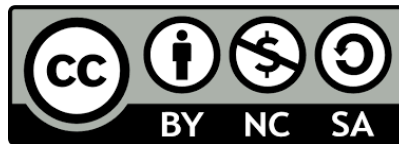


Algorithmic Profiling of Job Seekers in Austria

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THE CASE

- Algorithmic profiling system of job seekers
- Announced in October 2018, by the Public Employment Service in Austria (AMS)
 - profiling of job seekers independently started since before 2010
- Actual deployment of the system from July 2020
- Under legal disputation for discrimination

Political goal

- High-level political goal: make funding instruments more “effective”
- Support for reintegration into the job market dependent on the profile of the applicant
- AMS justification: according to AMS “experience”, expensive active labor market programs do not significantly increase the chances of hiring both for high and low job seekers prospects

The AMS-Algorithm

- Classification of job seekers into three categories
 - Group H: High chance to find a job within 6 months
 - Group L: bad outlook of employment in the next 2 years
 - Group M: neither H nor L, as “mediocre” prospects → **FOCUS OF FUNDING**
- Regression model *supposed to be used* to assign individual scores to job-seekers and label each of them in one of the three categories.

Data-driven approach

- As all ML/AI algorithms, AMS algorithm works with historical data.
- It uses two types of data:
 - Data from the procedure of registration to the AMS network
 - Data from the Main Association of Austrian Social Security Institutions, that collects personal data on the individuals (e.g., gender, nationality, age).

„DATA CONSTELLATIONS“

Variables	Characteristics
Gender	M / F
Age Group	< 30 / 30 – 49 / 50+
Citizenship	Austria / EU / Non-EU Countries
Education	Grade school / Apprenticeship, vocational school / high- or secondary school, university
Health Impairment	Yes / No
Obligations of Care (only women)	Yes / No
Occupational Group	Production / Service
Regional Labor Market	Five categories (Type 1 – 5) for employment prospects in assigned job center
Prior occupational career	< 75% / >75% days of gainful employment within 4 years
Cases within 4 Year Intervals	0 cases / 1 case / 2 cases (1/year) / 3+ cases
Duation of Cases	0 cases > 6 months / 1+ cases > 6 months
Measures Claimed	0 / min. 1 supportive / min. 1 educational / min. 1 subsidized employment
Duration of Unemployment	Start / 3 / 6 / 9 / 12 / 15 / 18 / 21 / 24 / 30 / 36 / 48+ months

Slide adapted from: Doris Allhutter, “Transforming Welfare Infrastructures in Europe. The Use and Abuse of Algorithms in Decision Making”, THESEUS Colloquium 23rd Feb. 2023, POLITECNICO DI TORINO

„Quality“ of AMS algorithm in test phase

- Precision $[TP / (TP + FP)]$ as Performance Indicator
 - precision rates are only known for high and low segments
 - group H, precision in range of 80%-84%
 - group L, precision in range 81%-91%.
 - → approx. 120,000 people with wrong results
- Limits of precision:
 - only shows the fraction of false positives
 - no information about false negatives.

Discrepancies in error rates

- errors not distributed equally across populations
- e.g. between populations / constellations
- minorities particularly affected

Historical biases

AMS reflects the high degree of historical inequality in the labor market

Examples:

- women at the beginning of unemployment approx. twice as often as men in the low segment
- ‘migration background’ and people with age > 50 systematically get lower scores
- “regional labor market” = proxy for social class
- in general, marginalized groups were disadvantaged in the classification

Other types of biases in AMS ALGORITHM

- Measurement bias:
 - weak abstraction of variables, hard thresholds
 - e.g., "care obligations" only apply to women.
- Aggregation bias:
 - inhomogeneity of chances within constellations
- Omitted variables bias and representation bias, due to:
 - regular changes in the labor market
 - change of social values, e.g. third gender
 - extraordinary events, e.g. recession 2008, COVID-19
 - legislative changes and local changes (e.g. the bankruptcy of a large company)

Values embedded in the software design

- Biography and skills reduced to variables of a prediction model
- Employability tied to the individual
- Claims of objectivity versus value-laden selection of variables, categories, thresholds and performance indicators

AMS algorithm and organizational goals

Objectives as stated by the AMS:

1. Increase the efficiency of the counselling process
 - Risk of routine adoption of scores counteracts service orientation of agency
2. Increase the effectiveness of the use of funds
 - Coarse profiling of clients counteracts goal of effective use of resources
3. Standardize the granting of funding (vs. arbitrariness)
 - Disparate impact in the system's design

Other issues

- Lack of transparency about data collection and design details
- Lack of ability to verify, contest and remedy AMS decisions
- The use of sensitive information, initially collected for other purposes
- Social stigma and psychological consequences

AMS: summary of issues

- **Intervention vs prediction:** organizational goals not met
- **Target-construct mismatch:** mediocre prospect != not employed
- **Distribution shifts:** constellations, changes in law/market/values
- **Limits to prediction:** average precision around 80%
- **Disparate performance:** women, migrants, age 50+, minorities
- **Lack of contestability:** citizens cannot challenge the classification
- **Goodhart's law:** -

Sources

- Doris Allutther, *Transforming Welfare Infrastructures in Europe. The Use and Abuse of Algorithms in Decision Making* , 2023 <https://www.polito.it/impatto-sociale/centro-studi-theseus/theseus-colloquia/theseus-colloquia-doris-allhutter>
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