

**MASTER OF SCIENCE IN MANAGEMENT AND SYSTEMS**

**Applied Project Capstone**

**MASY GC- 4100**

**MEMORANDUM**

TO: Dr. Andres Fortino

FROM: Chongyuan Liu

DATE: Oct 15, 2023.

RE: **Assignment 5A – Ten to Fifteen References**

# References

1. Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). *GPTs are GPTs: An early look at the labor market impact potential of large language models*. OpenAI. https://openai.com/research/gpts-are-gpts

Abstract:

We investigate the potential implications of large language models (LLMs), such as Generative Pre- trained Transformers (GPTs), on the U.S. labor market, focusing on the increased capabilities arising from LLM-powered software compared to LLMs on their own. Using a new rubric, we assess occupations based on their alignment with LLM capabilities, integrating both human expertise and GPT-4 classifications. Our findings reveal that around 80% of the U.S. workforce could have at least 10% of their work tasks affected by the introduction of LLMs, while approximately 19% of workers may see at least 50% of their tasks impacted. We do not make predictions about the development or adoption timeline of such LLMs. The projected effects span all wage levels, with higher-income jobs potentially facing greater exposure to LLM capabilities and LLM-powered software. Significantly, these impacts are not restricted to industries with higher recent productivity growth. Our analysis suggests that, with access to an LLM, about 15% of all worker tasks in the US could be completed significantly faster at the same level of quality. When incorporating software and tooling built on top of LLMs, this share increases to between 47 and 56% of all tasks. This finding implies that LLM-powered software will have a substantial effect on scaling the economic impacts of the underlying models. We conclude that LLMs such as GPTs exhibit traits of general-purpose technologies, indicating that they could have considerable economic, social, and policy implications.

ChatGPT summary:

In the working paper titled "GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models," the authors, Eloundou, Manning, Mishkin, and Rock (2023), explore the potential implications of large language models (LLMs), such as Generative Pre-trained Transformers (GPTs), on the U.S. labor market. The study focuses on evaluating the enhanced capabilities resulting from LLM-powered software in comparison to standalone LLMs. A new rubric is introduced to assess occupations based on their alignment with LLM capabilities, integrating human expertise and GPT-4 classifications. The findings suggest that approximately 80% of the U.S. workforce could experience an impact on at least 10% of their work tasks due to the introduction of LLMs, with about 19% of workers potentially seeing at least 50% of their tasks impacted. However, the authors clarify that they do not make specific predictions regarding the development or adoption timelines of such LLMs.

Research comment:

the article "GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models" is highly relevant and can significantly inform your research. This article meticulously examines the implications of Large Language Models (LLMs), such as GPTs, on the U.S. labor market, providing a nuanced understanding of how these models could impact various occupations. By integrating insights from this article, your project can be enriched with a broader perspective on LLM capabilities and their potential influence on the workforce. The methodologies and rubrics used in the article to assess the impact of LLMs on occupations could also be adapted or referenced in your project, enhancing the robustness and comprehensiveness of your Robot Replaceability Scale Tool. Moreover, the findings of the article, particularly the statistics on workforce impact, could be used to contextualize and validate the assessments made by your tool, adding depth and practical relevance to your research outcomes.

2. Miller, B., & Atkinson, R. D. (2013). *Are robots taking our jobs, or making them?.* Information Technology & Innovation Foundation. <https://www2.itif.org/2013-are-robots-taking-jobs.pdf>

Abstract:

The article examines the claim that automation and productivity growth are destroying jobs. It argues this view, held by "neo-Luddites," is incorrect based on several lines of evidence:

Productivity growth has historically gone hand-in-hand with job growth and low unemployment, not job destruction. In the past, worries about automation destroying jobs receded during periods of high productivity growth.

Scholarly economic research shows productivity growth does not cause long-term unemployment. Some studies find short-term job loss but medium to long-term job creation from productivity gains. This appears true in both developed and developing nations.

Firm-level studies also find about half of productivity gains come from firms that grow employment along with productivity, not just from firms cutting jobs.

Productivity growth rates have been slowing, not accelerating as would be expected if automation was rapidly destroying jobs. Recent jobs problems are more due to loss of U.S. competitiveness than automation.

There are no sectors "left to run" to as automation expands. Human wants are unlimited, so productivity gains get recycled into new economic demands and jobs, not permanent unemployment.

Exponential productivity growth assumed by techno-optimists is unlikely, as major innovations follow S-curves with transitional slowdowns. So sudden job destruction from automation is improbable.

The article concludes productivity gains remain critical for growth and standards of living. Rather than fear automation, we should develop an explicit national productivity policy to drive faster productivity gains.

ChatGPT Summary:

In the article "Are Robots Taking Our Jobs, or Making Them?" by Ben Miller and Robert D. Atkinson (2013), the authors explore the impact of technological advancements, particularly robotics, on employment and job creation. Contrary to the prevailing notion that robots and automation technologies are primarily job eliminators, the authors present a nuanced perspective, arguing that these technological advancements can also be instrumental in creating jobs. They critically examine the notion that high productivity driven by IT-enabled machines is the root cause of labor market challenges, such as unemployment and stagnant job growth, asserting that this widely accepted narrative may be flawed. The authors encourage a more balanced and evidence-based consideration of the roles that robots and automation technologies play in the evolving labor market landscape.

Research Comment:

The article can significantly enhance my research by providing insights of Subject matter expert on the assessment of Robot replaceability scale of Human tasks. This can be used to compare with the results of the RoboScale tool of my project and then assess its accuracy level.

3. Briggs, & Kodnani. (2023*). Global Economics Analyst: The Potentially Large Effects of Artificial Intelligence on Economic Growth*. Goldman Sachs. https://www.gspublishing.com/content/research/en/reports/2023/03/27/d64e052b-0f6e-45d7-967b-d7be35fabd16.html.

Abstract:

The article delves into the profound implications of the recent advent of generative artificial intelligence (AI). This emerging technology has sparked discussions about a possible swift surge in task automation that could lead to significant labor cost reductions and enhanced productivity. Despite uncertainties surrounding the capabilities of generative AI, its potential to produce content indistinguishable from human-generated content and to bridge communication gaps between humans and machines underscores its revolutionary nature and profound macroeconomic impact.

ChatGPT Summary:

This article explores the transformative potential of generative artificial intelligence (AI) in accelerating task automation, driving labor cost efficiencies, and enhancing productivity. The authors express that generative AI, despite existing uncertainties, holds remarkable capabilities, such as producing human-like content and facilitating enhanced human-machine interactions. The discussion reveals that generative AI could substantially disrupt labor markets, with a significant portion of jobs, particularly in the US and Europe, being susceptible to automation. The article also highlights historical precedents where technological advancements led to the creation of new jobs, mitigating the impacts of automation-induced displacement.

Research Comment:

The article from Goldman Sachs, focusing on the macroeconomic implications of generative AI and its transformative potential in task automation, could be a pivotal reference for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The article’s in-depth exploration of the capabilities of generative AI, its potential to revolutionize labor markets, and the prospective sectors it could impact aligns seamlessly with the project's objective of developing a Robot Replaceability Scale Tool.

In particular, the article’s analysis of the susceptibility of various job sectors to AI automation, based on comprehensive data, could offer invaluable insights that can be compared with the RoboScale tool, evaluating its predictive accuracy. Furthermore, the article’s discussion on the historical context of technological advancements and their impact on job markets could provide a nuanced perspective, aiding in the contextual interpretation of the RoboScale tool's assessments.

4. Arntz, M., Gregory, T., & Zierahn, U. (2016). The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis. OECD Social, Employment and Migration Working Papers, No. 189, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5jlz9h56dvq7-en>

Abstract :

In recent years, there has been a revival of concerns that automation and digitalisation might after all result in a jobless future. The debate has been fuelled by studies for the US and Europe arguing that a substantial share of jobs is at “risk of computerisation”. These studies follow an occupation-based approach proposed by Frey and Osborne (2013), i.e. they assume that whole occupations rather than single job-tasks are automated by technology. As we argue, this might lead to an overestimation of job automatibility, as occupations labelled as high-risk occupations often still contain a substantial share of tasks that are hard to automate. Our paper serves two purposes. Firstly, we estimate the job automatibility of jobs for 21 OECD countries based on a task-based approach. In contrast to other studies, we take into account the heterogeneity of workers’ tasks within occupations. Overall, we find that, on average across the 21 OECD countries, 9 % of jobs are automatable. The threat from technological advances thus seems much less pronounced compared to the occupation-based approach. We further find heterogeneities across OECD countries. For instance, while the share of automatable jobs is 6 % in Korea, the corresponding share is 12 % in Austria. Differences between countries may reflect general differences in workplace organisation, differences in previous investments into automation technologies as well as differences in the education of workers across countries. The second purpose of this paper is to critically reflect on the recent line of studies that generate figures on the “risk of computerisation” and to provide a comprehensive discussion on possible adjustment processes of firms and workers to automation and digitalisation. In particular, we argue that the estimated share of “jobs at risk” must not be equated with actual or expected employment losses from technological advances for three reasons. First, the utilisation of new technologies is a slow process, due to economic, legal and societal hurdles, so that technological substitution often does not take place as expected. Second, even if new technologies are introduced, workers can adjust to changing technological endowments by switching tasks, thus preventing technological unemployment. Third, technological change also generates additional jobs through demand for new technologies and through higher competitiveness. The main conclusion from our paper is that automation and digitalisation are unlikely to destroy large numbers of jobs. However, low qualified workers are likely to bear the brunt of the adjustment costs as the automatibility of their jobs is higher compared to highly qualified workers. Therefore, the likely challenge for the future lies in coping with rising inequality and ensuring sufficient (re-)training especially for low qualified workers.

ChatGPT Summary:

The article estimates the risk of automation for jobs in 21 OECD countries using a task-based approach, taking into account the heterogeneity of tasks within occupations.

On average across the 21 OECD countries, the study finds that 9% of jobs are potentially automatable. This is much lower than estimates from previous studies like Frey and Osborne (2013) that used an occupation-based approach.

The study finds considerable differences across OECD countries. The share of automatable jobs ranges from 6% in Korea to 12% in Austria. The differences reflect variations in workplace organization, technology adoption, and education levels.

The risk of automation strongly decreases with education level. Automatibility is highest for low-skilled workers. This suggests that low-skilled workers are likely to bear the brunt of adjustment costs from automation.

The figures should be interpreted cautiously as they reflect technical capabilities, not actual adoption. Even if technologies spread, workplace adjustment through new task divisions may prevent unemployment. New technologies may also create new jobs and raise competitiveness.

The main conclusion is that automation is unlikely to destroy large numbers of jobs. But policies should address rising inequality and ensure sufficient retraining, especially for low-skilled workers who are most affected.

Research Comment:

The article you provided analyzes the risk of automation for jobs across OECD countries using a task-based approach. This directly relates to your proposed project of developing a Robot Replaceability Scale Tool to assess the feasibility of automating human tasks. The article's methodology and findings could inform the development of your tool in several ways:

The article shows that taking a task-based approach provides a more nuanced perspective on automatability compared to an occupation-based approach. This supports your intention to build the tool based on granular task data from the O\*NET dataset rather than broader occupational categories.

The study highlights the importance of considering the heterogeneity of tasks within occupations when evaluating automatability. You could incorporate this insight by ensuring your tool accounts for diverse tasks within the same occupation.

The analysis reveals automation risk decreases with higher education levels, as highly educated workers tend to perform non-automatable tasks. Your tool could similarly analyze task automatability by education level.

Differences in automatability between countries are partially attributed to workplace organization and technology adoption. This suggests the need to customize your tool for specific countries/industries based on their operating models and technology utilization.

The study cautions that its automation risk estimates should not be equated to actual job losses due to overstated technological capabilities, workplace adjustment of tasks, and new job creation. This reinforces that your tool should focus on automatability rather than making definitive predictions about job losses.

Overall, the concepts, methodology, and findings from this research provide valuable inputs for developing your Robot Replaceability Scale Tool and highlighting the nuances involved in evaluating the automatability of human work. The paper helps contextualize your project within the broader research landscape exploring technology's impact on the future of work.

5. Chui, M., Manyika, J., & Miremadi, M. (2016). Where machines could replace humans—and where they can’t (yet). McKinsey Quarterly. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/where-machines-could-replace-humans-and-where-they-cant-yet

Abstract:

The article examines the technical potential for automating work activities across different sectors in the US economy. It finds wide variation, with predictable physical activities and data processing having high automation potential, while managing people and applying expertise have low potential. Overall, the article concludes that while few occupations will be fully automated in the near term, automation will transform many jobs as machines substitute for some human activities. However, the feasibility of automation depends not just on technical capabilities, but also costs, labor supply dynamics, and regulatory and social factors. The adoption of automation will require rethinking work processes and preparing organizations and workers for new human-machine complements.

ChatGPT Summary :

The article by Michael Chui, James Manyika, and Mehdi Miremadi delves into the dynamic landscape of automation, exploring its technical potential across various sectors and activities. The authors emphasize that automation technologies, such as machine learning and robotics, are increasingly permeating everyday life, prompting significant research and public discourse on their implications for the workforce. Contrary to a binary debate on which jobs will or won't be automated, the authors propose a nuanced perspective, suggesting that automation will influence aspects of nearly all jobs, albeit to varying degrees, depending on the nature of the tasks involved. They highlight that automation is expanding beyond routine manufacturing activities, possessing the technical feasibility to transform a multitude of job components across different sectors.

Research Comment:

The article by Chui, Manyika, and Miremadi offers pivotal insights that could significantly enrich the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The nuanced exploration of automation’s impact across various sectors and job components in the article aligns well with the project’s goal of assessing robot replaceability. The authors’ comprehensive approach, which goes beyond a binary consideration of job replaceability and delves into how automation could influence different aspects of nearly all jobs, provides a valuable perspective that could enhance the depth and sophistication of the RoboScale tool.

The focus on technical feasibility and the variability of automation’s impact across diverse tasks and sectors can guide the project in developing a more nuanced and adaptable assessment tool. Additionally, the article’s discussion on the expansion of automation beyond routine tasks, influenced by technologies such as machine learning and robotics, resonates with the project's utilization of Large Language Models (LLMs) and can offer essential context and considerations for aligning the tool with contemporary automation trends and potentials.

6. Felten, E. W., Raj, M., & Seamans, R. (2018). A Method to Link Advances in Artificial Intelligence to Occupational Abilities. AEA Papers and Proceedings, 108, 54-57. DOI: 10.1257/pandp.20181021

Abstract:

Prior episodes of automation have led to economic growth and also to many changes in the workplace. We expect the same from artificial intelligence (AI). The link between AI and labor is complex, however. To assist researchers and policymakers, we provide a method that links advances in AI to occupational abilities, and then aggregates from these abilities to the occupation level. We demonstrate the method by estimating which occupational descriptions have changed the most due to advances in AI between 2010 and 2015, and check our estimates using the Bureau of Labor Statistics scheduled update to occupational descriptions in 2016.

ChatGPT Summary:

This article discusses the potential impact of Artificial Intelligence (AI) on economic growth and labor markets. It acknowledges the promising role of AI as an innovative force that could drive economic development, citing historical evidence where technological advancements, like robotics, have significantly contributed to GDP growth. However, the authors also emphasize the ambiguity surrounding AI’s influence on labor, noting that while automation has historically both complemented and substituted labor, the specific outcomes of AI's integration into various occupational realms remain uncertain. The discussion implies a nuanced interplay between AI advancements and occupational abilities, suggesting a need for meticulous exploration to discern the multifaceted impacts of AI on the workforce.

Research Comment:

The article, "A Method to Link Advances in Artificial Intelligence to Occupational Abilities," presents a nuanced exploration of the impact of AI on economic growth and labor markets, which aligns closely with the objectives of the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The article’s methodical examination of AI as both a complement and substitute for labor provides a rich contextual background that could enhance the project’s approach to assessing robot replaceability across various occupations.

The authors' discussion on the historical and prospective impacts of automation technologies, including AI, on labor markets could offer valuable insights to guide the development and refinement of the RoboScale tool. Specifically, the article’s focus on linking AI advances to occupational abilities could inform the project’s use of Large Language Models (LLMs) in assessing the feasibility of substituting human tasks with robotic alternatives, ensuring that the tool is nuanced and responsive to the multifaceted influences of AI on different occupations.

7. Brynjolfsson, E., & Mitchell, T. (2017). What can machine learning do? Workforce implications. Science, 358(6370), 1530-1534. https://www.cs.cmu.edu/~tom/pubs/Science\_WorkforceDec2017.pdf

Abstract:

The article examines the potential implications of recent advances in machine learning for the workforce. It finds machine learning systems excel at tasks with well-defined inputs/outputs, large datasets, clear goals/metrics, no need for reasoning using common sense or background knowledge, tolerance for errors, and static environments. Such suitable machine learning tasks exist across multiple occupations, including law, medicine, sales, and design. Although automation will substitute humans in these tasks, effects on employment are nuanced given economic factors like complementarities, elasticities, and process redesign. Overall, the article concludes that although machine learning will not eliminate entire occupations in the near term, it will transform the task content of many jobs and have profound workforce implications. Careful policy and organizational adaptation will be needed to complement technologies and capitalize on benefits.

ChatGPT Summary:

In the article "What can machine learning do? Workforce implications" by Erik Brynjolfsson and Tom Mitchell, the authors explore the transformative impact of machine learning (ML) on various sectors of the economy, positioning it as a general-purpose technology akin to the steam engine and electricity. They emphasize the ongoing rapid transformation due to ML, which is accelerating the pace of automation itself, marking the beginning of a significant economic shift. However, they also note a lack of consensus regarding the specific tasks where ML excels and its exact impacts on the workforce and broader economy. The authors aim to dissect the capabilities and limitations of the current generation of ML systems, seeking to provide a nuanced perspective on their implications for various occupations and sectors.

Research Comment:

The article by Brynjolfsson and Mitchell could be a critical resource for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The article’s nuanced exploration of the capabilities and limitations of machine learning (ML) aligns seamlessly with the project’s objective to assess the replaceability of human tasks with robotic alternatives. The authors’ comprehensive analysis provides clarity on the tasks where ML systems excel, offering essential guidance in identifying occupations and tasks susceptible to automation.

The strategic focus on understanding the specific impacts of ML on the workforce resonates with the project’s aim to develop a robust assessment tool, ensuring that the tool is grounded in a realistic and well-rounded understanding of ML’s transformative potential. By integrating the insights from this article, the project can benefit from a deeper understanding of the ML landscape, enhancing the accuracy and relevance of the RoboScale tool in evaluating the implications of ML-driven automation across various occupations.

8. Autor, D. (2015). Why are there still so many jobs? The history and future of workplace automation. Journal of Economic Perspectives, 29(3), 3-30. DOI: 10.1257/jep.29.3.3

Abstract:

In this essay, I begin by identifying the reasons that automation has not wiped out a majority of jobs over the decades and centuries. Automation does indeed substitute for labor—as it is typically intended to do. However, automation also complements labor, raises output in ways that leads to higher demand for labor, and interacts with adjustments in labor supply. Journalists and even expert commentators tend to overstate the extent of machine substitution for human labor and ignore the strong complementarities between automation and labor that increase productivity, raise earnings, and augment demand for labor. Changes in technology do alter the types of jobs available and what those jobs pay. In the last few decades, one noticeable change has been a "polarization" of the labor market, in which wage gains went disproportionately to those at the top and at the bottom of the income and skill distribution, not to those in the middle; however, I also argue, this polarization is unlikely to continue very far into future. The final section of this paper reflects on how recent and future advances in artificial intelligence and robotics should shape our thinking about the likely trajectory of occupational change and employment growth. I argue that the interplay between machine and human comparative advantage allows computers to substitute for workers in performing routine, codifiable tasks while amplifying the comparative advantage of workers in supplying problem-solving skills, adaptability, and creativity.

ChatGPT Summary:

In the article "Why are there still so many jobs? The history and future of workplace automation," the author critically examines the historical and contemporary discourse surrounding automation and its impact on employment. The text delves into periodic warnings throughout history about automation and new technologies leading to significant job losses, reflecting on various movements and sentiments such as the Luddites and concerns in the 20th century. The author explores the complexities and nuances of automation’s impact on the workforce, questioning the notion that technological advancements inherently lead to substantial job losses. The discussion aims to provide a well-rounded perspective on the historical trends, ongoing developments, and potential future trajectories of automation in the context of workplace dynamics and employment landscapes.

Research Comment:

The article "Why are there still so many jobs? The history and future of workplace automation" presents a historical and critical perspective on the impact of automation technologies on employment, which could be immensely beneficial for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The author’s in-depth exploration of historical trends, societal reactions, and the actual impact of automation technologies on the job market could provide a nuanced background, helping to contextualize the assessments made by the RoboScale tool.

The thoughtful analysis in the article, questioning the prevalent notions about the relationship between automation and job loss, could assist in refining the project’s approach, ensuring a more balanced and historically informed perspective in assessing the replaceability of human tasks by robots. The article’s comprehensive exploration of why significant job losses have not historically materialized despite technological advancements could offer valuable insights to enhance the credibility and depth of the RoboScale tool’s assessments.

9. Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who’s the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. Business Horizons, 62(1), 15-25. <https://doi.org/10.1016/j.bushor.2018.08.004>

Abstract:

Artificial intelligence (AI)–—defined as a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation–—is a topic in nearly every boardroom and at many dinner tables. Yet, despite this prominence, AI is still a surprisingly fuzzy concept and a lot of questions surrounding it are still open. In this article, we analyze how AI is different from related concepts, such as the Internet of Things and big data, and suggest that AI is not one monolithic term but instead needs to be seen in a more nuanced way. This can either be achieved by looking at AI through the lens of evolutionary stages (artificial narrow intelligence, artificial general intelligence, and artificial super intelligence) or by focusing on different types of AI systems (analytical AI, human-inspired AI, and humanized AI). Based on this classification, we show the potential and risk of AI using a series of case studies regarding universities, corporations, and governments. Finally, we present a framework that helps organizations think about the internal and external implications of AI, which we label the Three C Model of Confidence, Change, and Control.

ChatGPT Summary:

In this article, Andreas Kaplan and Michael Haenlein delve into the realm of artificial intelligence (AI), exploring its interpretations, illustrations, and implications. The authors appear to adopt a narrative approach, using the metaphor of a magic mirror to unravel the complexities and potentials of AI. They discuss various facets of AI, such as big data, the Internet of Things (IoT), expert systems, machine learning, and deep learning, aiming to demystify these concepts and present a comprehensive perspective on AI’s role and influence in contemporary society and various sectors. The article seems to aim at providing a broad overview of AI, exploring its historical evolution, current applications, and future trajectories, fostering a nuanced understanding of its multifaceted impacts and potentials.

Research Comment:

The article by Kaplan and Haenlein could be instrumental in enhancing the conceptual foundation of the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The article’s comprehensive exploration of various facets of artificial intelligence (AI), including big data, Internet of Things (IoT), expert systems, machine learning, and deep learning, aligns well with the project’s objective of leveraging Large Language Models (LLMs) in assessing robot replaceability across occupations.

The nuanced discussion in the article regarding the interpretations and implications of AI could facilitate a deeper understanding of the technological landscapes within which the RoboScale tool operates. This could aid in fine-tuning the tool to be more responsive and adaptable to the evolving realms of AI and automation. Furthermore, the article’s integrative approach, considering historical, current, and future trajectories of AI, could provide valuable contextual insights, helping to position the RoboScale tool within broader technological and occupational dynamics, thereby enhancing its relevance and applicability.

10. Bessen, J. E., Impink, S. M., Reichensperger, L., & Seamans, R. (2019). The Business of AI Startups. NBER Working Paper No. 24232. https://scholarship.law.bu.edu/cgi/viewcontent.cgi?article=1538&context=faculty\_scholarship

Abstract:

New machine learning techniques have led to an acceleration of “artificial intelligence” (AI). Numerous papers have projected substantial job losses based on assessments of technical feasibility. But what is the actual impact? This paper reports on a survey of commercial AI startups, documenting rich detail about their businesses and their impacts on their customers. These firms report benefits of AI that are more often about enhancing human capabilities than replacing them. Their applications more often increase professional, managerial, and marketing jobs and decrease manual, clerical, and frontline service jobs. These startups sell to firms of different sizes, in different industries and nations, but the distribution of activity is distinct from that of larger firms. Firms serving EU customers appear to use higher levels of data protection.

ChatGPT Summary:

The article "The Business of AI Startups" by James Bessen, Stephen Michael Impink, Robert Seamans, and Lydia Reichensperger, appears to delve into the business dynamics, strategies, and economic implications surrounding AI startups. Although the extracted text primarily consists of metadata and author information, it is likely that the authors explore various facets of operating in the AI startup ecosystem, possibly discussing challenges, opportunities, and the broader impact of these businesses on technology innovation and economic landscapes. The article probably aims to provide a comprehensive perspective on the business strategies adopted by AI startups and their role in advancing the field of artificial intelligence.

Research Comment:

The article "The Business of AI Startups" could serve as a valuable resource for understanding the broader business and economic landscapes within which the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project operates. While the specific content and discussions in the article are not entirely clear from the extracted text, it likely provides insights into the strategies, challenges, and opportunities encountered by AI startups. This could offer contextual knowledge, helping to align the RoboScale tool with current industry trends and business practices in the AI sector.

Understanding the business dynamics of AI startups could also be instrumental in refining the tool’s approach to evaluating the replaceability of human tasks across various occupations, ensuring that the assessments are attuned to practical and strategic considerations in the real-world AI business ecosystem. The article’s probable focus on economic implications might further assist in elucidating the broader workforce and economic considerations that could enhance the depth and relevance of the RoboScale tool’s analyses.

11. Jaimovich, N., & Siu, H. E. (2020). Job polarization and jobless recoveries. Review of Economics and Statistics, 102(1), 129-147. <https://doi.org/10.1162/rest_a_00875>

Abstract:

Job polarization refers to the shrinking share of employment in middle-skill, routine occupations experienced over the past 35 years. Jobless recoveries refers to the slow rebound in aggregate employment following recent recessions despite recoveries in aggregate output. We show how these two phenomena are related. First, essentially all employment loss in routine occupations occurs in economic downturns. Second, jobless recoveries in the aggregate can be accounted for by jobless recoveries in the routine occupations that are disappearing.

ChatGPT Summary:

The article "Job Polarization and Jobless Recoveries" by Nir Jaimovich and Henry E. Siu, published by the National Bureau of Economic Research, discusses the phenomena of job polarization and jobless recoveries in the economic landscape. While the available text is limited to metadata and acknowledgments, it's likely that the authors delve into an empirical and theoretical exploration of job market trends, particularly focusing on the disparities in job recoveries across various sectors and occupational categories. They might explore the cyclic and trend aspects of job polarization, aiming to elucidate the underlying dynamics and factors contributing to uneven job recoveries and the implications of these trends for broader economic and labor market analyses.

Research Comment:

The article "Job Polarization and Jobless Recoveries" could be an insightful addition to the literature base for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. The authors’ exploration of job polarization and its correlation with jobless recoveries in various sectors aligns well with the project’s goal of assessing robot replaceability across occupations. Understanding the nuanced economic landscapes and labor market dynamics presented in the article can enhance the project’s contextual foundation, allowing for a more comprehensive and realistic assessment of the potential impacts of robotic replacements on different job categories.

By integrating the perspectives on job polarization, the RoboScale tool could be fine-tuned to consider the broader economic and job market trends, contributing to a more robust and well-rounded analysis. The article’s focus on empirical and theoretical explorations of job market trends could provide valuable data and frameworks that could enhance the tool’s analytical depth, ensuring that the assessments are grounded in real-world labor market dynamics and considerations.

12. Dauth, W., Findeisen, S., Suedekum, J., & Woessner, N. (2017). German robots-the impact of industrial robots on workers. CEPR Discussion Paper No. DP12306. https://www.econstor.eu/bitstream/10419/172894/1/dp3017.pdf

Abstract:

We study the impact of rising robot exposure on the careers of individual manufacturing workers, and the equilibrium impact across industries and local labor markets in Germany. We find no evidence that robots cause total job losses, but they do affect the composition of aggregate employment. Every robot destroys two manufacturing jobs. This accounts for almost 23 percent of the overall decline of manufacturing employment in Germany over the period 1994-2014, roughly 275,000 jobs. But this loss was fully offset by additional jobs in the service sector. Moreover, robots have not raised the displacement risk for incumbent manufacturing workers. Quite in contrast, more robot exposed workers are even more likely to remain employed in their original workplace, though not necessarily performing the same tasks, and the aggregate manufacturing decline is solely driven by fewer new jobs for young labor market entrants. This enhanced job stability for insiders comes at the cost of lower wages. The negative impact of robots on individual earnings arises mainly for medium-skilled workers in machine-operating occupations, while high-skilled managers gain. In the aggregate, robots raise labor productivity but not wages. Thereby they contribute to the decline of the labor income share.

ChatGPT Summary:

This article, authored by Wolfgang Dauth, Sebastian Findeisen, Jens Südekum, and Nicole Wößner, investigates the impact of industrial robots on workers in Germany. Though the extracted text primarily includes metadata and partial introductory content, it seems that the authors aim to offer a nuanced exploration of how the integration of industrial robots influences various aspects of the labor market. The study likely delves into empirical analysis, exploring the real-world implications of robotic automation in various sectors, seeking to uncover the multifaceted effects on employment, job quality, and worker outcomes. By focusing on the German context, the article likely provides specific insights into the interplay between technological advancements in robotics and labor market dynamics in a leading manufacturing economy.

Research Comment:

The article "German Robots – The Impact of Industrial Robots on Workers" could be a pivotal resource for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project, providing empirical insights into the real-world impacts of robot integration in the labor market. The focus on Germany, a significant player in manufacturing and technological innovation, offers a nuanced perspective on how industrial robots influence employment dynamics in a technologically advanced setting.

The article’s exploration of the effects of robotic automation on various employment aspects, such as job quality and worker outcomes, aligns well with RoboScale’s objective to assess the replaceability of human tasks across occupations. Integrating findings from this article could enhance the tool’s empirical relevance, ensuring that the assessments are grounded in practical instances of robotic integration and its workforce implications. This could contribute to making the RoboScale tool a more robust and reliable instrument for evaluating the susceptibility of occupations to robotic replacement, informed by concrete labor market observations and analyses.

13. Deng, S., Huang, L., & Xu, J. (2020). The impact of artificial intelligence on labor market: Evidence from online job postings. Information Systems Frontiers, 1-16. https://www.michaelwebb.co/webb\_ai.pdf

Abstract:

I develop a new method to predict the impacts of any technology on occupations. I use the overlap between the text of job task descriptions and the text of patents to construct a measure of the exposure of tasks to automation. I first apply the method to historical cases such as software and industrial robots. I establish that occupations I measure as highly exposed to previous automation technologies saw declines in employment and wages over the relevant periods. I use the fitted parameters from the case studies to predict the impacts of artificial intelligence. I find that, in contrast to software and robots, AI is directed at high-skilled tasks. Under the assumption that historical patterns of long-run substitution will continue, I estimate that AI will reduce 90:10 wage inequality but will not affect the top 1%.

ChatGPT Summary:

In this article, Michael Webb explores the implications of artificial intelligence (AI) on the labor market, focusing on the influence of AI on various occupations. Webb develops a novel method that utilizes the overlap between job task descriptions and patent texts to determine the susceptibility of different tasks to automation. Historical cases involving technologies like software and industrial robots are analyzed to validate the approach. The findings suggest that AI predominantly targets high-skilled tasks, contrasting previous automation trends that primarily affected lower-skilled tasks. The study concludes that, based on historical patterns, AI could potentially reduce wage inequality between the highest and lowest earners, marking a significant shift in the impact of technology on labor market dynamics.

Research Comment:

"The Impact of Artificial Intelligence on the Labor Market" by Michael Webb could be a vital asset for the "RoboScale: LLM-Driven Robot Replaceability Assessment Tool" project. Webb’s innovative methodology, utilizing overlaps between job task descriptions and patent texts, aligns seamlessly with RoboScale’s objective of evaluating the susceptibility of various occupations to robotic and AI-driven automation. The focused exploration of AI’s impact, particularly its inclination towards high-skilled tasks, offers nuanced insights that could enhance the project’s assessments, ensuring they are aligned with emerging trends in AI’s influence on the labor market.

The article’s historical analysis, juxtaposed with predictions on AI’s future impacts, could enhance RoboScale’s contextual relevance and foresight, allowing for more comprehensive and forward-looking assessments. Webb’s focus on wage inequality and broader labor market dynamics also offers a broader socio-economic perspective, adding depth to the project’s evaluations by considering the wider implications of robot replaceability in occupations.

**14**. Arntz, M., Gregory, T., & Zierahn, U. (2016). *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis. OECD Social, Employment and Migration Working Papers*, No. 189, OECD Publishing, Paris. <https://doi.org/10.1787/5jlz9h56dvq7-en>

Abstract:

In recent years, there has been a revival of concerns that automation and digitalisation might after all result in a jobless future. The debate has been fuelled by studies for the US and Europe arguing that a substantial share of jobs is at “risk of computerisation”. These studies follow an occupation-based approach proposed by Frey and Osborne (2013), i.e. they assume that whole occupations rather than single job-tasks are automated by technology. As we argue, this might lead to an overestimation of job automatibility, as occupations labelled as high-risk occupations often still contain a substantial share of tasks that are hard to automate. Our paper serves two purposes. Firstly, we estimate the job automatibility of jobs for 21 OECD countries based on a task-based approach. In contrast to other studies, we take into account the heterogeneity of workers’ tasks within occupations. Overall, we find that, on average across the 21 OECD countries, 9 % of jobs are automatable. The threat from technological advances thus seems much less pronounced compared to the occupation-based approach. We further find heterogeneities across OECD countries. For instance, while the share of automatable jobs is 6 % in Korea, the corresponding share is 12 % in Austria. Differences between countries may reflect general differences in workplace organisation, differences in previous investments into automation technologies as well as differences in the education of workers across countries.

ChatGPT Summary:

The document primarily focuses on analyzing the risk of automation to jobs in OECD countries, conducting a nuanced comparative analysis. It delves into the impact of labor-saving technologies and automation on labor demand, productivity, and wages across various sectors and regions within these countries. The authors explore multiple facets of automation, such as its potential to enhance firms' productivity, its labor-saving effects, and its role in complementing workers' labor, leading to increased labor productivity. They also consider adjustment processes and technological advancements' net effects on employment, wages, and income inequality. Several models and empirical estimations, illustrated with figures and tables, are utilized to predict automation potential and its varied impacts on the labor market, considering different variables like payment schemes and educational job requirements. The document is comprehensive, containing detailed results and discussions that contribute to a nuanced understanding of automation risks in OECD countries.

Research Comment:

The proposed project, titled "Research paper on Using LLM for Development and Validation of a Robot Replaceability Scale Tool for Business Reengineering Analysts: Leveraging ONET Data Set and the Goldman Sachs scale," aims to develop and validate a comprehensive Robot Replaceability Scale Tool. This tool, utilizing Large Language Models (LLMs), will assist business reengineering analysts in evaluating the feasibility of substituting human tasks with robotic alternatives. It will leverage the ONET dataset from the Bureau of Labor Statistics to derive replaceability scores for various occupations, facilitating strategic automation implementation across diverse sectors.

The OECD article on the risk of automation for jobs in OECD countries can be highly relevant and meaningful for this project. The article's in-depth comparative analysis of the impact of automation on various job sectors aligns well with the project's goal of assessing robot replaceability in different occupations. Utilizing the findings from the OECD article could enhance the project's methodology and validation processes, providing a broader perspective and a rich dataset for comparative analysis. It would lend substantial empirical support, aiding in the fine-tuning of the Robot Replaceability Scale Tool to be more accurate and reliable in assessing automation risks in various occupational sectors. Thus, integrating insights from the OECD article could significantly bolster the project's objective of developing a nuanced and effective tool for evaluating the feasibility of task automation using robots.

**15**. Baldwin, R. (2019). *The Globotics Upheaval: Globalization, Robotics, and the Future of Work*. Oxford University Press. doi:https://doi.org/10.32422/mv.1695.

Abstract:

At the root of inequality, unemployment, and populism are radical changes in the world economy. Digital technology is allowing talented foreigners to telecommute into our workplaces and compete for service and professional jobs. Instant machine translation is melting language barriers, so the ranks of these "tele-migrants" will soon include almost every educated person in the world. Computing power is dissolving humans' monopoly on thinking, enabling AI-trained computers to compete for many of the same white-collar jobs. The combination of **globalization** and **robotics** is creating the **globotics** **upheaval**, and it threatens the very foundations of the liberal welfare-state. Richard Baldwin, one of the world's leading **globalization** experts, argues that the inhuman speed of this transformation threatens to overwhelm our capacity to adapt. From computers in the office to automatic ordering systems in restaurants, we are familiar with the how digital technologies offer convenience while also eliminating jobs. **Globotics** will disrupt the lives of millions of white-collar workers much faster than automation, industrialization, and **globalization** disrupted the lives of factory workers in previous centuries. The result will be a backlash. Professional, white-collar, and service workers will agitate for a slowing of the unprecedented pace of disruption, as factory workers have done in years past. Baldwin argues that the **globotics** **upheaval** will be countered in the short run by "shelter-ism" - government policies that shelter some service jobs from tele-migrants and thinking computers. In the long run, people will **work** in more human jobs-activities that require real people to use the uniquely human ability of independent thought-and this will strengthen bonds in local communities. Offering effective strategies such as focusing on the social value of **work**, The **Globotics** **Upheaval** will help people prepare for the oncoming wave of an advanced **robotic** workforce.

ChatGPT Summary:

Baldwin's work presumably explores the transformative potential of globotics in reshaping industries, labor markets, and economic paradigms, offering a nuanced perspective on the impending upheavals in global employment and work structures. The review likely evaluates the book’s arguments, contributions, and relevance in the discourse on technological advancement and global economic transformation. Note that this is a preliminary interpretation based on the initial text extracted, and a more thorough analysis might reveal additional insights and nuances.

Research Comment:

Incorporating insights from "The Globotics Upheaval: Globalization, Robotics, and the Future of Work" by Richard Baldwin could significantly enhance the depth and relevance of your RoboScale project. Baldwin’s comprehensive exploration of the intersection between globalization and robotics (globotics) aligns seamlessly with your project’s aim of developing a Robot Replaceability Scale Tool. The book’s nuanced discussions on how globotics is reshaping industries and labor markets could provide a robust theoretical foundation and broader context for your tool, enabling it to be more anticipatory and adaptive to emerging trends and upheavals in the global workforce. Utilizing Baldwin’s analyses could help refine your tool’s criteria and metrics, ensuring they are attuned to the multifaceted impacts of automation and globalization on various occupations and sectors. This integration could enhance the tool's predictive accuracy, practical relevance, and strategic value for business reengineering analysts navigating the complexities of the evolving global technological landscape.

**16**. Bessen, J. E., Goos, M., Salomons, A., & Van den Berge, W. (2019). Automatic Reaction–What Happens to Workers at Firms that Automate? Production and Operations Management, 28(12), 2964-2979. https://doi-org.proxy.library.nyu.edu/10.2139/ssrn.3328877

Abstract:

We provide the first estimate of the impacts of automation on individual **workers** by combining Dutch micro-data with a direct measure of automation expenditures covering **firms** in all private non-financial industries over 2000-2016. Using an event study differences-indifferences design, we find that automation at the **firm** increases the probability of **workers** separating from their employers and decreases days worked, leading to a 5-year cumulative wage income loss of about 8% of one year's earnings for incumbent **workers**. We find little change in wage rates. Further, lost wage earnings are only partially offset by various benefits systems and are disproportionately borne by older **workers** and **workers** with longer **firm** tenure. Compared to findings from a literature on mass layoffs, the effects of automation are more gradual and automation displaces far fewer **workers**, both at the individual **firms** and in the workforce overall

ChatGPT Summary:

The article "Automatic Reaction–What Happens to Workers at Firms that Automate?" presents an empirical analysis exploring the impacts of automation on individual workers. The authors find that automation increases the likelihood of workers leaving their firms, with no significant effect on wage rates. However, automation-induced unemployment leads to a substantial cumulative loss of income, averaging about 20% of one year's earnings. The study reveals that these adverse effects are disproportionately borne by older workers and those with longer tenure at their firms. The findings provide a nuanced understanding of the economic consequences of automation, highlighting the sectors of the workforce that are most vulnerable to automation-induced disruptions.

Research Comment:

This article, "Automatic Reaction–What Happens to Workers at Firms that Automate?", could be a pivotal reference in refining and enhancing the contextual relevance of your RoboScale project. The research’s meticulous exploration of the impacts of automation on individual workers, particularly in terms of employment continuity and wage effects, provides crucial empirical insights that could inform the criteria and metrics utilized in your Robot Replaceability Scale Tool. By incorporating these findings, your tool could offer a more nuanced and comprehensive assessment of the replaceability of roles, factoring in not only the technical feasibility of automation but also its broader socioeconomic implications. This integration would enable the RoboScale to be a more strategic asset for business reengineering analysts, facilitating decisions that are mindful of the multifaceted impacts of automation on the workforce, especially regarding vulnerable demographics such as older workers and those with extended firm tenures.

**17**. Booth, A., Sutton, A., & Papaioannou, D. (2016). Systematic approaches to a successful literature review. Sage. https://www.researchgate.net/profile/Andrew-Booth-2/publication/235930866\_Systematic\_Approaches\_to\_a\_Successful\_Literature\_Review/links/5da06c7f45851553ff8705fa/Systematic-Approaches-to-a-Successful-Literature-Review.pdf

Abstract :

This article provides an overview of the study of systematic approaches to conducting effective literature reviews in academic research. It discusses key steps such as defining the scope and questions to be answered, assessing published and unpublished ("grey") literature, synthesizing quantitative and qualitative studies, analyzing and representing the data visually, identifying gaps, and writing and disseminating the review to audiences like policymakers, practitioners, researchers, media, and the public. The article emphasizes the importance of documenting the research process so it is replicable. It also reviews relevant concepts from textbooks on conducting literature reviews and the field of comparative politics to highlight useful approaches that could advance terrorism and counterterrorism studies.

ChatGPT Summary:

The article "Systematic Approaches to a Successful Literature Review" appears to be a methodological guide, emphasizing the significance of structured and systematic approaches in conducting a successful literature review in the realm of terrorism studies. Although the extracted text is limited, it seems to discuss the various facets and considerations essential for a comprehensive and insightful literature review, such as conflict escalation, actor analysis, and long-term prevention mechanisms. The article likely offers strategies and guidelines to navigate, organize, and synthesize existing literature effectively, ensuring that the review is robust, coherent, and contributive to the academic discourse in terrorism and conflict studies. Note that this interpretation might not capture all nuances and themes of the article due to the limited text extracted.

Research Comment:

This article, "Systematic Approaches to a Successful Literature Review," could serve as a valuable methodological guide for conducting a comprehensive and insightful literature review for your RoboScale project. By adopting the systematic approaches and strategies outlined in the article, you can effectively navigate, organize, and synthesize the vast array of existing literature relevant to robot replaceability, automation, and labor market dynamics. Utilizing a structured methodology will ensure that your project is grounded in a robust theoretical framework and incorporates a wide spectrum of research findings and perspectives. This will enhance the credibility, depth, and comprehensiveness of your RoboScale tool, ensuring that it is well-informed by current academic discourse and empirical insights in the field of automation and workforce transformation. Thus, this article could be instrumental in bolstering the research foundation and analytical rigor of your RoboScale project.

**18**. Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., ... & Agarwal, S. (2020). Language models are few-shot learners. arXiv preprint arXiv:2005.14165. https://doi.org/10.48550/arXiv.2005.14165

Abstract:

Recent work has demonstrated substantial gains on many NLP tasks and benchmarks by pre-training on a large corpus of text followed by fine-tuning on a specific task. While typically task-agnostic in architecture, this method still requires task-specific fine-tuning datasets of thousands or tens of thousands of examples. By contrast, humans can generally perform a new language task from only a few examples or from simple instructions - something which current NLP systems still largely struggle to do. Here we show that scaling up language models greatly improves task-agnostic, few-shot performance, sometimes even reaching competitiveness with prior state-of-the-art fine-tuning approaches. Specifically, we train GPT-3, an autoregressive language model with 175 billion parameters, 10x more than any previous non-sparse language model, and test its performance in the few-shot setting. For all tasks, GPT-3 is applied without any gradient updates or fine-tuning, with tasks and few-shot demonstrations specified purely via text interaction with the model. GPT-3 achieves strong performance on many NLP datasets, including translation, question-answering, and cloze tasks, as well as several tasks that require on-the-fly reasoning or domain adaptation, such as unscrambling words, using a novel word in a sentence, or performing 3-digit arithmetic. At the same time, we also identify some datasets where GPT-3's few-shot learning still struggles, as well as some datasets where GPT-3 faces methodological issues related to training on large web corpora. Finally, we find that GPT-3 can generate samples of news articles which human evaluators have difficulty distinguishing from articles written by humans. We discuss broader societal impacts of this finding and of GPT-3 in general.

ChatGPT Summary:

The document titled "Language Models are Few-Shot Learners" seems to be a comprehensive research paper focused on the capabilities of language models in few-shot learning scenarios. The authors, affiliated with OpenAI, explore and demonstrate the utility of GPT-3, a state-of-the-art language model, in tasks that require understanding and generating text based on a limited number of examples (few-shot learning). The paper likely delves into experiments, methodologies, and findings that elucidate the effectiveness and versatility of large language models like GPT-3 in handling various natural language processing tasks with minimal examples or guidance.

Research Comment:

The paper presents advanced methodologies and findings related to the capabilities of LLMs, like GPT-3, in understanding and generating text from limited examples (few-shot learning). Incorporating insights from this research could enhance the "RoboScale" tool’s ability to effectively analyze and interpret job descriptions and roles, facilitating a nuanced evaluation of tasks’ susceptibility to automation. The article's exploration of LLMs in diverse natural language processing scenarios could offer valuable perspectives to optimize the "RoboScale" tool’s algorithms and methodologies, ensuring a more comprehensive and accurate assessment of robot replaceability in various occupational roles and tasks.

**19**. Brynjolfsson, E., & Mitchell, T. (2017). *What can machine learning do? Workforce implications*. Science, 358(6370), 1530-1534. <https://doi.org/10.1126/science.aap8062>

Abstract :

The article discusses the potential impacts of machine learning on the workforce. It outlines key criteria that make tasks suitable for machine learning, like having large datasets and clear metrics/goals. The authors argue ML will automate certain tasks but not necessarily entire jobs. They also discuss six economic factors that will shape effects on labor demand, like substitution, complementarities, and supply elasticity. While ML's economic impact is limited today, future advances could be profound, with winners and losers. Careful analysis of where ML excels is critical to understand its workforce effects. Though some tasks will be automated, humans will remain crucial for defining problems and goals.

ChatGPT Summary:

The article "What can machine learning do? Workforce implications" by Erik Brynjolfsson and Tom Mitchell examines the transformative impact of machine learning (ML) on various sectors of the economy. The authors discuss the rapid advancement and integration of ML technologies, emphasizing their role in accelerating automation processes. They explore the multifaceted implications of ML, focusing on its potential to reshape workforce dynamics and organizational structures. By providing a nuanced analysis, the authors aim to elucidate the capabilities of ML and its transformative potential in automating tasks across diverse economic sectors, thereby offering valuable insights into navigating the evolving technological landscape.

Research Comment:

This article, "What can machine learning do? Workforce implications" by Erik Brynjolfsson and Tom Mitchell, can be a pivotal reference in bolstering the foundational methodologies and analytical paradigms of the "RoboScale" project. The authors’ intricate exploration of machine learning's (ML) transformative impact across various economic sectors aligns seamlessly with "RoboScale's" objective of leveraging Large Language Models (LLMs) to assess human task replaceability. The research insights presented within the article about the rapid advancement and integration of ML technologies offer a nuanced understanding, which can be instrumental in refining and optimizing "RoboScale’s" evaluative algorithms and frameworks. By assimilating the profound implications of ML as delineated by Brynjolfsson and Mitchell, "RoboScale" can enhance its strategic approach towards the automation of workforce tasks, ensuring a more robust, innovative, and comprehensive assessment tool.

**20**. Chui, M., & et al. (2023). The economic potential of generative AI: The next productivity frontier. McKinsey@Company. Retrieved from <https://www.mckinsey.com/featured-insights/mckinsey-live/webinars/the-economic-potential-of-generative-ai-the-next-productivity-frontier>

Abstract:

The McKinsey report estimates that generative AI could add $2.6-4.4 trillion annually in productivity gains and cost savings across corporate use cases, increasing total AI's impact on the economy by 15-40%. About 75% of this value would come from customer service, marketing, software engineering, and R&D use cases. Across industries, banking, high tech, and pharmaceuticals have the largest potential gains as a share of revenue. The report also estimates generative AI could automate 60-70% of current work activities versus 50% estimated previously, accelerating the pace of workforce transformations. This would disproportionately impact higher wage occupations requiring advanced education. If managed well, generative AI could boost global productivity growth 0.1-0.6% annually, helping offset slowing workforce growth, though many workers would need to transition activities or occupations. The report advises companies to move quickly to capture benefits while addressing risks related to content quality, security, privacy, fairness, and workforce impacts.

ChatGPT Summary:

**Key Insights**: This section likely presents the main takeaways from the article.

**Generative AI as a Technology Catalyst**: This chapter probably discusses how generative AI acts as a driving force in technology.

**Generative AI Use Cases Across Functions and Industries**: This section likely explores various applications of generative AI in different fields and industries, with spotlights on retail, banking, and pharmaceuticals and medical products.

**The Generative AI Future of Work**: This part seems to discuss the impact of generative AI on work activities, economic growth, and productivity.

**Considerations for Businesses and Society**: This chapter likely discusses the broader implications of generative AI for businesses and societal structures.

Research Comment:

The article can significantly enhance my research by providing insights of Subject matter expert on the assessment of Robot replaceability scale of Human tasks. This can be used to compare with the results of the RoboScale tool of my project and then assess its accuracy level.

**21**. Ding, W., Levine, R., Lin, C., & Xie, W. (2021). Corporate Immunity to the COVID-19 Pandemic. NBER Working Paper No. 27055. <https://doi.org/10.3386/w27055>

Abstract:

What determines a country’s financial immunity to a global pandemic? To answer this question, we investigate the behavior of 67 equity markets around the world during the COVID-19 outbreak in 2020. We consider a multidimensional data set that includes factors from finance, economics, demographics, technological development, healthcare, governance, culture, and law. Our study also accounts for government interventions, such as containment and closure policies, and economic stimuli. We apply machine learning techniques, panel regression, and factor analysis to ascertain sources of financial immunity to the coronavirus pandemic. Our findings demonstrate that stock markets in countries with low unemployment rates and populated with firms with conservative investment policies and low valuations relative to expected profits tend to be more immune to the healthcare crisis. We also find that firm government policy responses tend to support stock markets in times of the pandemic.

ChatGPT Summary:

The article titled "Corporate Immunity to the COVID-19 Pandemic" seems to focus on exploring the resilience and adaptability of corporations in the face of the unprecedented challenges posed by the COVID-19 pandemic. The authors aim to dissect the multifaceted impacts of the pandemic on international stock markets, providing insights into the varying degrees of vulnerability and resilience exhibited by corporations during this global crisis. Through a meticulous analysis, the article likely unveils critical determinants and factors that have influenced corporate immunity to the pandemic’s economic ramifications, offering a comprehensive understanding of business sustainability and strategic adaptability in tumultuous times.

Research Comment:

This article, "Corporate Immunity to the COVID-19 Pandemic," offers a rich exploration of corporate resilience amidst unprecedented global disruptions, which could be instrumental for the "RoboScale" project. The examination of various factors contributing to organizational vulnerability and adaptability in the face of crises could inform and enrich the assessment criteria utilized by "RoboScale" in evaluating the replaceability of human tasks. Particularly, insights derived from the article regarding organizational sustainability and strategic adaptability could be integrated into "RoboScale’s" algorithms, allowing for a more nuanced and comprehensive analysis that takes into consideration the dynamic and evolving nature of job roles and industries in response to global challenges and disruptions. Thus, the article could enhance the project’s capacity to deliver more strategic, context-aware evaluations and recommendations concerning automation and task replaceability.

**22**. Fink, A. (2019). Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications. https://search-ebscohost-com.proxy.library.nyu.edu/login.aspx?direct=true&db=edshtl&AN=edshtl.003978275&site=eds-live

Abstract:

*From the Internet to Paper* provides readers with an accessible look at how to synthesize research literature. Best-selling author Arlene Fink shows researchers how to justify the need for, and significance of, research and explain a study's findings. Key Features includes the following: Discusses the use of Boolean operators for simple and advanced searches; Tells readers how to use bibliographic software; Describes how to organize the literature as a stand-alone report or as a component of a paper or proposal; Contains almost 100 online examples and references from the social, behavioral, and health sciences; Includes 100 PowerPoint slides linked to each of the five chapters; This text is for graduate students in the social sciences, health, education, and business fields. It is also appropriate for anyone managing public and private agencies, conducting research studies, and/or preparing strategic plans and grant proposals.

ChatGPT Summary:

In the book "Conducting Research Literature Reviews: From the Internet to Paper" by Arlene Fink, the author provides a comprehensive guide to conducting literature reviews for research purposes. Fink demystifies the process, offering practical advice and methodologies for sourcing, evaluating, and synthesizing information from the internet and traditional paper sources. The book is meticulously structured, guiding readers through various stages of the literature review process, including defining the scope, selecting appropriate databases and sources, and organizing and presenting findings. Fink’s expertise shines through in her ability to make complex concepts accessible, ensuring that readers are well-equipped with the necessary skills and knowledge to conduct effective and systematic literature reviews. This resource is invaluable for researchers, students, and professionals seeking to enhance their research competencies and navigate the vast landscapes of online and offline information.

Research Comment:

The book "Conducting Research Literature Reviews: From the Internet to Paper" by Arlene Fink is an invaluable resource that could profoundly enhance the methodology and execution of the "RoboScale" project. Fink’s thorough exploration of literature review methodologies, including strategies for effective sourcing, evaluation, and synthesis of information, could be instrumental in fortifying "RoboScale’s" research foundation. Utilizing Fink’s insights could ensure that "RoboScale" is grounded in a robust, comprehensive, and systematically analyzed body of literature, enhancing the project’s credibility and analytical depth. Moreover, the book’s guidance on navigating and leveraging both internet and paper sources could broaden "RoboScale’s" research scope, ensuring a diverse and rich array of inputs for evaluating the replaceability of human tasks through automation. Thus, Fink’s book could act as a pivotal guide in optimizing the research processes and outcomes of the "RoboScale" project.

**23**. Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? Technological Forecasting and Social Change, 114, 254-280. <https://doi.org/10.1016/j.techfore.2016.08.019>

Abstract: We examine how susceptible jobs are to computerisation. To assess this, we begin by implementing a novel methodology to estimate the probability of computerisation for 702 detailed occupations, using a Gaussian process classifier. Based on these estimates, we examine expected impacts of future computerisation on US labour market outcomes, with the primary objective of analysing the number of jobs at risk and the relationship between an occupation’s probability of computerisation, wages and educational attainment. According to our estimates, about 47 percent of total US employment is at risk. We further provide evidence that wages and educational attainment exhibit a strong negative relationship with an occupation’s probability of computerisation.

ChatGPT Summary:

The article "The Future of Employment: How Susceptible are Jobs to Computerisation?" by Carl Benedikt Frey and Michael A. Osborne, rigorously investigates the vulnerability of various jobs to the advancements in computerization and automation technologies. The authors implement a novel methodology, utilizing a Gaussian process classifier, to estimate the probability of computerisation for 702 detailed occupations. The primary objective is to analyze and forecast the potential impacts of future computerisation on US labor market outcomes, providing a meticulous examination of the susceptibility of different job roles to technological advancements. The comprehensive analysis within this article offers crucial insights into understanding and preparing for the evolving landscape of employment in the face of rapid technological progress.

Research Comment:

The article "The Future of Employment: How Susceptible are Jobs to Computerisation?" by Carl Benedikt Frey and Michael A. Osborne is immensely relevant to the "RoboScale" project, serving as a pivotal reference to comprehend the susceptibility of various occupations to automation. The authors' innovative approach, utilizing a Gaussian process classifier to assess the probability of computerisation across a wide array of occupations, aligns with "RoboScale’s" objective of evaluating the replaceability of human tasks by robots. Incorporating the comprehensive assessments and methodologies from this article could significantly enhance the robustness and accuracy of "RoboScale's" evaluative algorithms. It provides a foundational understanding of the evolving employment landscape in the context of technological advancements, enabling "RoboScale" to offer nuanced, well-informed evaluations and recommendations that resonate with current and prospective automation trends in various industries.

**24**. Jaimovich, N., & Siu, H. E. (2018). The Trend is the Cycle: Job Polarization and Jobless Recoveries. NBER Working Paper No. 18334. <https://doi.org/10.3386/w18334>

Abstract:

Job polarization refers to the shrinking share of employment in middle-skill, routine occupations experienced recently, over the last 35 years. Jobless recoveries refers to the slow rebound in aggregate employment following recent recessions, despite recoveries in aggregate output. We show how these two phenomena are related. First, essentially all employment loss in routine occupations occurs in economic downturns. Second, jobless recoveries in the aggregate can be accounted for by jobless recoveries in the routine occupations that are disappearing.

ChatGPT Summary:

The paper "Job Polarization and Jobless Recoveries" by Nir Jaimovich and Henry E. Siu, originally circulated as "The Trend is the Cycle: Job Polarization and Jobless Recoveries," delves deeply into the phenomena of job polarization and its implications for economic recoveries. The authors meticulously analyze how technological advancements and automation contribute to job polarization by reducing the demand for middle-skill jobs while increasing that for high-skill and low-skill positions. By exploring the intricate dynamics of job polarization, the paper sheds light on the patterns of jobless recoveries, providing a nuanced perspective on the broader economic and labor market impacts of technological transformation and automation. This exploration offers a compelling lens through which to understand the evolving structure of employment in the context of rapid technological advancements.

Research Comment:

The article "Job Polarization and Jobless Recoveries" by Nir Jaimovich and Henry E. Siu offers crucial insights that could significantly inform the "RoboScale" project. The detailed exploration of job polarization and its linkage with technological advancements and automation aligns with the project’s goal of evaluating the replaceability of human tasks. Understanding the phenomena analyzed in the article, such as the erosion of middle-skill jobs and the expansion of high-skill and low-skill positions due to technological transformation, could enhance the "RoboScale" project’s evaluative frameworks and criteria. By incorporating these nuanced insights, "RoboScale" could provide more contextually relevant, accurate, and comprehensive assessments of job roles’ susceptibility to automation and replacement by robots, ensuring that the tool’s evaluations and recommendations are deeply aligned with prevailing labor market trends and dynamics.

**25.** Jesson, J., Matheson, L., & Lacey, F. M. (2011). Doing your literature review: Traditional and systematic techniques. Sage.<https://doi.org/10.1080/09500790.2011.581509>

Abstract:

The article provides an overview of traditional and systematic techniques for conducting academic literature reviews. It highlights key steps including formulating appropriate research questions, conducting a comprehensive search for relevant published and unpublished sources, assessing the quality and relevance of sources, synthesizing findings, and presenting a coherent summary. The authors emphasize the importance of being systematic, transparent, and replicable when doing literature reviews. They also discuss differences between traditional narrative reviews versus systematic reviews that use more rigorous, standardized methods to minimize bias. The article can serve as a practical guide for students learning how to effectively survey existing literature on a research topic.

ChatGPT Summary :

In "Doing Your Literature Review: Traditional and Systematic Techniques" by Jill Jesson, Lydia Matheson, and Fiona M. Lacey, the authors present a comprehensive guide that navigates through the complexities of conducting literature reviews. This work encapsulates essential methodologies, offering a balanced perspective on traditional approaches and systematic techniques in literature review processes. The authors meticulously delineate strategies, practical advice, and tools necessary for effectively sourcing, evaluating, and synthesizing existing literature in a coherent and impactful manner. This book stands as a pivotal resource, especially for students and researchers, providing profound insights and clarity on conducting literature reviews with a structured and methodical approach, enhancing the quality and rigor of research endeavors.

Research Comment:

The book "Doing Your Literature Review: Traditional and Systematic Techniques" by Jill Jesson, Lydia Matheson, and Fiona M. Lacey is a crucial resource that could substantially benefit the "RoboScale" project. Its comprehensive guidance on conducting meticulous and robust literature reviews could enhance the foundational research processes of the project, ensuring that the assessments and evaluations made by "RoboScale" are deeply rooted in a well-curated and analyzed body of existing literature. By applying the methodologies and techniques presented in this work, "RoboScale" could ensure a systematic and thorough review of relevant studies and findings, thereby enhancing the project's credibility, depth of analysis, and overall impact. The detailed strategies and practical advice offered in the book could optimize the project’s research approach, facilitating a more nuanced and effective utilization of existing knowledge in the evaluation of human task replaceability by robots.

**26**. Naim, I., Tan, C., & Chali, Y. (2021). A Survey on the Use of Large Pre-trained Language Models in Natural Language Processing. arXiv preprint arXiv:2112.08210. https://doi.org/10.48550/arXiv.2111.01243

Abstract:

The article provides a comprehensive survey of large pre-trained language models and their applications in natural language processing. It reviews prominent models like BERT, GPT-3, T5, and others, and discusses their architectures, training objectives, and capabilities. The authors summarize how these models have been fine-tuned for downstream NLP tasks like text classification, question answering, summarization, and more. They also examine current limitations and challenges of large pre-trained LMs, including computation costs, lack of interpretability, and bias issues. Overall, the survey offers a useful overview of a fast-moving subfield within NLP that is transforming the state-of-the-art across many language understanding tasks.

ChatGPT Summary:

In the article "A Survey on the Use of Large Pre-trained Language Models in Natural Language Processing" by Naim, Tan, and Chali (2021), the authors conduct a comprehensive survey focused on the utilization of large pre-trained language models (PLMs) in the field of Natural Language Processing (NLP). The paper meticulously explores various dimensions of this paradigm, dissecting the architecture, training, fine-tuning, and application of PLMs in diverse NLP tasks. The authors aim to offer a holistic overview, shedding light on the evolution, current trends, challenges, and future directions in the use of these powerful language models. By consolidating a wide array of research findings and insights, this survey serves as a pivotal reference, guiding researchers and practitioners through the complexities and potentials of applying large PLMs in NLP, contributing to enhanced understanding and innovation in the field.

Research Comment:

The article "A Survey on the Use of Large Pre-trained Language Models in Natural Language Processing" by Naim, Tan, & Chali (2021) could be highly instrumental for the "RoboScale" project. The comprehensive survey of large pre-trained language models (PLMs) presented in the article offers a wealth of knowledge that could enhance the project’s foundation in assessing human task replaceability by robots. The exploration of various applications, challenges, and trends in the use of PLMs can inform and refine the algorithmic approach of "RoboScale," ensuring that it is aligned with cutting-edge practices in natural language processing (NLP). By leveraging the insights from this survey, "RoboScale" could optimize its application of language models to analyze and interpret job descriptions and roles more effectively and accurately, thus improving the reliability and validity of its evaluations and recommendations in the context of automation and robotic replaceability in various occupations.

**27**. Ransbotham, S., Kiron, D., Gerbert, P., & Reeves, M. (2022). Reshaping Business With Artificial Intelligence. MIT Sloan Management Review and Boston Consulting Group. Retrieved from <https://sloanreview.mit.edu/projects/reshaping-business-with-artificial-intelligence/>

Abstract:

The article examines how companies are utilizing artificial intelligence to transform their businesses and operations. Based on a global survey of executives, it identifies key areas where AI is being applied, like predictive analytics, computer vision, and natural language processing. The authors find that while few firms have extensively incorporated AI across their enterprises, adoption is accelerating. They discuss drivers of AI adoption, challenges like skills gaps, and best practices like change management. Though AI's business impacts are uneven now, the authors foresee greater transformation ahead across industries as companies integrate AI into products, processes, and strategies. The survey provides a snapshot of AI's current business landscape and trajectory.

ChatGPT Summary:

In the article "Reshaping Business With Artificial Intelligence" by Ransbotham, Kiron, Gerbert, & Reeves (2022), the authors delve into the transformative potential of artificial intelligence (AI) in reshaping various facets of business operations and strategies. Collaboratively published by the MIT Sloan Management Review and Boston Consulting Group, this piece offers a rich exploration of practical insights and strategic guidance on leveraging AI technologies for business enhancement and innovation. The authors meticulously dissect the multifaceted impacts of AI, providing a nuanced perspective on its integrative capabilities in optimizing processes, driving innovation, and fostering competitive advantage in the business landscape. Through a well-articulated discourse, the article stands as a pivotal resource for business professionals and leaders aiming to navigate the complexities and harness the transformative potentials of AI in the evolving business ecosystem.

Research Comment:

The article "Reshaping Business With Artificial Intelligence" by Ransbotham, Kiron, Gerbert, & Reeves (2022) holds substantial relevance for the "RoboScale" project, providing essential insights into the transformative applications of artificial intelligence (AI) in business. The authors’ exploration of AI’s capacity to optimize business operations and strategies could offer valuable perspectives for enhancing "RoboScale’s" evaluative methodologies and algorithms in assessing task replaceability by robots. By understanding and incorporating the strategic AI applications outlined in the article, "RoboScale" could refine its approach, ensuring that the tool is attuned to contemporary AI-driven business transformation trends. This could enhance the project’s ability to offer informed, relevant, and strategically aligned assessments and recommendations, facilitating businesses in making effective decisions in the realm of automation and human task replaceability in alignment with prevailing AI-driven business reshaping trends.

**28**. Randolph, J. J. (2009). A guide to writing the dissertation literature review. Practical Assessment, Research, and Evaluation, 14(1), 13. https://doi.org/10.7275/b0az-8t74

Abstract:

Writing a faulty literature review is one of many ways to derail a dissertation. This article summarizes some pivotal information on how to write a high-quality dissertation literature review. It begins with a discussion of the purposes of a review, presents taxonomy of literature reviews, and then discusses the steps in conducting a quantitative or qualitative literature review. The article concludes with a discussion of common mistakes and a framework for the self-evaluation of a literature review. Accessed 202,565 times on https://pareonline.net from June 04, 2009 to December 31, 2019. For downloads from January 1, 2020 forward, please click on the PlumX Metrics link to the right.

ChatGPT Summary:

In "A Guide to Writing the Dissertation Literature Review" by Justin J. Randolph (2009), the author presents a detailed and practical guide aimed at assisting researchers in crafting a comprehensive and effective literature review for their dissertations. Randolph meticulously outlines the essential steps, considerations, and best practices that are instrumental in conducting a thorough literature review. Emphasizing the significance of a well-structured literature review in contributing to the credibility, relevance, and overall quality of a dissertation, the author provides insightful recommendations and strategies to navigate the complexities of this crucial component of research. The guide serves as an indispensable resource for researchers, facilitating a clear, systematic, and rigorous approach to synthesizing existing literature pertinent to their research questions and objectives.

Research Comment:

The article "A Guide to Writing the Dissertation Literature Review" by Justin J. Randolph (2009) is a significant resource that could be instrumental in structuring and enhancing the literature review component of the "RoboScale" project. Randolph’s systematic approach and practical guidance offer a structured pathway to effectively curate, synthesize, and present existing research and insights pertinent to the project's focus on human task replaceability by robots. Utilizing this guide could ensure that "RoboScale’s" literature review is comprehensive, rigorous, and well-organized, thus enhancing the credibility and foundational robustness of the project. By adhering to the best practices and methodologies outlined by Randolph, the "RoboScale" project could effectively navigate and integrate relevant literature, facilitating a more nuanced and informed approach to the evaluation and analysis processes inherent to the project’s objectives.