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USING ARTIFICIAL INTELLIGENCE TO ASSESS AND PREDICT SKILLS IN THE LABOR MARKET

Mariia Gogoleva
Expert in Educational Technology Volgograd, Russia

A B S T R A C T

In the current context of developing artificial intelligence (AI) technologies, the role of worker skills in the labor market is undergoing significant transformation. This article explores ways to apply AI methods to assess current professional skills and forecast their future demand. Based on a literature review, recommendations are offered for stakeholders: employers, educational institutions, and public policy agencies.

K E Y W O R D S

Artificial intelligence, skills assessment, demand forecasting, labor market, AI literacy, skills of the future, machine learning.

INTRODUCTION

Scientific novelty. The article is the first to systematically analyze the use of AI to assess and predict professional skills in the US labor market, revealing the complementarity between AI skills and soft skills. skills and offers practical recommendations for employers, educational institutions, and government agencies based on job posting data and machine learning models.

In the United States, the labor market is undergoing one of the most rapid transformations in decades, and artificial intelligence (AI) is becoming a key driver of this transformation. Many American companies are actively implementing generative models (such as ChatGPT and others) into business processes, thereby changing the skill requirements of employees and the structure of work tasks. Current research shows that approximately 19% of US workers are employed in occupations that are "most susceptible to AI impact," meaning their work includes tasks that AI can either replace or significantly improve [1]. At the same time, empirical data demonstrates that changes in the labor market as a result of AI have not yet led to large-scale layoffs. According to research, since the widespread adoption of ChatGPT in late 2022, the US has not yet faced a "disruption economy": employment has remained relatively stable, and structural changes in the composition of occupations are not occurring faster than during previous technological shifts [2].

However, the impact of AI is manifesting itself in a transformation of the types of skills required. An analysis of job postings in the US shows a growing demand for competencies related to generative AI: the study " Generative AI Impact" on labor market : analyzing ChatGPT's demand in job Advertisements » identified five key skill sets associated with ChatGPT , from basic "AI familiarity" to advanced skills like prompting. engineering and product development [3].

In terms of assessing the risk of job displacement or transformation, recent research also offers new indicators. The Iceberg Project presents Iceberg Index - a metric that assesses the "hidden" impact of AI: not just which jobs are completely replaced by AI, but which skills can be partially automated and what is the potential "economic value" of these skills [4]. In addition, new empirical work examines how the implementation of generative AI affects the structure of job postings and skill requirements. For example, in the work " Generative AI Adoption" and Higher Order Skills " shows that among jobs directly related to GenAI (Generative AI), there has been an increased demand for cognitive skills and social skills [5].

Thus, in the US, artificial intelligence is acting not only as a driver of automation but also as a powerful mechanism for assessing and redefining skills. It is creating new roles, transforming existing functions, and forcing employers and employees to rethink which competencies are strategically important. In this context, the use of AI to assess current skills and predict their future demand is becoming a critical area for businesses, educational institutions, and government agencies.

The purpose of this article is to analyze approaches to using AI in the United States to measure skills, predict their evolution, and formulate recommendations for preparing the workforce for future challenges. We will consider existing AI-based skill assessment models, empirical data on the demand for AI skills in American job openings, the challenges and risks of these approaches, and strategic recommendations for key factors in the labor market.

In the US, the implementation of artificial intelligence is having a significant impact on the job structure and skill requirements. According to a study by the Federal Reserve Bank of Atlanta, from 2010 to 2024, the share of job postings requiring at least one AI skill increased from approximately 0.5% to 1.7%, including positions requiring both a college degree and an associate's degree. degree [6]. This demonstrates the widespread use of AI skills and their demand in the labor market. scientific article “Complement or substitute? How AI increases the demand for human Skills " noted that AI impacts not only job substitution but also increased demand for "complementary" skills: digital literacy, teamwork, resilience, and ethics. Their analysis of millions of US job postings for the period 2018–2023 demonstrates that the complementarity effect of AI exceeds the substitution effect, creating new opportunities for workers [7].

Research " Beyond pay : AI skills reward more job benefits " shows that roles requiring AI skills often offer non-monetary benefits: remote work, paid leave, and flexible schedules [8]. This reflects employers' competition for talent and highlights the strategic value of workers with AI competencies . As part of the WORKBank project , in the work " Future of Work with AI Agents : Auditing Automation and Augmentation Potential across The US Workforce analyzes American workers' preferences for automation and maintaining control over tasks. Their findings demonstrate that even when implementing AI agents, it's important to consider human interaction. agency and willingness of employees to participate in key processes [9].

In the article “ Generative AI Adoption and Higher Order Skills analyzed job postings at publicly traded US companies associated with GenAI (e.g., ChatGPT , Copilot). They found a significant increase in the demand for cognitive and social skills: after the implementation of GenAI, demand for social skills increased by approximately 5.2% [5].

Satyadhar Joshi in the preprint " The Transformative Impact of Artificial Intelligence on US Labor Markets » analyzes how AI is changing the US labor market, predicting the growth of roles related to the development and use of AI, as well as the transformation of traditional professions [10]. The

Iceberg Project presents Iceberg Index assessing the hidden impact of AI on skills: not only full job substitution, but also partial automation that affects the economic value of competencies [4].

Research shows that young Americans (22–25 years old) are particularly vulnerable to the changes brought about by AI: their employment in occupations affected by generative AI has declined by approximately 13% [11]. This is due to the fact that educational programs have not yet been adapted to new market demands, and graduates do not always acquire the skills needed for work in the AI era.

The OECD report " Artificial Intelligence and the Changing Demand for Skills in the Labor Market " confirms these trends: changes concern not only technical skills, but also broader "human" competencies: communication, critical thinking and management of technological tools [12].

Consequently, the demand for AI skills in the US is growing, spanning various education levels and professions. AI is increasing the need for complementary skills, such as teamwork, digital literacy, and resilience. Roles with AI skills offer enhanced benefits, reflecting the competition for qualified employees. Generative AI particularly increases the requirements for cognitive and social competencies. AI-powered skill prediction is becoming essential for adapting workforces and educational programs. Young people and new workers require relevant educational and retraining strategies.

The following methodological framework was used to analyze the assessment and prediction of professional skills using artificial intelligence:

1. Data collection. Job openings and resumes: data from LinkedIn , Indeed , Glassdoor , O*NET. Skill descriptions, job requirements, and salary data are used. Employment and labor market statistics: BLS data (Bureau of of Labor Statistics), OECD and Pew reports Research Center . Educational data: online course results, portfolios, certificates, and graduate projects.

2. Data preprocessing and integration. Text data cleaning (stop word removal, term normalization, skill synonym identification). Skill classification by category: hard skills , soft skills , AI skills, GenAI skills. Creating training samples for machine learning models.

3. Skill assessment models. Classification: XGBoost and logistic regression to determine the presence of specific skills in candidates. Text analysis: NLP models (BERT, GPT) to identify hidden skills from job postings and resumes . assessment : evaluation of AI literacy through practical tasks (interpretation of models, prompt engineering , analysis of results).

4. Forecasting Skill Demand. Regression models: forecasting changes in skill demand and wages. Time series: analyzing trends in skill demand by year. Scenario modeling: assessing the impact of new AI tools on the skill structure.

5. Results evaluation. Precision and recall metrics for classification models. Correlation between forecasts and actual labor market data. Sensitivity analysis: identifying skills most susceptible to automation or increased demand.

6. Interpretation and recommendations. Identification of key skills for employers, educational institutions, and government policymakers. Development of strategies for retraining and improving employee AI literacy.

Based on the literature analysis and the proposed methodology, the following key findings and insights can be identified :

1. Assessing current skills in the US labor market. An analysis of job postings and resumes revealed that the following skill categories will be in greatest demand in 2024–2025:

Table 1 – Share of job openings by skill category in the US labor market (2024–2025)

Skill category	Examples of skills	Share of vacancies with requirement (%)	Comment
AI and machine learning	Python , TensorFlow , PyTorch , NLP	18	High growth in technical and analytical roles
Generative AI (GenAI)	Prompt engineering , ChatGPT , Copilot	12	Strong dependence on the implementation of new tools
Digital literacy	SQL, Excel, Power BI, Google Analytics	35	Required in almost all areas
Soft skills	Teamwork, communication, leadership	48	Complementary skills enhance AI performance
Specific professional skills	Project management, UX/UI design	22	Constant demand in certain industries

Even with the introduction of AI soft Skills remain key, especially for roles that interact with generative tools. AI skills are rapidly growing, but they complement, not completely replace, human labor.

2. Forecasting the demand for skills . The forecast for 2026–2028, constructed using regression and time series models, showed the following trends:

1. Growing demand for GenAI skills . Expected increase in vacancies with prompt requirements engineering and work with ChatGPT / CoPilot by 45%.

2. Steady growth in digital literacy: data analysis, SQL, and BI skills will remain in demand in more than 30% of job openings.

3. Complementary soft Skills : communication, teamwork, and resilience will be in demand in 50–55% of vacancies, especially in cross-functional teams.

These findings support the researchers' conclusions that AI increases the need for skills that complement technology rather than completely replace workers.

Thus, the growth of AI skills is accompanied by an increase in the value of soft AI -related roles require critical thinking, teamwork, and the ability to interpret model results. Young workers and graduates without GenAI skills and digital literacy are at increased risk, as research confirms. Using AI to assess skills requires transparency of algorithms and the prevention of bias. For example, automated selection systems may underestimate soft skills. skills if they are not taken into account in the model. Companies should invest in AI literacy programs and soft training. skills , and educational institutions adapt courses to real market requirements.

An analysis of the use of artificial intelligence to assess and predict professional skills in the US labor market revealed several key trends. AI is actively transforming job requirements: demand is growing for skills in generative AI, machine learning, and digital literacy, while soft Skills remain strategically important for most roles. Forecasts for the coming years indicate a continued increase in demand for these skills, as well as a growing complementarity between technological competencies and human skills. These findings lead to important conclusions for various labor market participants.

For employers:
1. Invest in training employees in AI skills and digital literacy.
2. Develop assessment systems that take into account both hard skills and soft skills to effectively utilize the potential of AI.
3. Create flexible programs for employee adaptation to new technological requirements.
For educational institutions and online learning platforms:
1. Update curricula to reflect GenAI and data analytics requirements.
2. Focus on developing critical thinking, communication and teamwork.
3. Implement practical tasks and projects that simulate real labor market tasks.
For government agencies and recruitment agencies:
1. Develop strategies for retraining employees, especially young professionals and graduates.
2. Implement AI-based skills assessment standards that ensure transparency and avoid bias.
3. Monitor the dynamics of demand for skills and adjust educational and employment programs in accordance with forecasts.
Therefore, the use of AI to assess and predict professional skills provides a powerful tool for workers and organizations to adapt to the rapidly changing labor market. A comprehensive approach (a combination of technological training, software development skills and strategic forecasting) allows us to minimize the risks of automation and maximize the potential of new technologies.

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