

## Measuring the risk of labor automation through skills required in job postings

Language: German or English

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**Background:** The agricultural sector is expected to see substantial change from further digitalization/automation/computerization, promising more efficient and environmentally friendly food production. Simultaneously, it is expected that the amount of labor and skills required in the agricultural labor force will change accordingly. However, empirical assessments of the expected changes in the labor market are lacking and difficult to obtain. The two major obstacles are that data about the skills that are currently required in the agricultural labor market are hardly available and additionally that it is required to forecast which skills are most likely to be replaced by technical innovations. Frey & Osborne (2017) address both obstacles, the first by using a US job classification databases (O\*NET - Occupational Information Network) that describes in detail which skills are required for a large range of jobs. For the second they used expert knowledge to quantify how susceptible a certain skill is to computerization. By combining both pieces of information, they are able to draw conclusions about the risk of job replacement in the future and found that 47 percent of jobs in the US are at risk of future computerization. Other studies such as those by Kim et. al., 2013 and Deming & Kahn, 2017 determine the skills required in certain occupations based on the listed skills in job postings. Job posting data was either collected manually from several online sources (as done by Kim et. al., 2013) or provided by a third-party employment analytics firm (as done by Deming & Kahn, 2017). In principle, it is also possible to derive this information using web scraping, a technique used by Landers & Brusso (2016) and Cavallo & Rigobon (2016) in their studies to automatically derive information from webpages. None of the studies mentioned above have a specific focus on the agricultural labor market.

**Objective:** The objective of this thesis is to assess quantitatively what effects further computerization of agricultural production might have on the agricultural job market. For this, the thesis should first aim at identifying the skills that are currently mainly required in job advertisements for farm workers. Secondly, it should identify the risk of these skills being replaced in the future using the classification approach developed by Frey & Osborne (2013). Putting both together it should draw a conclusion about the extent we can expect changes in the skills demand for farm workers in the future.

### Approach:

- Identify skills required in the agricultural sector through current job advertisements (e.g. machinery driving skills, specific animal/crop skills, pest control skills, farm management skills etc.)
- Identify one or several job posting sites for farm workers that are suitable for the analysis (e.g. <https://www.agrarjobboerse.de/boerse/stellenangebote>)
- Use web scraping techniques to derive information about the skills currently demanded in job postings (e.g. 80% of postings require machinery driving skills, farm management skills, etc.)
- Use the approach and information from Frey & Osborne (2013) to determine how susceptible a skill is to replacement (e.g. machinery driving skills very likely, farm management less likely)
- Assess to what extent the required skills and hence demanded jobs will change in the future

### References to Start:

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- Kim, J., Warga, E., Moen, W. (2013). Competencies Required for Digital Curation: An Analysis of Job Advertisements. *The International Journal of Digital Curation* 8(1): 66-83.
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