AI Job Threat

Predicting which jobs are at risk for AI replacement

Polina Minkovski

Pew Re

Which

In 2022, 19

intelligence

ILO Voices

Does Artificial Intelligence threaten decent work? | The Future of Work Podcast

The world of work has always been shaped by technology, but the new generation of Artificial Intelligence (AI) has raised fears that it...

's which are most

Forbes

Does Artificial Intelligenc

Cofounder and CEO of the Tender

investor. More than 20 years of exp

300 million jobs coul Goldman Sachs

As many as 300 million full-time jobs around the world could be automated in some way by the newest wave of artificial intelligence that has...

Top 10 Jobs Threatened by AI: Is Yours on the List?

It's another delightful day on Medium, and today we're diving into a rather spicy topic: the rise of Artificial Intelligence and the jobs...

Leaders from OpenAI, Google DeepMind, Anthropic and other A.I. labs warn that future

CNBC

These are the American workers most worried that A.I. will soon make their jobs obs

About one-quarter of workers fear jo

CNBC survey, but the majority aren't

Fox Business

AI threatens blue-collar jobs, too

Generative AI tools have been seen as a significant threat to many white-collar jobs for the past year, but blue-collar workers in...

Business Insider

ChatGPT: The

The Guardian

Tech firms to allow vetting of AI tools, as Musk warns all human jobs threatened

'There will come a point where no job is needed', says Elon Musk, who predicts 'AI will be able to do everything'

netical—just ask IBM's boss

sk IBM's boss ... The artificial intelligence es around...

Overview

Problem

The impact of Artificial Intelligence on employment prospects is a well-debated topic, but there are currently no reliable models to predict AI impact by occupation. Here, we seek to develop a model and a tool that would help job-seekers proactively upskill and optimize their job search to withstand the potential impacts of AI replacement.

Overview

Purpose:

- Create a model to predict AI Risk to jobs
- Parse which factors drive AI Risk

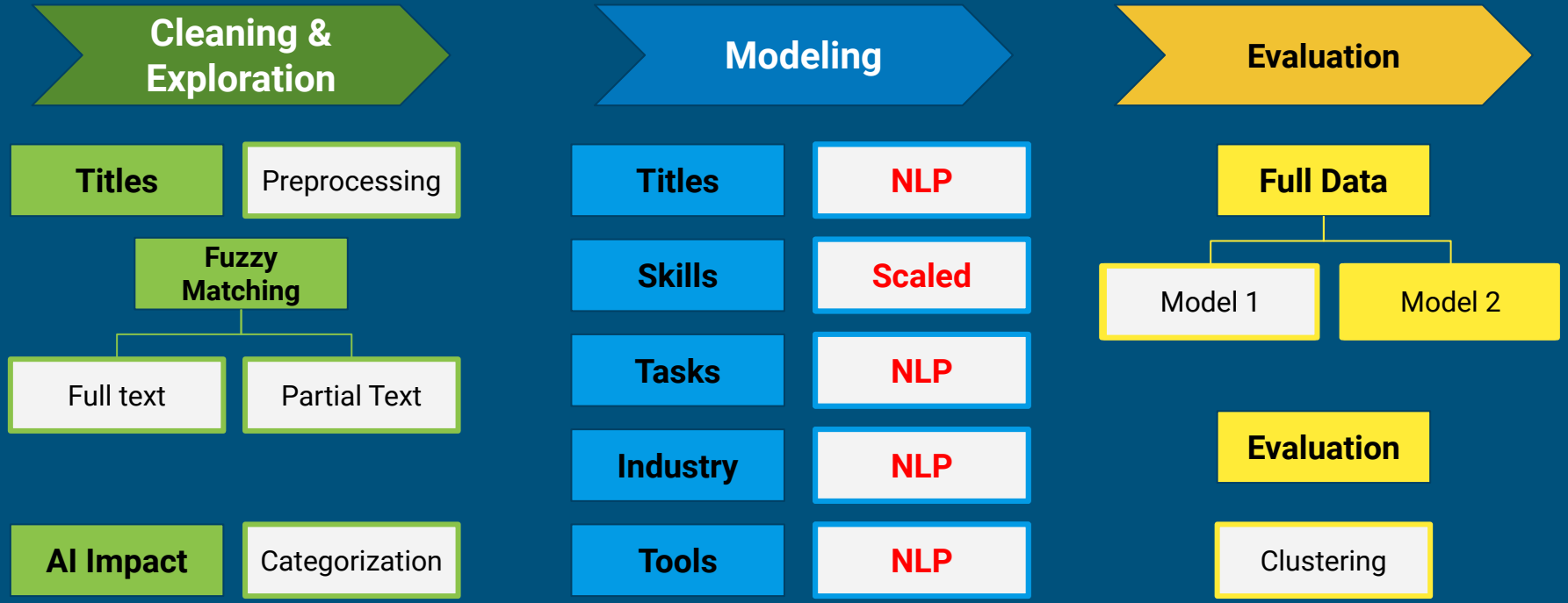
Data

- O*NET Database, US Census Bureau (Skills, Technology, Tasks, Industries by Occupation)
- AI Threat Index (a manually compiled evaluation of the potential impact from AI on jobs)

Overview


AI THREAT
4706 Job Titles with Estimated AI Impact
TASKS
161,847 tasks
SKILLS
35 skills
INDUSTRIES
21 industries
TITLE
873 occupations
JOB
TOOLS
8743 tools

Process

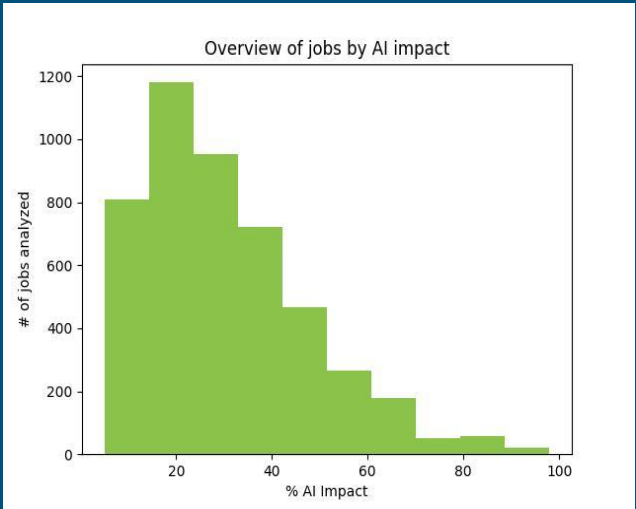

Cleaning & Exploration
Titles
Preprocessing
Fuzzy Matching
Full text
Partial Text
AI Impact
Categorization
Modeling
Titles
NLP
Skills
Scaled
Tasks
NLP
Industry
NLP
Tools
NLP
Evaluation
Full Data
Model 1
Model 2
Evaluation
Clustering

Data Overview - AI Risk

- ➡ It’s difficult to tell whether occupations are sufficiently different to warrant a ppt difference in AI Impact
- ➡ Raw AI Impact scores will be binned for a classification model analysis

Job Title	AI Impact Raw Score	AI Impact Category	Impact Rating
Communications Manager	98.0	very high	4
Data Collector	95.0	very high	4
Data Entry	95.0	very high	4
Mail Clerk	95.0	very high	4
Compliance Officer	92.0	very high	4

Data Overview - AI Risk

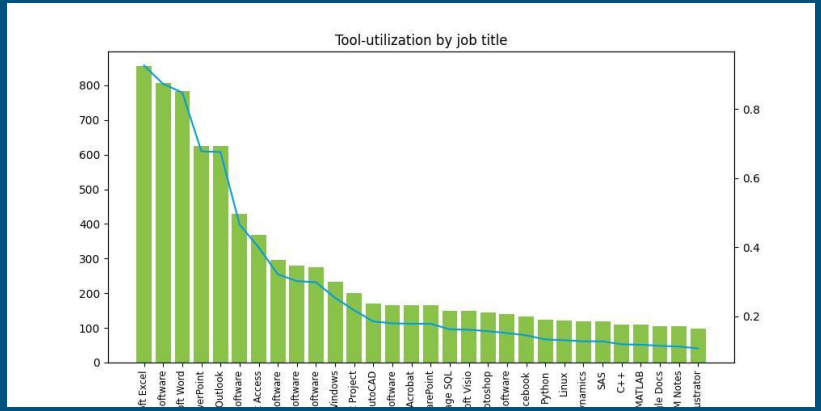


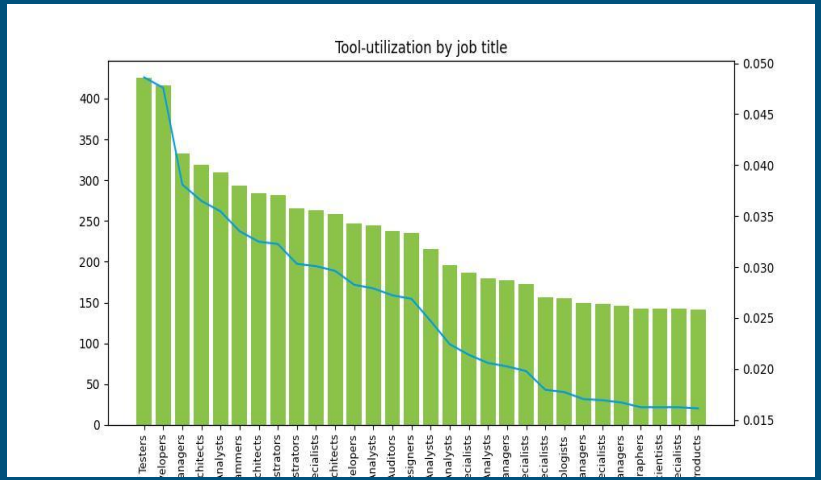
Impact Rating	% Distribution	AI Impact Category
1	0.485	Low Impact (0-25%)
2	0.352	Moderate Impact (25-50%)
3	0.135	High Impact (50-75%)
4	0.03	Very High Impact (75-100%

➡ Task data was collected such that no occupation had the same task as another.

Data Overview - Tools

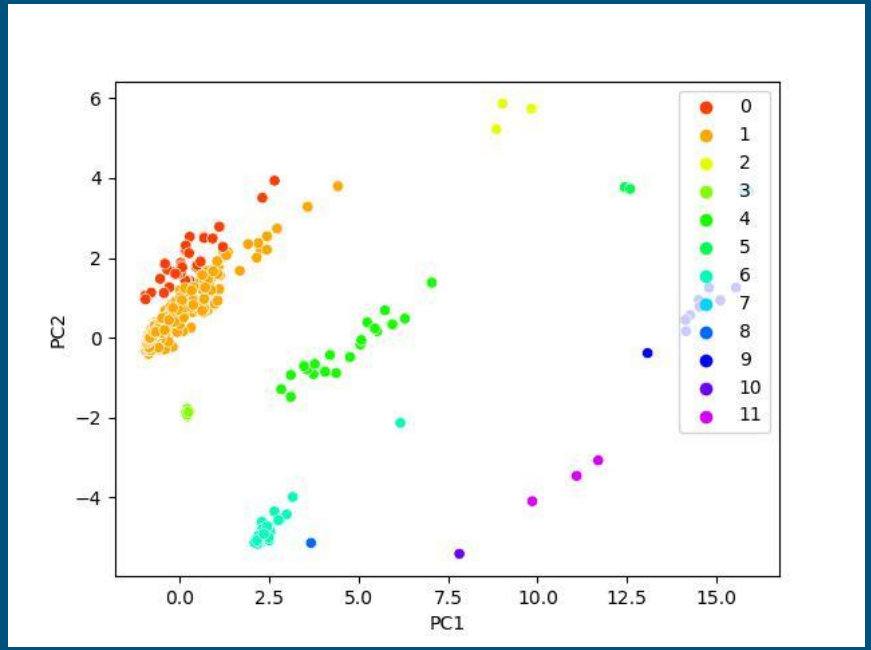
- Some tools are utilized by virtually every occupation; will not be differentiators in terms of AI Impact
- On average, occupations utilize 35 different tools (with a maximum utilization of 425)
- On average a tool is utilized by 3 different occupations (with a maximum overlap of 855 occupations)



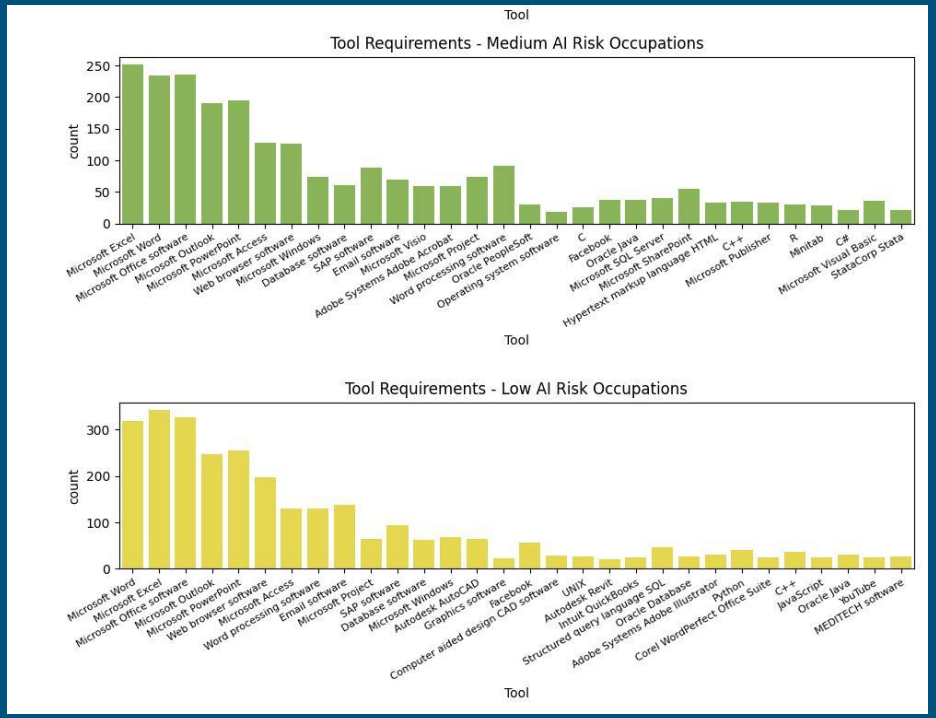


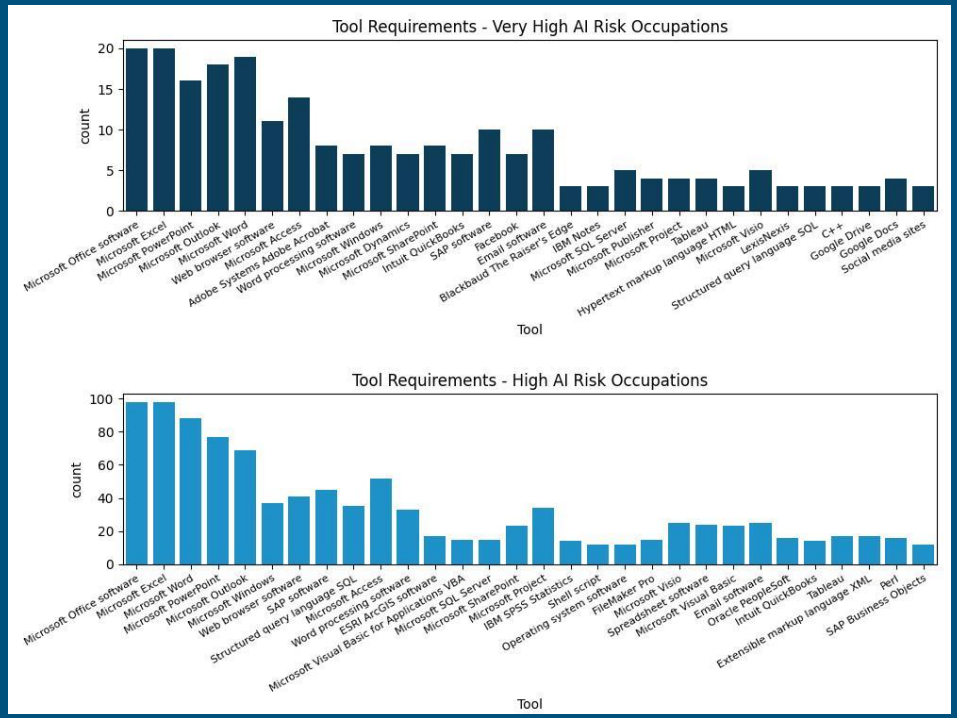
Data Overview - Tools

- ➡ Despite there being more than 8,500 tools in our analysis, all occupations could be grouped into 12 clusters
- ➡ This indicates that most tools do not provide significant differentiation across occupations

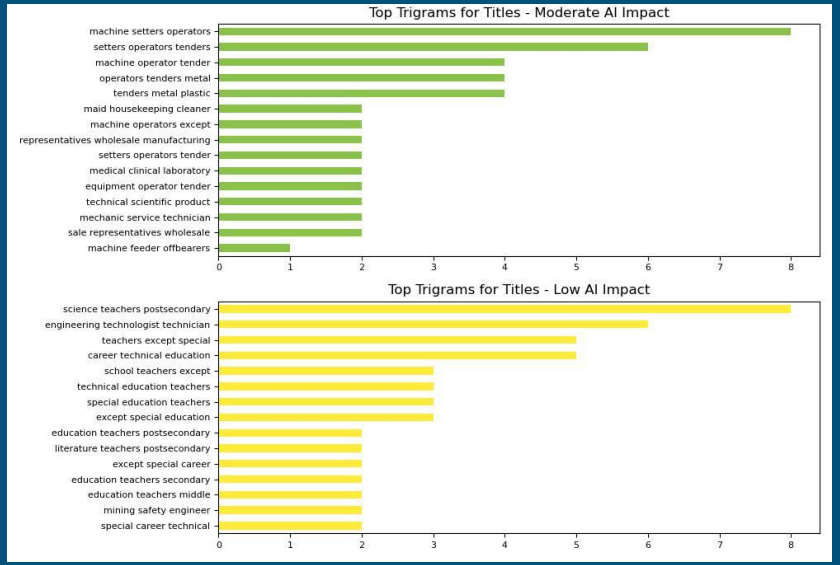


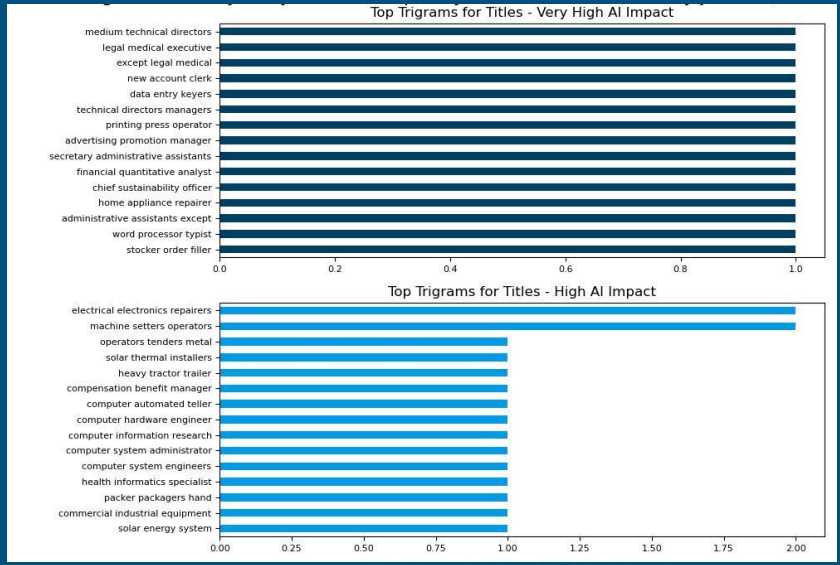
Data Overview - Tools





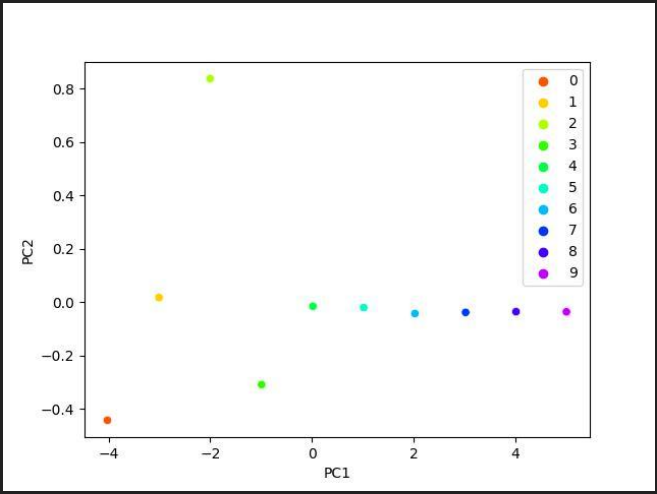
Data Overview - Titles



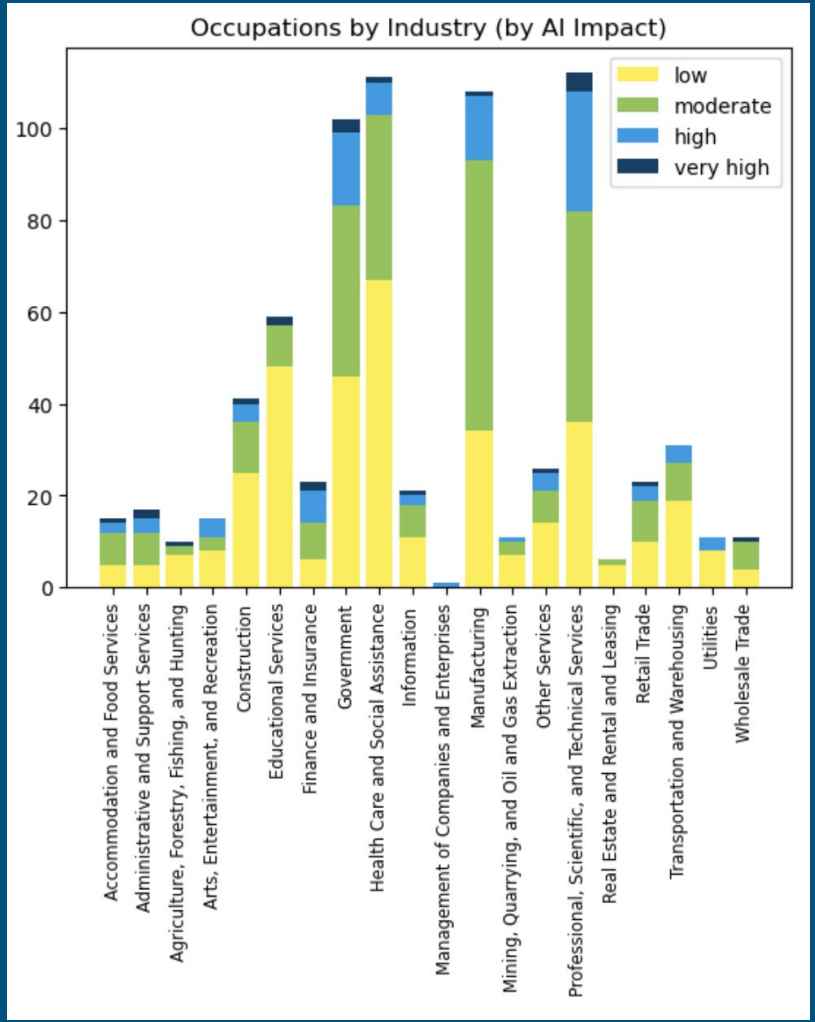


➡ Job titles provide a small insight into factors that could drive AI Impact, including a higher occurrence of titles referencing education, physical presence and laboratory work among jobs with lower AI Impact.

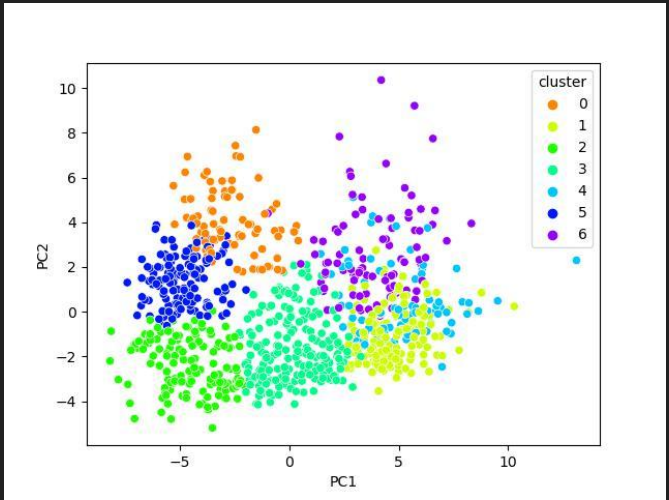
Data Overview - Industry



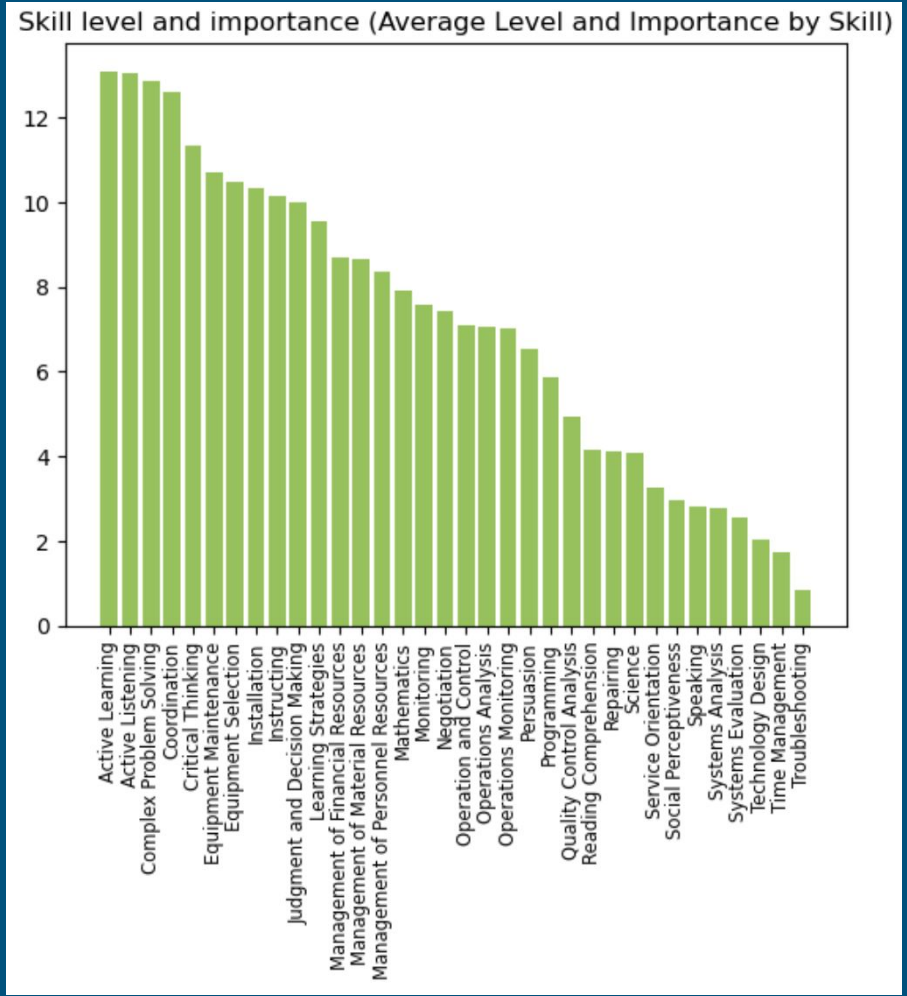
➡ While there are 21 distinct industries associated with occupations, data could be clustered into just 10 groups; indicating a significant overlap between industries in terms of transferability of occupations by industry



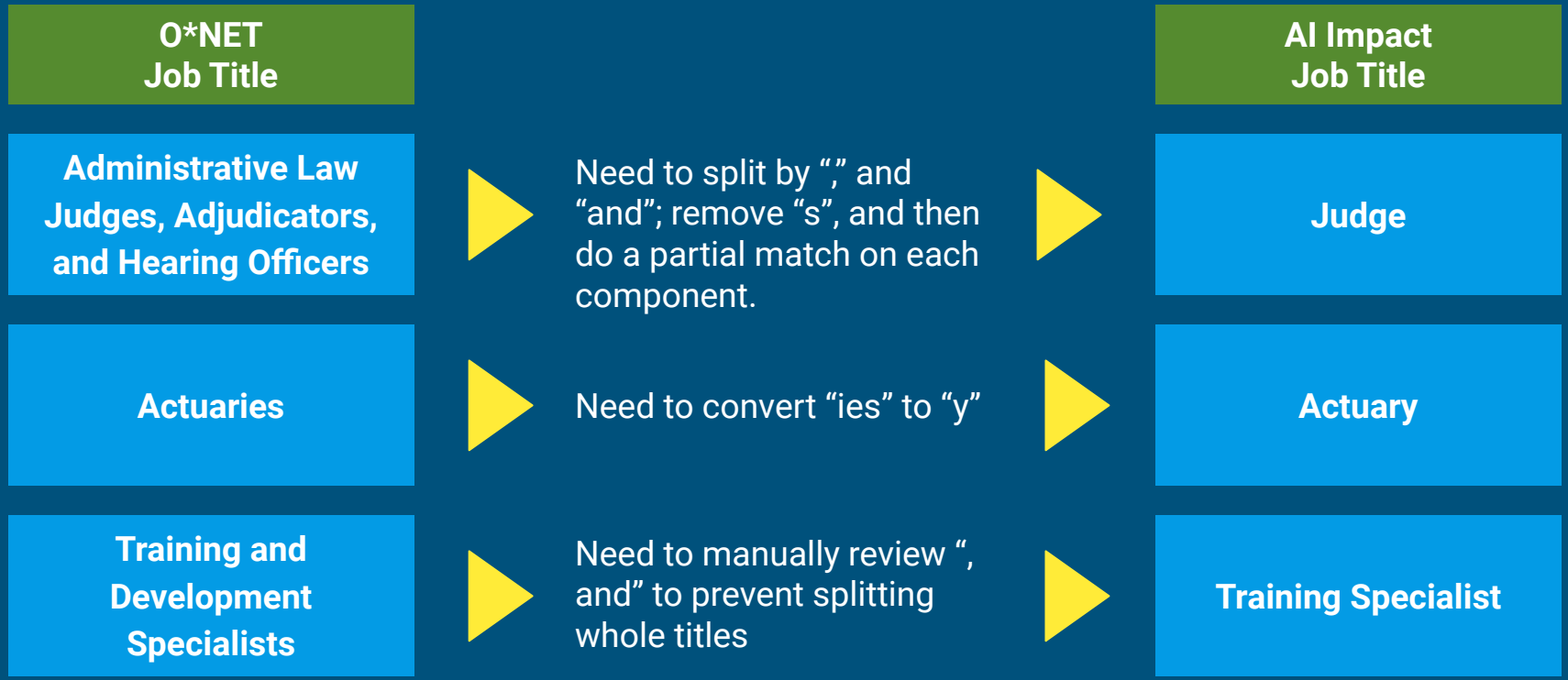
Data Overview - Skills



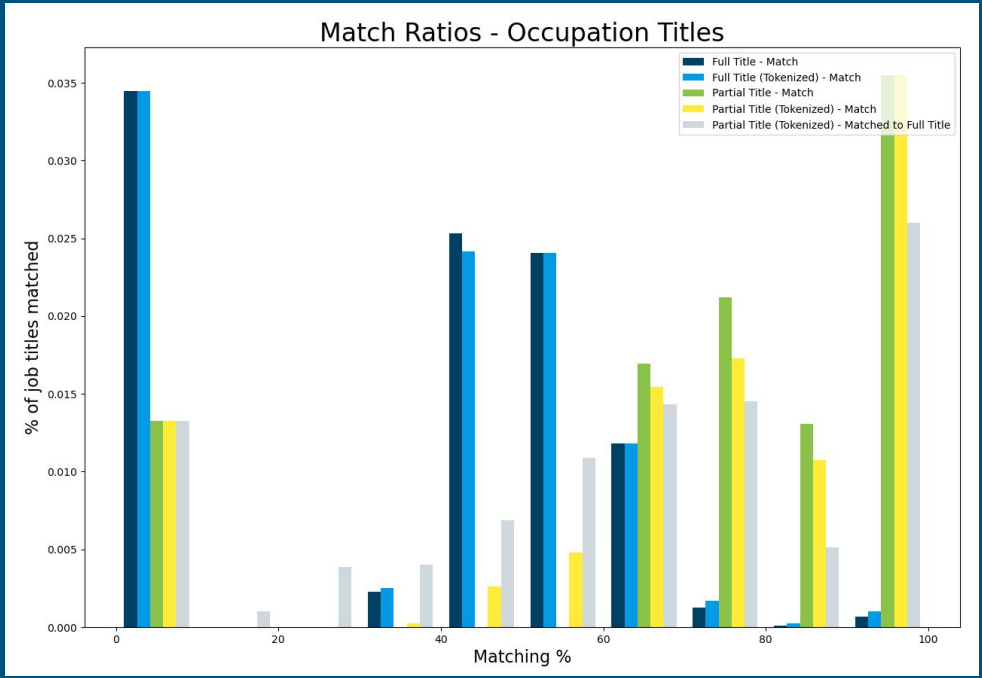
➡ Across 35 skills mapped by occupation, the most variation was achieved by organizing our occupations into 7 clusters. This is encouraging for job seekers, as it signals a general transferability of skills.



Mapping Process



Mapping Process



- The matching process that resulted in the highest % of matches above 50% was the Partial Title Match. This entailed using the first part of a split title to complete a fuzzy match.
- Fuzzy match: an algorithmic method that uses Levenshtein Distance to identify similarity between two records, based on how they perform on various parameters, such as:
  - Misspelling occurrence
  - Letter omission
  - Letter combination

Model evaluation

TASKS

Model	Score on train	Score on test
Logistical Regression TVEC - Tasks	0.79	0.495

SKILLS

Model	Score on train	Score on test
Logistical Regression - Skills	0.578	0.605

INDUSTRIES

Model	Score on train	Score on test
Logistical Regression - Industry	0.543	0.521

JOB

Model	Score on train	Score on test
Logistical Regression (CVEC) - Full	0.707	0.532

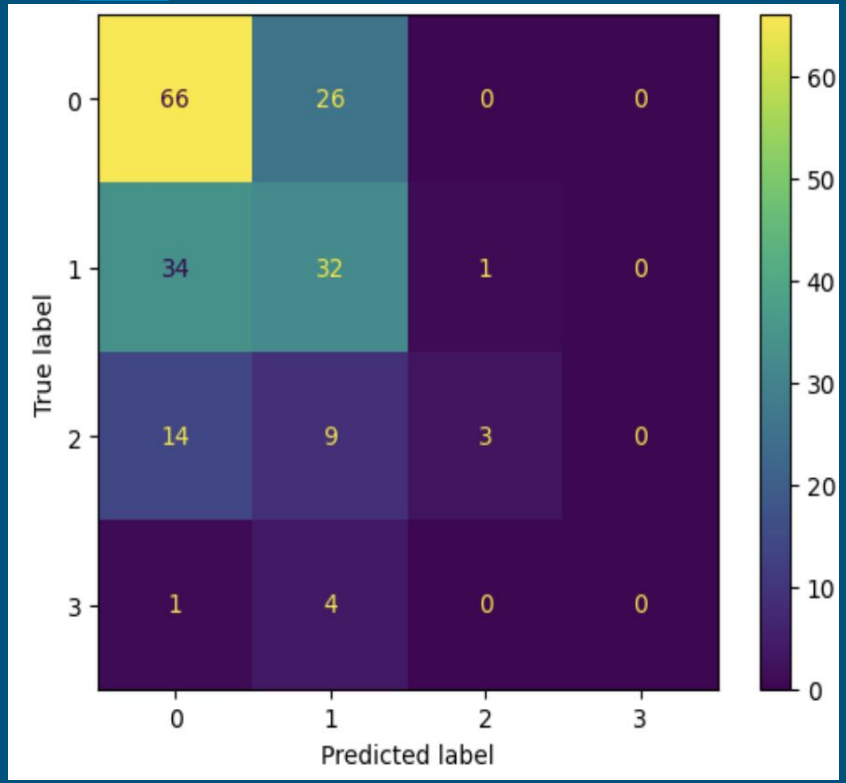
TITLE

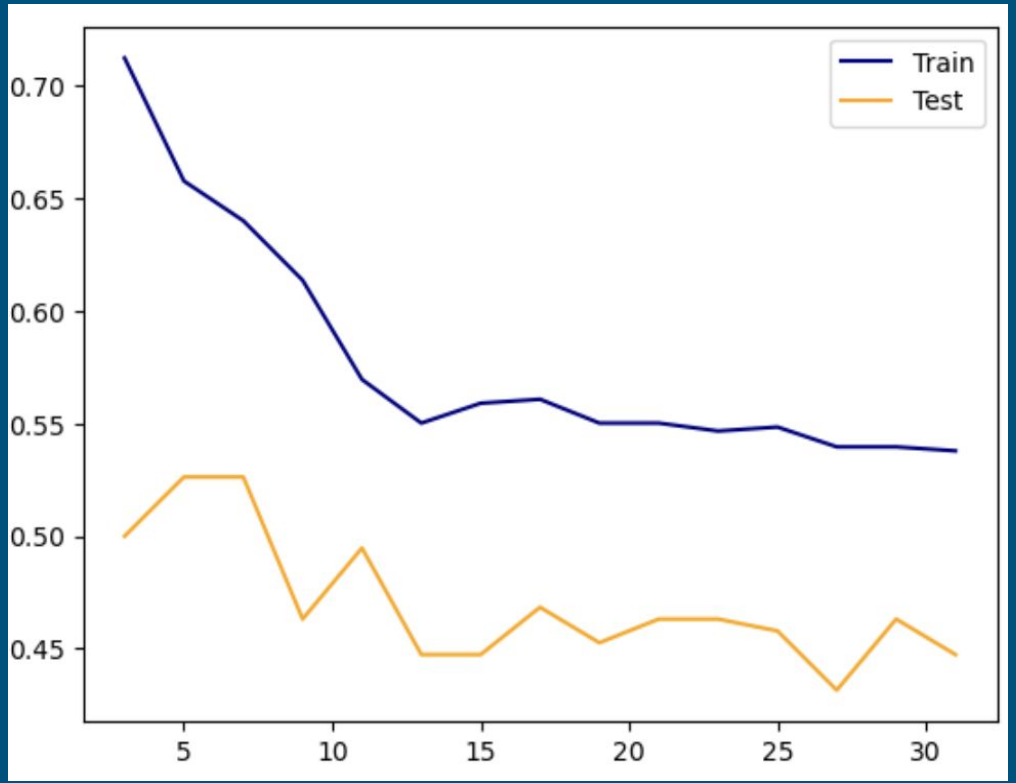
Model	Score on train	Score on test
Logistical Regression CVEC - Title	0.716	0.542

TOOLS

Model	Score on train	Score on test
Logistical Regression - Tool (Binary)	0.6	0.505

Best combined model - LogR (CVEC, L2)





Findings and Next Steps

Findings:

- While we learned that AI is difficult to predict with just parameters of a given occupation, we have established strong foundations for further evaluation and model building here.
- With more accurate and reliable target (AI Impact) data and a larger sample size, we can develop a career-guidance model for individuals to make strategic career pivots focused on the long term.
- We can also work with Lixit to connect this analysis to current job postings, and simplify the targeted job search as an immediate outcome of the model's recommendations.