JobLex: A Lexico-Semantic Knowledgebase of Occupational Information Descriptors

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Motivation, Objective, and Summary. Technological advancements in several work sectors have influenced evolution of the landscape of work at an unprecedented speed, leading to the demand of continuous skill development [1,8]. In turn, this interests a number of stakeholders spanning across academia and industry in a number of disciplines including labor economics, who leverage large-scale data available from a variety of offline and online sources (e.g., resumes, job portals, professional social networking such as LinkedIn, search engine, job databases, etc.) [9,11,12]. On these data streams, describing job aspects and skills vary extensively, confounded by factors such as self-presentation, subjective perspectives on soft and hard skills, audience, and intrinsic traits such as personality and mindset [2,4,7,15,17]. Such data analyses require a taxonomy of keywords that are associated with skills per job description or type. However, most databases are only limited — they do not capture variants, typos, abbreviations, or internet slangs that are used on social media or in informal settings [6]. To facilitate research in this space, our work builds on a well-validated dictionary of occupational descriptors (O*Net) to propose a method, and correspondingly a knowledgebase, JobLex of occupational descriptors that can be used in computational social science and organizational studies [13]. We publish both our script and an example lexicon (for Twitter) for purposes of research and practical application.

JobLex. We obtain a database of occupational descriptors, Occupational Information Network (O*Net). O*Net (onetonline.org) is developed under the sponsorship of the U.S. Department of Labor/Employment and Training Administration, and has extensively been used in research [3,5,16]. It enlists and describes eight primary occupational categories expanded further into 248 leaf occupational-categories. The hand-curated occupational descriptors allow us to represent occupational descriptors in a theoretically-grounded fashion. To capture the linguistic and semantic context of these descriptors, we use word embeddings. In particular, we expand them into clusters of keywords on the basis of pre-trained word embeddings [GloVe] [10] in the lexico-semantic latent space of word-vector dimensions [14]. In our specific case, we choose 30 keywords per cluster (ranked on cosine similarity), and use the $n$-dimensional ($n=200$) word-vectors trained on word-word co-occurrences in a Twitter corpus of 6B tokens [10] (see Table 1 for example keywords in eight broad occupational descriptors). We qualitatively inspect JobLex to observe that its keywords are theoretically and intuitively associated with the categories that they belong to — for example, understanding, feelings, person occur with high similarity with Concern for Others, and responsibilities, challenges, willingness occur with high similarity with Work Styles: Initiatives [3]. For research and practical purposes, we publish the script and lexicon of JobLex at github.com/joblex/joblex.

Table 1: Job aspect types with their descriptions as obtained from O*Net.

<table>
<thead>
<tr>
<th>Job Aspect</th>
<th>Example Keywords</th>
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<tbody>
<tr>
<td>Interests</td>
<td>people, think, working, learning, teaching, business, involved, reason, helping</td>
</tr>
<tr>
<td>Knowledge</td>
<td>development, technology, teaching, training, education, information, improve</td>
</tr>
<tr>
<td>Skills</td>
<td>people, learning, lesson, education, bridging, differences, behavior, intentions</td>
</tr>
<tr>
<td>Wk. Activities</td>
<td>spending, teaching, conflicts, resolving, disputes, performance, relationships</td>
</tr>
<tr>
<td>Wk. Styles</td>
<td>people, competitive, require, group, offer, think, person, experience, schedule</td>
</tr>
<tr>
<td>Wk. Values</td>
<td>working, understand, right, difficult, responsibilities, positive, improving, effort</td>
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</tbody>
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business, ability, allow, decisions, potential, development, leadership, honest
References


