

# *NSF* Job Search Fundamentals

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# Popular Online Job Search Websites

## Advantages

- Search by Job title
- Location
- Company

## Disadvantages

- Limited functionality
- Outdated ranking metrics
- Unreliable job search results
- Unorganized query results

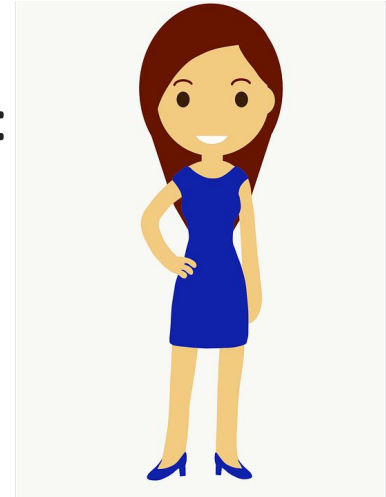


*In the Article*

# Quantifying Skill Relevance to Job Titles

**Computer Scientists** used a ranking metric to analyze job titles & quantify their relevance to:

- Skills and responsibilities
- Description
- Resume



# Goal of the Study

*“...to develop a systematic approach to assess the relevance of different skill terms for each job title.”*



1. Identifying skills
2. Quantifying skills
3. Utilizing skills

# Identifying Skills

- **Core Skills:** Accountant - Accounting
- **Stand Out Skills:** Leadership, Collaboration

# Presenting Skills and Keywords

## Chronological Resume

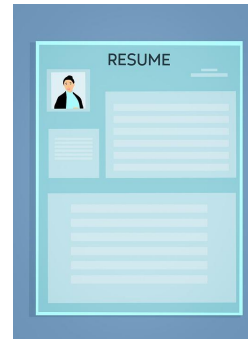
- Most widely accepted format
- Easy to scan; traditional

## Functional Resume

- Highlights transferable skills
- Minimizes experience

## Hybrid Resume

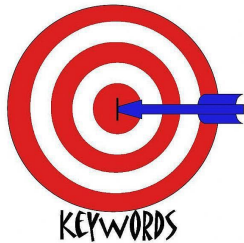
- Highlights expertise
- Still easy to scan; modern



# Using Keywords

## Job market:

- Scans keywords to match skills
- Lists results by % match



## Job seekers should:

- Use relevant skills to ↑ % match
- Test % match via [jobscan.co](https://www.jobscan.co)
- Test % match with CTRL + F

# Quantifying Skills

## Hard skills are quantifiable

- Software Development
- Research & Design
- Budgeting & Forecasting
- Project Management

## Soft skills are less quantifiable

- Problem Solving
- Energetic & Enthusiastic
- Intelligent
- Articulate



# Utilizing Skills

## Broadly:

- Skill requirements drive the economy and shape future industries

## Specifically:

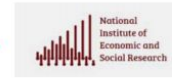
- Valuable employee skills contribute significantly to organizational growth and productivity.

*In the Article*

# An Open and Data-driven Taxonomy of Skills Extracted from Online Job Adverts

Researchers from **Economic Statistics Centre of Excellence**  
**National Institute of Economic and Social Research** proposed a taxonomy to:

- Create links between skills
- Aggregate job titles
- Capture salaries mentioned



# Goal of the Study

*“The main purpose of this paper is to outline the methodology for building the taxonomy, report initial results, and describe the skill clusters”*



1. Taxonomy methods
2. Report results
3. Describe skill clusters

# Algorithmic Methodologies

## Modeled skills as a graph

with individual skills as vertices and their co-occurrences in job adverts as edges.



## Measure relationship strength

using the frequency of actual skills co-occurrences the same advert and their shared context, based on a trained word embeddings model.



## Represent skills as a network

group them into hierarchical clusters.

## To ensure the stability of the resulting clusters

bootstrapping and consensus clustering stages are introduced into the methodology.

# Machine Learning Methods

## Used in the study:

- Word embeddings
- Network community detection
- Consensus clustering



# Skill Taxonomy Comparison

## Data driven - Open source

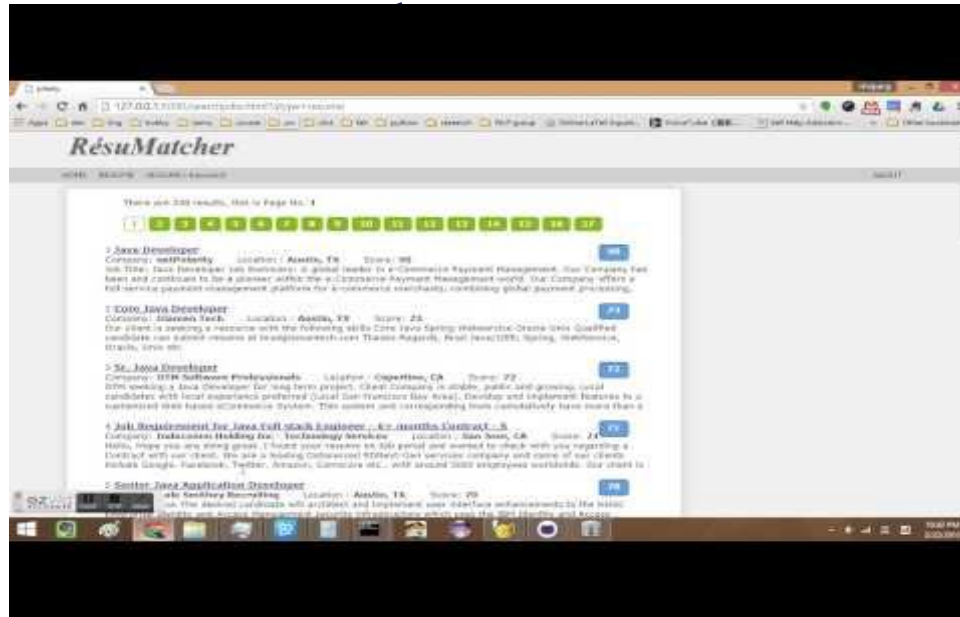
- Online Job adverts
- Resumes
- Easily updated
- Real-time
- Enriched w/ salary & title

## O\*NET & ESCO

- Expert limitations
- Expensive to maintain
- Fragmented relationships  
between skills, competences  
and knowledge requirements.

*In the Article*

# RésuméMatcher: A personalized résumé-job



<https://www.youtube.com/watch?v=raxbMIPIA4o>

# Goal of the Study

*“to reduce the difficulty and duration of the job-search process, their search functionality is insufficient.”*



RésuméMatcher calculates similarities between

1. The candidate and job models
2. The resume and job description



# Analytical Solutions

- **RésuméMatcher** uses a two-level classification taxonomy.
- **RésuméMatcher** offers a single extraction and factors the differences between job descriptions and résumés.
- **RésuméMatcher** generates a domain specific ontology of skills.
- **RésuméMatcher** uses machine learning to develop a statistical similarity measure to establish a formal relationship between skills.

# Analytical Solutions

Career Builder's **Carotene** uses a two-level classification taxonomy. This large machine learning job title classification system.

Carotene has a multitasking cascade architecture and a clustering-base job title taxonomy.

Other examples of well developed taxonomies include Amazon, eBay, and Wikipedia.

# Analytical Solutions

Tools such as **CareerCoach** provide insight for job seekers

The screenshot displays the CareerBuilder website interface. At the top left is the CareerBuilder logo. Navigation links include 'Find Jobs', 'Upload Resume', 'Career Advice', 'Explore Careers', and 'Help & Support'. On the right, there are links for 'Sign In', 'Sign Up', and 'Post Jobs'. A search bar contains the text 'Job Title, Skills, or Military Occupational Code' and 'City, State, or ZIP', with a 'Find Jobs' button. The main content area features a job listing for 'Health Information Technician'. To the left of this listing is a box titled 'Average Salaries for Health Information Technician' showing a national average of \$39,000 and a North Carolina average of \$35,500. Below the salary box is a 'Recent Job Postings' section listing an 'Automotive Master Technician / Mechanic' position at Sport Durst Chrysler Dodge Jeep in Durham, NC, posted 4 weeks ago. To the right of the job listing is a 'Sign Up for Job Alerts' section with a text input for 'Your Email', radio buttons for 'Alert Frequency' (Daily and Weekly), and a 'Create Job Alert' button. A note at the bottom states 'You can cancel job alerts at any time'.

CAREERBUILDER

Sign In Sign Up Post Jobs

Find Jobs Upload Resume Career Advice Explore Careers Help & Support

Job Title, Skills, or Military Occupational Code City, State, or ZIP Find Jobs

**Average Salaries for Health Information Technician**

National  
**\$39,000**

NC  
**\$35,500**

**Health Information Technician**

A health information technician enters, organizes, and maintains patients' health information into physical files and digital systems.

A typical day in the life of a health information technician might include:

- Recording electronic data for storage, analysis, and reporting
- Applying clinical codes to records to enhance data analysis
- Taking standard steps to ensure patient confidentiality.

**Recent Job Postings**

[Automotive Master Technician / Mechanic](#)  
Sport Durst Chrysler Dodge Jeep | Durham, NC  
4 weeks ago

**Sign Up for Job Alerts**

Never miss the latest Health Information Technician Jobs in NC

Your Email

Alert Frequency  
 Daily  
 Weekly

[Create Job Alert](#)

You can cancel job alerts at any time

# Conclusions and Future Work

*Ranking job skills appear to offer*

- Improved certainty of job ad and job skill confidence
- Increased dynamic responses
- Future work is needed





# References

<https://drive.google.com/open?id=1ctBJTcrV2bLw0ZzBHRY2KTfbXqvTjsPUaMw1PhEYU9Q>

<https://docs.google.com/document/d/1XzX6mrXtdxiDt05ctiWy7JAA6OaZ8Krl6vzGgE9mJ7o/edit?usp=sharing>

<https://drive.google.com/open?id=0B7acgCX1lwq0QIFIT1hKZ2Z1NXZJaG95b1VoUnZzLVNkdUlV>

<https://www.youtube.com/watch?v=raxbMIPIA4o>

[Big-Data Analytics and Cloud Computing Theory, Algorithms and Applications](#)