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Impact of Artificial Intelligence on IT Jobs: Opportunities, Displacement Risks, and Skill Transformation

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Abstract: Artificial intelligence (AI), particularly generative AI, is changing the way information-technology work is planned, performed, reviewed, and delivered. Its influence extends beyond the automation of repetitive activities to include task redistribution, productivity, software quality, recruitment expectations, and the skills required across technical occupations. This paper examines the impact of AI on IT jobs through a narrative review of institutional reports and selected empirical studies. It focuses on software development, software testing, IT support, data and cloud operations, cybersecurity, and entry-level employment. The review indicates that exposure to AI should not be interpreted as an equivalent probability of job loss. Many occupations contain tasks that can be assisted by AI while still requiring human judgement, domain understanding, verification, communication, and accountability. Evidence of productivity improvement is promising but context-dependent, and results from controlled tasks cannot automatically be generalised to every workplace. The paper analyses opportunities and displacement risks, identifies capabilities that complement AI-assisted work, and presents recommendations for students, employers, and educational institutions. The study is based entirely on secondary sources; it does not claim to have conducted a primary survey or generated original respondent statistics.

Keywords: Artificial intelligence, generative AI, IT employment, job displacement, task transformation, software development, reskilling, future of work.

I. INTRODUCTION

Artificial intelligence has moved from a specialised research field into everyday technology work. Machine-learning systems support recommendation engines, fraud detection, forecasting, anomaly identification, and data classification. More recently, generative AI systems have made it possible to produce and transform text, code, images, summaries, and other digital content through natural-language instructions. In information technology, these capabilities are being used to draft code, explain unfamiliar functions, generate test cases, prepare documentation, summarise logs, and support customer interactions.

The growing use of AI has created both enthusiasm and uncertainty. Organisations expect faster delivery, lower operational effort, and improved access to technical knowledge. At the same time, employees and job seekers are concerned about automation, reduced hiring, changing job descriptions, and the possibility that routine responsibilities may no longer require the same number of workers. These concerns are important, but the relationship between AI and employment is not simple. A technology may automate a particular task without eliminating the entire occupation in which that task is performed.

IT occupations consist of connected activities that vary in complexity and responsibility. A software developer does more than write code: the role includes understanding requirements, choosing architecture, coordinating with stakeholders, reviewing changes, testing behaviour, protecting data, and maintaining systems. AI may assist with some of these activities, but the complete delivery of reliable software still requires decisions about context, trade-offs, risk, and accountability. Similar distinctions apply to testing, support, cloud operations, data engineering, and cybersecurity.
This paper therefore studies AI as a force that can automate selected tasks, augment human performance, and reshape occupational responsibilities. It considers the opportunities created by AI adoption alongside the risks of displacement, skill obsolescence, unequal access to training, and weaker entry-level pathways. The emphasis is on IT-related work and the practical choices available to students, professionals, employers, and educational institutions.

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II. PROBLEM STATEMENT

The rapid adoption of AI tools has created uncertainty among IT professionals, students, and job seekers about the future of technical employment. Routine coding, documentation, testing, data preparation, and support activities may become faster or partly automated. However, the extent to which this changes employment depends on the reliability of AI systems, organisational adoption, the nature of the task, customer expectations, regulation, and the availability of workers with complementary skills. General forecasts do not adequately explain how individual IT roles may be redesigned or how early-career professionals can prepare. A structured review is therefore required to distinguish task-level exposure from actual job displacement and to identify the skills and practices that can support responsible adaptation.

III. OBJECTIVES

- To examine the principal applications of AI in software development and related IT occupations.
- To distinguish task automation, task augmentation, and broader occupational transformation.
- To analyse opportunities and potential displacement risks across selected IT job roles.
- To understand how AI may influence productivity, software quality, work organisation, and entry-level opportunities.
- To identify technical, analytical, and interpersonal capabilities that complement AI-assisted work.
- To recommend practical measures for students, IT professionals, employers, and educational institutions.

IV. REVIEW OF RELATED LITERATURE

A. Occupational Exposure and Job Transformation

Research on automation increasingly distinguishes between the tasks performed within an occupation and the occupation as a whole. The International Labour Organization's global analysis of generative AI explains that many exposed occupations are more likely to be transformed than completely automated. Its later update refines occupational exposure estimates by examining a larger set of work activities and degrees of exposure. This approach is useful because exposure indicates that AI may affect a task; it does not establish that an employer will adopt the technology or remove the worker performing that task.

Economic research on automation describes two broad effects. The displacement effect occurs when technology takes over activities previously performed by workers. The reinstatement effect occurs when new tasks emerge and create demand for human labour. In the IT sector, examples of emerging responsibilities include AI system integration, model evaluation, data governance, security review, workflow design, and monitoring of automated services. Whether these new responsibilities create enough employment to offset displaced tasks remains uncertain and may vary by organisation and region.

International organisations also caution that AI exposure is uneven across occupations, industries, and economies. Differences in digital infrastructure, investment, education, language, and business structure influence the speed and consequences of adoption. As a result, global estimates should be treated as broad indicators rather than direct predictions for a particular city, institution, or job category.

B. Employer Expectations and Changing Skills

Employer surveys and future-of-work reports identify technological change as a major driver of changing skill requirements. AI and big-data capabilities, networks and cybersecurity, and general technological literacy are increasingly important. However, technical skills alone are insufficient. Analytical thinking, creative problem-solving, resilience, flexibility, communication, and lifelong learning remain valuable because workers must interpret AI outputs and decide when they are appropriate.

The changing skill profile suggests that IT education should combine foundational computing knowledge with practical AI literacy. Students need to understand programming, databases, algorithms, networks, software engineering, and testing, while also learning how to use AI tools responsibly. The ability to explain a solution, verify generated code, identify security weaknesses, and communicate limitations may become as important as producing an initial draft quickly.

C. Evidence on Productivity and AI Assistance

Experimental research on generative AI has found productivity improvements in selected writing and knowledge-work tasks. Such studies suggest that AI can reduce the time needed to create a first draft or complete structured activities. However, results depend on task complexity, participant experience, tool quality, and the method used to assess output. Faster completion does not always mean better long-term learning, fewer errors, or lower total project cost.

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Research on AI coding assistants has similarly reported faster completion in specific programming experiments. These findings demonstrate the potential of AI pair-programming tools, particularly for code suggestions, examples, and routine implementation. They do not prove that all software development becomes faster. Real projects involve legacy systems, unclear requirements, dependencies, security constraints, code review, testing, and maintenance. In these settings, generated code may require substantial correction or may introduce defects that are difficult to detect.

Other research examines how AI changes the allocation of developers' time. Access to coding assistants may allow some developers to spend more time on core coding and exploration, while reducing time spent on selected non-core activities. This suggests that AI can change the composition of work even when the job title remains unchanged.

D. Economic and Distributional Considerations

Reviews of AI's economic effects describe a combination of potential productivity gains, labour substitution, changes in wages, and unequal distribution of benefits. Some workers may gain from tools that improve their output, while others may face pressure if their tasks are relatively easy to automate or if they lack access to training. The effects may also differ between large organisations with resources to integrate AI and smaller firms that adopt tools more gradually. The literature therefore supports a balanced interpretation. AI is neither guaranteed to eliminate IT employment nor guaranteed to create better jobs for everyone. Employment outcomes depend on how organisations redesign work, whether new services and markets emerge, how workers are trained, and whether productivity gains are shared.

V. RESEARCH METHODOLOGY

A. Research Design

This paper adopts a qualitative narrative-review design. It synthesises selected institutional reports, economic research, and empirical studies concerning AI exposure, workplace productivity, employment change, and skill requirements. The approach is descriptive and analytical. It is intended to organise existing evidence and apply it to IT occupations rather than to estimate a new statistical relationship.

B. Sources and Selection

The review uses publications from the International Labour Organization, World Economic Forum, International Monetary Fund, Organisation for Economic Co-operation and Development, and selected academic journals and research repositories. Sources were selected for their relevance to AI and employment, identifiable publication details, methodological transparency, and usefulness for understanding technical work. The literature includes conceptual studies of automation, occupational exposure assessments, controlled experiments, and reports on employer skill expectations.

C. Method of Analysis

The selected materials were examined through five themes: occupational exposure to AI; automation versus augmentation; productivity and quality; changes in IT job responsibilities; and workforce preparation. These themes were then applied to software development, testing and quality assurance, IT support, data and cloud operations, cybersecurity, and early-career employment. The analysis compares the direction and limitations of findings rather than combining unlike studies into a single numerical estimate.

D. Scope and Limitations

The study is based on secondary sources and does not report a new questionnaire, interviews, or primary survey sample. It cannot establish the views of a specific group of IT professionals or measure employment changes in Pune or elsewhere in India. The reviewed studies differ in their samples, tools, time periods, and outcome measures. AI systems also change rapidly, so findings from one model or experiment may not remain applicable to later tools. The paper consequently avoids presenting a single percentage as the expected level of job loss or productivity improvement for the entire IT sector.

VI. ANALYSIS AND DISCUSSION

A. Software Development

AI coding assistants can support boilerplate generation, code explanation, documentation, test scaffolding, debugging suggestions, and refactoring ideas. They can be especially useful when developers need to understand an unfamiliar library or produce a first version of repetitive code. These capabilities may reduce time spent on routine implementation and allow developers to focus more attention on system behaviour and design decisions.

However, AI-generated code can be incorrect, inefficient, insecure, or inconsistent with the architecture of an existing application. A suggestion that compiles successfully may still fail under unusual inputs, create a data exposure risk, or

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violate business rules. Developers must therefore understand the code they accept, review dependencies, test edge cases, and consider maintainability. Knowledge of programming fundamentals becomes more important, not less, because it enables developers to recognise errors that are not obvious from a generated explanation.

The likely change is a shift in the developer's work rather than the disappearance of software engineering. Requirements analysis, architecture, integration, debugging, code review, deployment, and accountability continue to require human involvement. Developers who combine strong fundamentals with effective AI-assisted workflows may be better positioned than those who rely on generated code without understanding it.

B. Software Testing and Quality Assurance

AI can help testing teams draft test cases, generate sample data, summarise defects, identify repeated failure patterns, and prepare test documentation. It may also support automation scripts and assist testers in exploring possible edge cases. These uses can improve coverage when the generated tests are reviewed against clear requirements.

Testing is not simply the production of test scripts. Quality assurance requires understanding user expectations, identifying risks, deciding what should be tested, interpreting unexpected behaviour, and determining whether a defect is significant. AI-generated test cases may repeat assumptions from the prompt and overlook important business scenarios. Human testers remain necessary to validate test relevance, evaluate system behaviour, and communicate quality risks.

C. IT Support and Operations

Conversational AI can classify routine service requests, suggest troubleshooting steps, summarise incident histories, and help prepare knowledge-base articles. In operations teams, AI may assist with log summarisation, alert grouping, and the explanation of configuration options. This can help reduce repetitive work and make technical information easier to search.

Complex incidents often involve several systems, incomplete information, service dependencies, and business consequences. An incorrect automated recommendation may extend an outage or cause data loss. Support engineers and operations specialists must verify suggestions, assess impact, communicate with users, and escalate incidents when necessary. The role may move towards supervision of automated workflows and resolution of complex cases.

D. Data, Cloud, and Cybersecurity Roles

AI tools can assist data professionals in drafting queries, explaining transformations, documenting pipelines, and identifying unusual patterns. Cloud engineers may use AI to interpret configuration documentation, prepare infrastructure templates, and investigate logs. Security teams may use AI to summarise alerts, support threat intelligence analysis, and prioritise repetitive events.

These activities require strong safeguards. Incorrect data transformations can affect business reporting; insecure cloud configurations can expose systems; and inaccurate security summaries can hide important indicators. Human review, access control, audit trails, data protection, and incident-response procedures remain essential. AI may increase the volume of work that can be processed, but it can also create new verification and governance responsibilities.

E. Entry-Level Employment and Early-Career Learning

Entry-level roles are particularly important because junior employees learn through supervised tasks such as writing simple functions, preparing documentation, fixing small defects, creating test cases, and responding to routine support requests. If organisations automate these activities without creating alternative learning opportunities, new entrants may find it harder to gain practical experience. A reduction in beginner tasks could also make employers expect candidates to demonstrate more advanced skills before their first job.

AI tools can also support early-career learning by explaining unfamiliar concepts, providing examples, and helping learners practise debugging. The benefit depends on how the tools are used. Copying generated solutions without understanding them can weaken problem-solving ability. Students should use AI as a tutor and reviewer, not as a substitute for independent practice. Educational institutions and employers should create structured projects, code reviews, internships, mentoring, and supervised assignments that help beginners develop professional judgement.

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F. Role-Wise Summary

TABLE I. SUMMARY OF POTENTIAL AI-RELATED CHANGES IN IT ROLES

IT Role	Potential AI Assistance	Continuing Human Responsibilities
Software development	Code drafts, explanations, tests, documentation	Requirements, architecture, review, security, maintenance
Testing and QA	Test ideas, sample data, defect summaries	Risk-based testing, validation, exploratory testing, quality decisions
IT support	Ticket classification, troubleshooting suggestions, knowledge articles	Complex diagnosis, user communication, escalation, accountability
Data and cloud	Query drafts, log analysis, configuration guidance	Data integrity, architecture, access control, operational reliability
Cybersecurity	Alert summaries, pattern detection, threat research	Risk assessment, incident response, policy, verification
Entry-level roles	Learning support, examples, routine task assistance	Foundational skills, independent reasoning, supervised practice

VII. KEY FINDINGS

• AI affects tasks within occupations and should not be treated as a direct prediction that an entire job will disappear.
• Productivity improvements have been observed in selected experiments, but the size of the benefit depends on the task, user experience, tool capability, and quality requirements.
• IT work continues to require human judgement in requirements analysis, architecture, verification, security, communication, and accountability.
• AI adoption is likely to increase the importance of AI literacy, data understanding, cybersecurity, analytical thinking, and continuous learning.
• Entry-level career pathways require attention so that automation does not remove the supervised tasks through which new professionals gain experience.
• The benefits and risks of AI are unlikely to be distributed equally; access to training, infrastructure, and organisational support will influence outcomes.

VIII. RECOMMENDATIONS

A. For Students and Job Seekers

Students should build strong foundations in programming, data structures, databases, operating systems, networking, software engineering, and software testing. AI tools can support learning, but generated explanations and code should be independently checked. Practical portfolios should demonstrate complete problem-solving: understanding a requirement, designing a solution, implementing it, testing it, documenting it, and explaining trade-offs. Students should also practise communication, teamwork, and the ability to learn unfamiliar technologies.

B. For IT Professionals

Professionals should learn to evaluate AI-generated outputs, integrate tools into existing workflows, protect confidential information, and measure the quality of automated results. They should strengthen system design, debugging, cloud, security, data, and domain knowledge. Workers should maintain awareness of organisational policies and avoid entering customer information, credentials, proprietary code, or sensitive data into unapproved AI services. Continuous learning should be linked to practical projects rather than limited to tool demonstrations.

C. For Employers

Employers should assess tasks before redesigning roles and should evaluate AI adoption using quality, rework, security incidents, customer outcomes, employee experience, and time saved. High-impact decisions should include appropriate human review. Organisations should communicate how AI will be used, provide training, and involve employees in workflow redesign. They should also preserve junior development pathways through mentoring, structured rotations, supervised code review, and project-based learning.

D. For Educational Institutions

Educational institutions should include AI literacy, verification practices, data privacy, cybersecurity, ethics, and responsible use in technical curricula. Assessment methods should reward understanding and explanation rather than only the production of code or text. Industry projects, internships, collaborative development, and practical laboratories can help students develop skills that are difficult to acquire through automated assistance alone.

IX. FUTURE RESEARCH DIRECTIONS

Future empirical research can examine how IT professionals, students, and job seekers in India use AI tools, which tasks they consider most exposed, and what training they need. A local study should define its target population, sampling method, questionnaire, data-collection period, and sample size before collecting responses. It should report the actual number of valid responses, respondent categories, missing data, and limitations. Comparisons between students, job seekers, and employed professionals should be made only when group sizes are adequate. Longitudinal research could examine whether AI adoption changes hiring, wages, task allocation, productivity, and career progression over time. Organisation-level case studies could also compare productivity gains with costs related to training, verification, security, and rework.

X. CONCLUSION

Artificial intelligence is changing IT employment through task automation, task augmentation, workflow redesign, and evolving skill requirements. The reviewed evidence does not support a simple conclusion that AI exposure is equivalent to the disappearance of an occupation. Effects vary according to the task composition of each role, the way organisations implement AI, and the readiness of workers to adapt. AI can assist developers, testers, support teams, data professionals, cloud engineers, and cybersecurity specialists, but its outputs still require verification and human accountability. The practical response is to combine AI literacy with strong technical foundations, security awareness, critical thinking, communication, and continuous learning. For students and early-career professionals, supervised practical experience will remain essential. Long-term employment outcomes will depend not only on AI capabilities, but also on choices made by employers, educators, policymakers, and workers.

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