mitigating the **ecological costs** of AI
- **Energy efficiency**: reducing energy consumption of robots
- **Waste reduction** & circular economy
- **Longevity**, maintenance & **reliability**

FULL POSITION PAPER

CASE STUDIES & SUCCESS STORIES