Candidate Number: 2196

PJ6100 – Research Methods
Submission Date: 28.11.2023
Individual Home Exam

The Future of Frontend:

A Study of AI's Impact on Job Tasks, Processes, and Skill Requirements

Kristiania University College, Autumn 2023
This answer has been completed as part of the education at Kristiania University College. The university is not responsible for the paper's methods, results, conclusions, or recommendations.

Table of Contents

Introduction

Interest in artificial intelligence (AI) dates back to 1921, when Czech author Karel Čapek first introduced the term “robots” in his play (Norwegian Computer Society 2023). The term "artificial intelligence" was formally established in 1956 (Tidemann 2023), and in the 1960s many predicted that machines would achieve the same intellectual capacity as humans (Tidemann 2023). Since then, the technology has developed significantly, and today, in 2023, anyone with internet access can utilize AI through various services, such as ChatGPT (Norwegian Computer Society 2023).

In terms of the labor market, AI has already taken over routine-based jobs, such as chatbot functions on websites (Johannessen 2023). AI’s automation capacity raises concerns among many, with fears of job loss. For example, it is expected that AI will replace up to 20 million manufacturing jobs in the USA by 2030 (Johannessen 2023). In the IT industry, AI can take on tasks like machine learning, deep learning, natural language processing, image processing, speech recognition, and data analysis (Softengi, n.d.).

This study will examine and analyze:
How does the implementation of AI and automation affect job performance within the IT sector?
Through an analysis of existing knowledge, this study will suggest a method and approach to this topic.

The answer is structured into four parts:
(Part 1) Background, **(Part 2) Knowledge**, **(Part 3) Method**, and **(Part 4) Evaluation**.

---

1. Background

The reason for choosing this topic is based on my existing knowledge, key challenges associated with the topic, and its practical relevance.

ChatGPT was launched as a prototype in November 2022 (Melteig 2023), and this made AI available in a way that had not been possible before. This technology has sparked widespread discussion about proper use, especially in schools and workplaces.

Critics such as Pierre Lison, a researcher at the Norwegian Computing Center and associate professor at the Department of Informatics at the University of Oslo, have pointed to possible concerns regarding the use of ChatGPT (Melteig 2023). These concerns include ChatGPT's ability to present false or discriminatory information (Melteig 2023), since ChatGPT retrieves knowledge from its database and the information it has been given (Hansen 2023). This highlights the importance of responsible AI use and critical thinking about the responses one receives from AI.

We also know that ChatGPT has already taken over automated work tasks (Johannessen 2023) such as customer service through chat services on websites. It has become a tool for us humans (Bangsbo 2023), and we must learn how to use it to our advantage.

Although AI can be a very useful tool that provides us with benefits and answers, there are some challenges with the technology. The first challenge that may arise is that people become too dependent on AI and no longer manage to think for themselves.

In an interview with the youth Victoria Cyptek, she expressed concerns about the growing dependence on AI among her peers (Cypek 2023). She experiences classmates using AI for large parts of their schoolwork, but also as a conversation partner when they feel lonely (Cypek 2023).

This dependency may carry over into working life, where a new generation lacks independent and critical thinking. This could potentially lead to greater breaches of privacy (Hill 2023) and crucial decisions that are not considered thoroughly enough.

On the other hand, many are positive about this technology and believe industries will gain a major competitive advantage (Bangsbo 2023). Anders Sørgaard, professor of computer science and philosophy at the University of Copenhagen, points out that it will take some time before we truly see the effect of AI in the job market (Bangsbo 2023). Jan Tore Lønning, professor of computer science, particularly highlights the tech industry and gives an example of how you can give code snippets to ChatGPT, and it tells you what's wrong or suggests improvements (Melteig 2023). Therefore, it will be important for workplaces to stay ahead of these changes, adjust tasks, and provide guidelines on how we can use this technology safely.

---

2. Knowledge

This section deals with the collection of existing relevant data for this topic. To collect this knowledge, keywords, Boolean operators, and relevant databases are defined. Finally, the results of the searches will be presented.

2.1. Limitations

To gather relevant knowledge and data, it is necessary to set some criteria for including or excluding information. The problem statement chosen for this paper is specific, and since there may still be limited research in this area, it may be relevant to look at similar situations or topics.

Criteria for including relevant knowledge are that it must primarily show how AI affects people in different ways. This can be how we think, solve tasks, relate to other people, relate to school and work, and so on. The data must also concern AI in professional settings such as school or the workplace.

Topics that are excluded are economic or political topics, unless they have a direct impact on how AI affects the job tasks of frontend developers.

Research from before 2015 will be excluded on the grounds that AI only became available to everyone with internet access in 2022. This shift is what the paper will focus on, and while earlier research may still be relevant, the focus will be on the new wave of accessibility.

2.2. Keywords and Boolean Operators

To determine which keywords are relevant to use, a list of topic words was created, followed by synonyms and their English equivalents, see Table 1. By having keywords in both English and Norwegian, it will be possible to find more relevant data than by searching only in Norwegian.

Boolean operators are also used to make the search more specific. Boolean operators define how keywords are combined and greatly influence the results that appear in the search (Western Norway University of Applied Sciences, University of Bergen, and University of Oslo 2023).

There are three types of Boolean operators: AND, OR, NOT. For example, if I use the keywords AI and automation together with the Boolean operator AND, I will only get results that contain both keywords. If I instead use OR, I get results with one, the other, or both keywords. With the operator NOT, I get results for the first keyword that do not contain the second (Western Norway University of Applied Sciences, University of Bergen, and University of Oslo 2023).

Keyword	Synonyms	English Keywords	English Synonyms
AI	Artificial intelligence, cognitive tech	Artificial intelligence	
Work tasks	Tasks, responsibilities	Job tasks	Tasks, responsibilities
Frontend development		Frontend development	
Technological influence	Technological changes	Technological influence	Technological changes
Automation		Automation	Automated process
Developer tools	Programming tools	Developer tools	Programming tools
Skill requirements	Competency requirements	Skill requirements	Competency needs
Efficiency	Productivity, work performance	Efficiency	Productivity, work performance
Training and skill development		Training and skill development	Training needs
Coding	Programming	Coding	Programming, code development

2.3. Databases

In my research work, I conducted extensive searches using several databases to gather relevant information. Google Scholar provides broad access to scientific articles and research publications. Idunn offers specific Nordic perspectives, and MDPI provides access to open scientific resources. This varied approach ensures a broad and deep understanding of the topic by drawing from various sources and perspectives.

2.4. Results

Many studies have been conducted on how AI will affect us humans. The results from these studies indicate that AI will have a significant impact on our ability to assess information, make decisions, and develop competencies (Grassini 2023; Danielsen 2023; Felix and

Sundsback 2023; McKinsey Global Institute 2018; Aspøy 2023; Liang, Yang, and Myers 2023).

2.3. Databases

In my research work, I conducted extensive searches using several databases to gather relevant information. Google Scholar provides broad access to scientific articles and research publications. Idunn offers specific Nordic perspectives, and MDPI provides access to open scientific resources. This varied approach ensures a broad and deep understanding of the topic by drawing from various sources and perspectives.

2.4. Results

Many studies have been conducted on how AI will affect us humans. The results from these studies indicate that AI will have a significant impact on our ability to assess information, make decisions, and develop competencies (Grassini 2023; Danielsen 2023; Felix and Sundsback 2023; McKinsey Global Institute 2018; Aspøy 2023; Liang, Yang, and Myers 2023).

The influence AI has on our ability to assess information can be seen in both a positive and negative light. On one hand, AI can provide objective information and a mechanical answer (Felix and Sundsback 2023; Danielsen 2023; Grassini 2023). In some situations, this can be very beneficial, for example when a mathematical calculation is needed. On the other hand, AI lacks the ability to "read between the lines" as humans do (Felix and Sundsback 2023; Danielsen 2023), and the information retrieved through AI may therefore be insufficient if it does not receive enough background information.

There are also differing views on how AI affects people's judgment process and decision-making abilities. One perspective is that AI does not consider emotions, which can lead to a reduced capacity for critical thinking (Danielsen 2023; Felix and Sundsback 2023). On the other hand, AI can be helpful in situations where people themselves are unable to resolve the issue (Aspøy 2023), allowing us to focus on the aspects of the situation that AI cannot solve (McKinsey Global Institute 2018).

It has also been pointed out how AI will influence skill development in the job market. Some argue that AI gives a false sense of mastery when used as a tool and that, in the long term, this will reduce people's ability to develop real skills (Felix and Sundsback 2023). Others argue that people must learn to master AI as a tool in both school and work contexts, as it will become as normalized as Google and calculators (Grassini 2023). We also see a shift in skill development in the form of demands in the labor market. Already,

we see examples of developers using various forms of AI to assist them with programming tasks (Liang, Yang, and Myers 2023). This suggests how various professions will gradually integrate AI over time.

---

3. Method

To answer the research question "How does the implementation of AI and automation affect job performance in the IT sector?", I would plan a **quantitative research method** as the approach. In this case, I would use **a survey** as the method for collecting data and various digital platforms to reach candidates. I would then analyze the data to be able to answer the research question.

3.1. Quantitative Method

This study would use a **quantitative approach** as a research method. This is a method used to test objective theories and provides an overview of the general research topic (Creswell 2023), in contrast to qualitative methods, which are more in-depth (Creswell 2023). To collect information, I would use a **survey** as the method. This method of data collection provides a generalized response from a sample of the population (Creswell 2023).

The research question addresses a specific change (the implementation of AI and automation) in a very broad professional group (the IT sector). On this basis, I have chosen to apply a quantitative research method, as the results will be more accurate for this research question.

3.2. The Survey

The questions asked will first map out the participant's occupation and whether they work in a small, medium-sized, or large company, and then where in the world they are located. This provides a background for later data analysis of the survey. I will then develop some research questions to break down the research problem. These questions will provide answers on various variables that fall under the research problem.

The survey questions developed are:

1. How has the implementation of AI and automation affected the efficiency of your job performance in the IT sector?

2. To what extent do you believe AI and automation have changed your job tasks compared to a few years ago?
3. Do you experience that the implementation of AI and automation has led to increased or decreased demands for competence and skills in your role within the IT sector?
4. How has the collaboration between humans and AI been in your work context? Do you perceive it as a positive or negative change?
5. Do you see challenges or opportunities associated with your workplace's adaptation to increased use of AI and automation?

These questions, along with information about the candidate's background, will provide enough data to identify whether certain jobs or companies show similar trends. I have chosen to limit the number of questions since too many could affect response quality.

To reach potential candidates, I would choose to use various **social media**. From personal experience, this is a great way to reach people within the IT sector, as they are very active on platforms such as **LinkedIn, Twitter, and Reddit**. This way, I would be able to reach candidates globally and from several types of occupations.

3.3. Data Analysis

To effectively analyze the data, I would use a **systematic approach**. First, I would collect and clean the data from the survey. This involves gathering responses and excluding invalid answers.

Next, I would create an overview of **statistical measures** based on the research questions and develop **charts and graphs** based on the results.

The dataset will be segmented based on **occupation, company size, and geographic location**, and then these groups will be analyzed to identify patterns and relationships.

The data will then be interpreted, and the findings discussed in relation to the research question and the survey's research questions. Finally, the results will be presented in a report.

4. Evaluation

This research proposal builds on a **quantitative approach** and collects data through a **survey** to then analyze the data and answer the research question:
"How does the implementation of AI and automation affect job performance in the IT sector?"
This approach provides the opportunity to reach many candidates without being limited by geographical location.

The research project could open up both opportunities and challenges.
The opportunities include the ability to identify innovative ways to use AI and automation in work processes, increase efficiency, and improve work quality within the IT sector.
It may also offer insights into how skill development will look in the future and provide a better decision-making basis for companies to understand the concrete effects of AI.
The information obtained from this research project could also be useful for other sectors or organizations facing similar challenges.

However, some challenges include the lack of control over the candidates.
This can lead to false information in the survey responses, which is difficult to verify afterward.
Because of this, there is a risk of inaccurate data and, therefore, inaccurate results.
Another challenge is also how relevant the research questions are.
Although they are designed to reach as many IT sector employees as possible, there may still be some who do not find the questions particularly relevant, which could make the responses unclear.

When conducting the project, **ethical considerations** are important.
A central ethical challenge in this situation is related to **privacy** regarding data collection.
To avoid this, I have chosen to base the background information on data that cannot be directly linked to a specific individual.
The data collected will include geographical location but not the specific company where they are employed.
Furthermore, it is important to inform participants about the purpose of the survey when it is shared via social media, so that the candidates are informed about how the results will be used.

References

Aspøy, Arild. 2023. "Only AI Can Regulate AI." *Stat & Styring* 33 (3): 33–38. https://doi.org/10.18261/stat.33.3.6

Bangsbo, Sara McClymont. 2023. "Will Artificial Intelligence Affect the Labor Market Differently Than Previous Technologies?" *Forskning.no*, June 9, 2023. https://www.forskning.no/arbeid-kunstig-intelligens-samfunn/vil-kunstig-intelligens-pavirke-arbeidsmarkedet-annerledes-enn-tidligere-teknologi/2207612

Creswell, John W. 2023. "The Selection of a Research Approach." In *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 6th ed., 3–24. Thousand Oaks, California: Sage.

Cypek, Victoria. 2023. "My Generation Is Addicted, and I Am Afraid." *Bergens Tidende*, May 5, 2023. https://www.bt.no/btmeninger/debatt/i/P4eBlR/min-generasjon-er-avhengig-og-jeg-er-redd

Danielsen, Maria. 2023. "The Emotional Risk Posed by AI in the Workplace." *Norsk filosofisk tidsskrift* 58 (2–3): 106–17. https://doi.org/10.18261/nft.58.2-3.4

Felix, Cathrine V., and Kariin Sundsback. 2023. "ChatGPT: A Threat to Our Mastery Skills?" *Norsk filosofisk tidsskrift* 58 (2–3): 153–58. https://doi.org/10.18261/nft.58.2-3.8

Grassini, Simone. 2023. "Shaping the Future of Education: Exploring the Potential and Consequences of AI and ChatGPT in Educational Settings." *Education Sciences* 13 (7). https://doi.org/10.3390/educsci13070692

Hansen, Adrian. 2023. "What Makes ChatGPT Unique?" *ChatGPT.no*, March 12, 2023. https://chatgpt.no/hva-gjor-chatgpt-unikt

Hill, Nicholas. 2023. "The Dark Side of Using ChatGPT in the Workplace: What You Need to Know!" *LinkedIn*, March 28, 2023. https://www.linkedin.com/pulse/dark-side-using-chatgpt-workplace-what-you-need-know-nicholas-hill/

Western Norway University of Applied Sciences, University of Bergen, and University of Oslo. 2023.
"Search Techniques." *Søk&Skriv*, March 11, 2023.
https://www.sokogskriv.no/soking/soketeknikker.html

Liang, Jenny T, Chenyang Yang, and Brad A Myers. 2023. "A Large-Scale Survey on the Usability of AI Programming Assistants: Successes and Challenges." IEEE Computer Society.

McKinsey Global Institute. 2018. "AI, Automation, and the Future of Work: Ten Things to Solve For."
McKinsey & Company.

Melteig, Elina. 2023. "ChatGPT: Should We Press the Pause Button?" *Forskning.no*, June 6, 2023.
https://www.forskning.no/informasjonsteknologi-internett-partner/chatgpt-bor-vi-trykke-pa-pauseknappen/2203846