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ROBOTICS AND THE CHANGING FACE OF HUMAN SOCIETY

HOW INTELLIGENT MACHINES ARE RESHAPING HUMAN RELATIONSHIPS, SOCIAL INSTITUTIONS AND EVERYDAY LIFE

Dr Neelam C Dey
Social Scientist, Director, GCSDR
neelamcdey16@gmail.com

Introduction

Robotics is gradually changing the way human society functions. What was once considered a specialised technology used mainly in industrial production has now entered several areas of everyday life. Robots are increasingly being used in healthcare, education, agriculture, transportation, manufacturing, hospitality and household activities. Their growing presence indicates that society is entering a new phase in which human beings and intelligent machines will increasingly share workplaces, public spaces and social environments.

The development of robotics is closely connected with advances in artificial intelligence, machine learning, sensors, automation and digital communication. Modern robots are no longer limited to performing repetitive mechanical tasks. Some can recognise objects, respond to instructions, navigate complex environments and interact with human beings. These developments are changing not only the nature of work but also human relationships, social institutions and expectations about the future.[1]

The emergence of robotics therefore needs to be understood as a social transformation, rather than simply a technological achievement. Its consequences will depend on how societies introduce, regulate and distribute these technologies.

The Emergence of a Robotic Society

A robotic society refers to a social environment in which robots and automated systems become increasingly integrated into everyday human activities. This does not necessarily mean that robots will replace human beings. Rather, it suggests that machines will perform certain tasks independently or alongside people, while human beings continue to provide judgement, creativity, emotional understanding and social responsibility.

The expansion of service robotics demonstrates this transition. Robots are being developed and deployed in logistics, professional cleaning, hospitality, agriculture, medical services and domestic activities. The International Federation of Robotics has documented substantial activity in these sectors, reflecting the growing role of robots beyond traditional industrial manufacturing.[2]

In hospitals, robots can assist with surgical procedures, rehabilitation, patient movement and the transportation of medical supplies. In agriculture, robotic technologies can support crop monitoring, precision farming, harvesting and resource management. In manufacturing, automated systems can improve production efficiency and workplace safety.

These developments indicate that robotics is becoming part of the wider social infrastructure. However, the extent of its benefits will depend on accessibility, affordability, infrastructure and the capacity of people and institutions to adapt.

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Changing Human Relationships and Social Interaction

One of the most interesting developments in robotics is the emergence of social robots. These machines are designed to interact with human beings through speech, movement, facial expressions and other forms of communication. They may be used in educational settings, healthcare facilities, rehabilitation centres and environments where social assistance is required.

Human-robot interaction is an expanding field of research. It examines how people perceive, communicate with and respond to robots in different social contexts. Research suggests that the design of robots, the environment in which they operate and the expectations of users can influence the quality of human-robot interaction.[3]

For example, an older person living alone may use a robotic device for reminders, assistance or companionship. In educational environments, interactive robots may encourage children to participate in learning activities. In healthcare, robots may support communication and routine assistance.

However, the growing presence of social robots also raises important questions. Can interaction with machines provide meaningful companionship? Could excessive dependence on robotic communication reduce opportunities for human interaction? What responsibilities should developers and institutions have when robots are used in emotionally sensitive situations?

Robots may support human relationships, but they cannot automatically replace the depth, empathy and mutual responsibility associated with human connections. Their use should therefore complement, rather than weaken, meaningful human relationships.

The Transformation of Work and Employment

The workplace is among the areas most directly affected by robotics. Industrial robots have already transformed manufacturing processes, while service robots and automated systems are increasingly being introduced into logistics, transportation, agriculture, healthcare and other sectors.

Automation can improve productivity, reduce exposure to dangerous tasks and support organisations in managing labour shortages. At the same time, it can change the demand for particular occupations and skills. Some repetitive and predictable tasks may be automated, while new opportunities may emerge in robotics maintenance, programming, system management, data analysis and technology-related services.

Research by Acemoglu and Restrepo on the effects of industrial robots in United States labour markets demonstrates that the introduction of robots can have measurable consequences for employment and wages in particular labour markets.[4] Their findings also underline the importance of examining the distributional consequences of automation rather than assuming that technological progress benefits every worker equally.

The International Labour Organization's analysis of employment and social trends further highlights the importance of employment quality, labour-market security and inequality in discussions about the future of work.[5]

For developing countries such as India, the challenge is particularly significant. A large proportion of the workforce is engaged in informal, agricultural, service and small-enterprise activities. The introduction of

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robotics must therefore be accompanied by skill development, vocational education, reskilling opportunities and social protection.

The future of employment should not be framed only around the question of whether robots will replace human workers. A more important question is whether societies can prepare people to work effectively alongside intelligent machines.

Robotics, Family Life and Everyday Activities

Robotics is also influencing domestic and family life. Household robots can assist with cleaning, security, monitoring and other routine activities. In the future, more advanced systems may support older persons, people with disabilities and individuals who require assistance with everyday tasks.

These technologies can reduce the physical burden of certain household responsibilities and support independent living. However, their adoption may also depend on household income, digital literacy, electricity, internet connectivity and access to technical support.

The social implications of domestic robotics deserve attention. If household responsibilities are increasingly automated, family members may have more time for education, employment and leisure. At the same time, technology cannot replace the emotional and relational dimensions of caregiving.

The use of robots in family environments should therefore be guided by human needs, dignity, privacy and safety. Technology should strengthen the ability of families to care for their members rather than encourage the withdrawal of human involvement.

Robotics and Social Inequality

The benefits of robotics are unlikely to be distributed equally across society. Access to advanced technology often depends on economic resources, educational qualifications, geographical location and digital infrastructure. Wealthier households, institutions and organisations may adopt new technologies earlier, while disadvantaged communities may face barriers to access.

India's digital development demonstrates the importance of examining these inequalities. Research on digital inclusion in India highlights the growing significance of internet access and digital participation in education, employment, financial services and access to public welfare.[6] These broader digital inequalities are relevant to discussions about robotics because the effective use of advanced technologies also requires connectivity, skills and institutional support.

There is a possibility that robotics may widen existing inequalities if its benefits remain concentrated among economically advantaged groups. Workers with access to technical education may find new opportunities, while those without relevant skills may face greater employment insecurity.

The ethical use of artificial intelligence and related technologies must therefore include concerns about fairness, inclusion, accountability and human dignity. UNESCO's Recommendation on the Ethics of Artificial Intelligence provides an important international framework for considering these responsibilities.[7]

A socially responsible robotic society must ensure that technological progress does not deepen existing

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divisions. Public investment, inclusive education, affordable access and appropriate labour policies will be essential.

Robotics in Education and Knowledge Development

Education will play a central role in preparing society for a future shaped by robotics. Schools, colleges and universities will need to move beyond traditional approaches to technology education and provide students with opportunities to understand robotics, artificial intelligence, computational thinking and problem-solving.

Robotics-based learning can encourage creativity, experimentation, teamwork and practical understanding. Students can learn how machines are designed, programmed and used to solve real-world problems. Such learning may also help develop interdisciplinary thinking by connecting science, technology, engineering, mathematics and social sciences.

However, introducing robotics into education should not mean replacing teachers with machines. Teachers provide guidance, emotional support, ethical understanding and the social environment necessary for learning. Robots and digital systems should function as educational tools that support teachers and students.

Educational institutions must also address unequal access to technological resources. Without adequate infrastructure and trained educators, robotics education may remain limited to well-resourced institutions. Inclusive educational planning is therefore necessary to ensure that students from rural, economically weaker and underserved communities are not excluded from emerging opportunities.

Ethical and Social Responsibilities

The growing use of robotics raises questions about privacy, safety, accountability, transparency and human control. Robots used in healthcare, education, workplaces and public environments may collect or process personal information. Their operation can also influence decisions affecting individuals and communities.

It is important to determine who is responsible when a robotic system causes harm or makes an incorrect decision. Responsibility may involve manufacturers, software developers, service providers, institutional authorities and users. Clear legal and ethical frameworks are necessary to establish accountability.

UNESCO's Recommendation on the Ethics of Artificial Intelligence emphasises human rights, dignity, fairness, transparency and the prevention of harm.[7] These principles are relevant to the development and deployment of intelligent robotic systems.

Technology should remain accountable to human society. The objective must not be to create machines that operate without meaningful oversight, but to develop systems that are safe, responsible and aligned with public interest.

Towards a Human-Centred Robotic Society

The future of robotics should be shaped by a human-centred approach. Technological innovation must be evaluated not only through productivity, efficiency and economic growth but also through its contribution to human wellbeing, social inclusion and quality of life.

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Governments, educational institutions, researchers, industries and civil society organisations all have important roles to play. Governments must develop appropriate policies and regulatory mechanisms. Educational institutions must prepare students and workers for technological change. Researchers must examine the social, economic and psychological consequences of robotics. Industries must ensure responsible design and deployment.

There is also a need for greater interdisciplinary research. Robotics should not be studied exclusively as an engineering subject. Its implications for sociology, psychology, economics, education, public health, law and public policy deserve equal attention. Understanding how people respond to robots, how employment patterns change and how technology influences social relationships will be essential for responsible planning.

The development of a robotic society should ultimately be guided by a simple principle: technology must serve humanity, not the other way around.

Conclusion

Robotics is changing the face of human society by influencing work, education, healthcare, family life and social interaction. Its development offers opportunities to improve productivity, support vulnerable populations, strengthen public services and address certain social challenges. At the same time, it raises concerns about employment insecurity, inequality, privacy, human relationships and accountability.

The future will not be determined by technology alone. It will depend on the choices made by governments, institutions, industries and communities. A society that invests in education, ethical governance, social protection and equal access can ensure that robotics contributes to inclusive development.

The real achievement of a robotic society will not be measured simply by the number of robots it produces or the tasks they perform. It will be measured by how effectively technological progress improves human lives while preserving dignity, social responsibility and the value of human relationships.

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