Effects of Technology on Jobs and Employment

Saba Dzmanashvili

Department of Mathematical Sciences, KAIST

Introduction

- As the robots and technology develops and replace some of the previous work, there are questions about the future of jobs. In the past people also have predicted that the world will be affected by this "new disease", called "technological employment".
- However, history shows that automation does often lead to growing employment: if the number of employees working in the company decreased, then the number of companies and demand on the market increased instead.
- Automation in the past did not necessarily lead to mass job loss. So, key question is why automation sometimes leads job growth and sometimes not.
- And James Bessen argues that answer of that question is because of nature of demand for the employment (job skills) which is changing over time, and adds that impact of automation may be a reallocation of jobs rather than a loss of jobs.

Literature Review

- James Bessen (2019, 12 Sep.) *Automation and Jobs: When Technology Boosts Employment*
  - Discusses the various impacts the development of technologies may have on the occupations and employment with the historical data, and states that some of the jobs will reallocate and some of them will be forever disappeared.
- McKinsey&Company (2017, Jan.) *A Future that Works*
  - Analyses hoe the automation will change the global economy and structure and how technical and economic factors will affect the pace of automation.

Objectives

- Determine the rate of change and growth of technologies and AI.
- Estimate the effect of this trend in the future on the employment and jobs.
- Which occupations and industry sectors are going to be affected by the new technologies? and which occupations and industry sectors are going to vanish in the following decades to come.

Methodology

- I aimed to define the trends among the various occupations and industry.
  - For that I used the **quantitative secondary data** describing the number of people employed in their jobs and sectors.
  - Collected employment data from the sources:
    - World Bank Open Data website (https://www.Data.WorldBank.org/)
    - International Labour Organization website (https://www.ILOStat.ILO.org/)
    - US Bureau of Labor Statistics website (https://www.BLS.gov/)
  - Used Excel to combine all the necessary data in one file,
  - Filtered the dates, specified the period for interest, and combined some of the occupations (they were expanded unnecessarily).
  - This type of research method makes large number of data into small and useful amount of information.
- I aimed to define the skills required for each occupations and how much of it can be automated.
  - For that I used the **qualitative secondary data** about description of occupation and skill categories.
  - For text and document analysis collected the text from:
    - Handbook of Occupational Groups and Families - U.S. Office of Personnel Management, December 2018
    - Chart of Skill Categories, Skill Sets and Sample Career Options (https://www.SkillScan.com/)
  - Used Word and then Excel to copy and paste all the text from each source into one file.
  - Used Text Classifier of https://MonkeyLearn.com in order to specify required job skills for each occupation.
  - This type of research method interprets social or human problem based on building a complex picture formed with words reporting detailed information.

Result: Table

- Ased Aliquet Luctus Lectus

Occupation	Employment 2020	New Jobs 2030
Food preparation and serving workers	915,400	190,800
Maids and housekeeping cleaners	1,212,800	137,500
Project management specialists	1,777,300	99,200
Sales representatives of services	985,200	97,000
Amusement and recreation attendants	264,400	85,400
...	...	...
Postman	12,200	-1,000
...	...	...
Telemarketers	119,700	-21,900
Office and administrative support workers	1,487,300	-22,900
Data entry keyers	158,400	-35,600
Retail sales workers	1,390,600	-90,200

Table 1:Employment statistics in U.S.

- For the postman job, its employment is 12,100 - 12,200 and its physical-technical skill is 55.6%. So, in the future approx. 6,750 jobs can be lost due to the automation.

Result: Figures

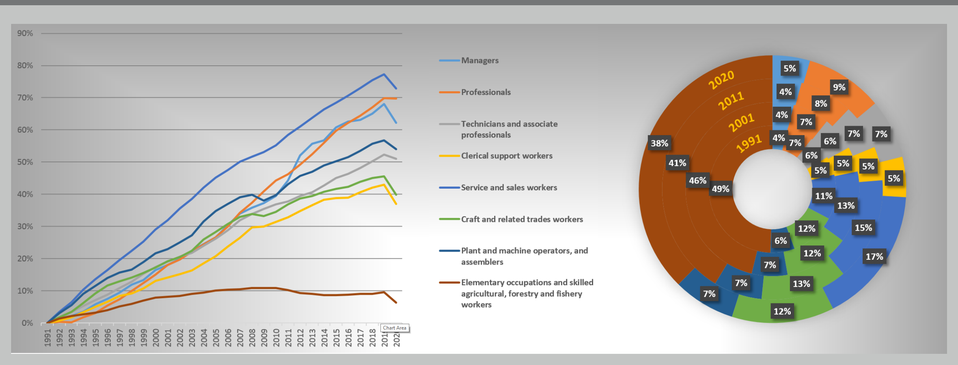

Figure 1:
Occupation growth (left) and quata (right) in 1991-2020 period

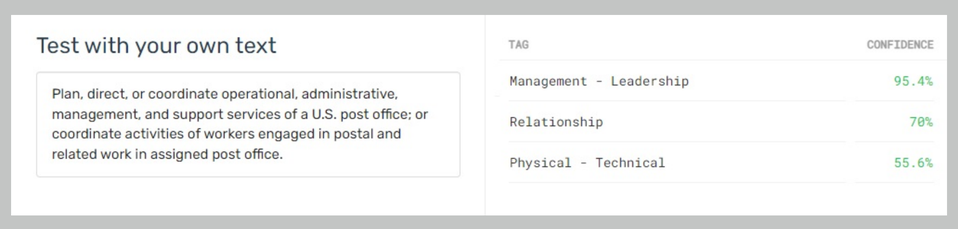

Figure 2:
Classification of U.S. Post-man's job skills

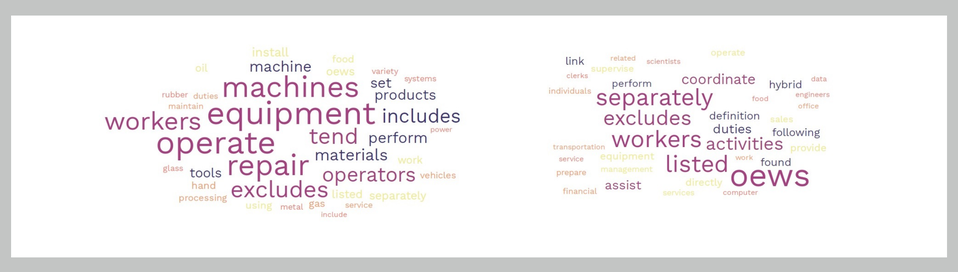

Figure 3:
Generated word clouds for Physical-Technical (left) and Management-Leadership (right) categories

Conclusion

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Ethical Concern, Open Science Policy, Limitation

- There is no ethical concern related to the research. All the data is collected from official sources and websites.
- For the limitation of my research, there can be a lot variables affecting the dynamic of economics and employment and I don't have the reach and scope to understand whole system of it. Therefore, I tried to depict the events which are visible and speak about the potential of having certain trends.