ÖAW ÖSTERREICHISCHE AKADEMIE DER WISSENSCHAFTEN

ITA INSTITUT FÜR TECHNIKFOLGEN ABSCHÄTZUNG

Algorithmic Welfare: Citizen Profiling in the Public Sector

Doris Allhutter

JKU AI Lectures

January 12, 2021

Vast increase of algorithmic systems in Europe

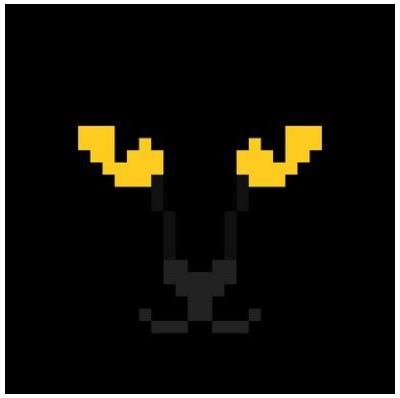
Source: Algorithmwatch 2020: Automating Society

Austria‘s Employment Prospects Assistance System: AMAS

Dr. Doris Allhutter

Interdisciplinary research team

Florian Cech
Centre for Informatics & Society, TU Wien



Fabian Fischer
Centre for Informatics & Society, TU Wien

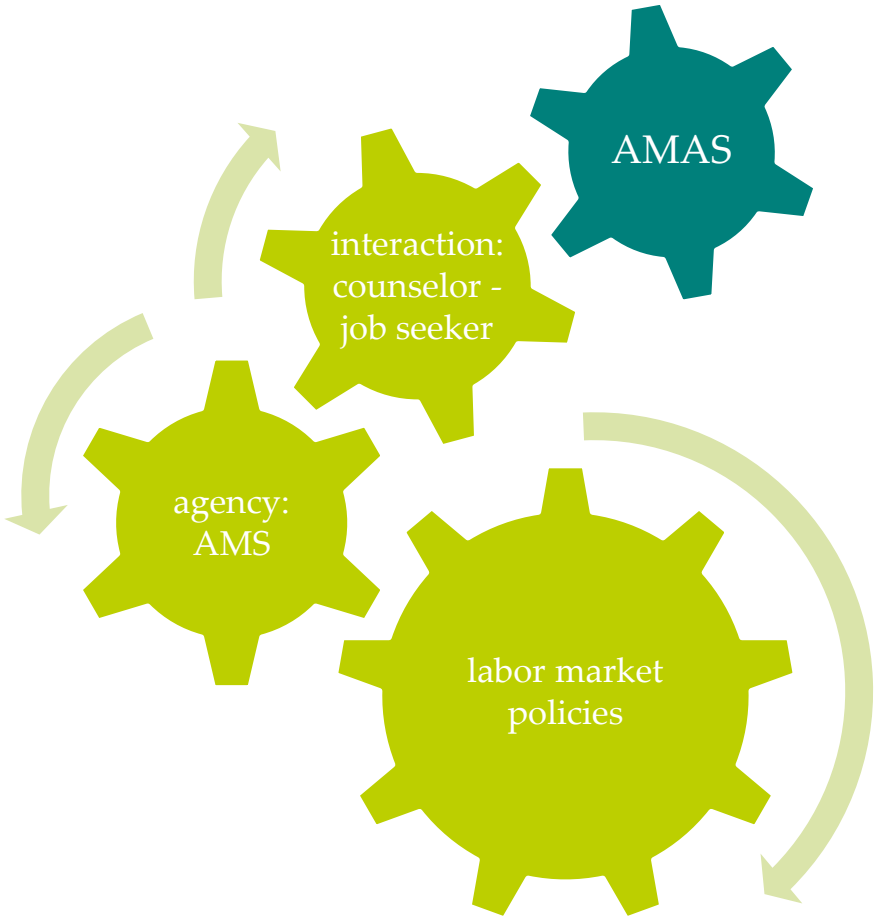
Gabriel Grill
School of Information, University of Michigan

Astrid Mager, co-PI
Institute of Technology Assessment, ÖAW

Funded by

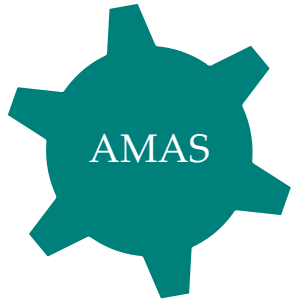
AK Oberösterreich

The *AMS-Algorithm* and its contexts



Dr. Doris Allhutter

The ‚AMS-Algorithm'



- Classification of Job seekers into three categories
  - Group H: High chance to find a job within 6 months
  - Group M: Mediocre prospects; not part of either group H or N
  - Group N: bad outlook of employment in the next two years
- Public debate on discriminatory potential of the algorithm: *More pessimistic outlook represents the 'harsh reality' on the job market - Johannes Kopf, CEO of the Austrian Public Employment Service (AMS)*

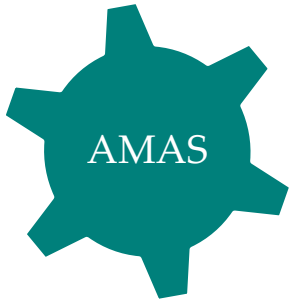
Objectives of AMAS

- Support is geared towards chances of labor market integration
- Policy objective: focus of funding on job seekers with "medium chances“
- Groups such as 50+, youth, ppl with disabilities,… supposed to retain full support

HETEROGENEITY OF OBJECTIVES

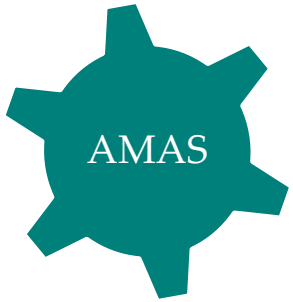
1. Increase the efficiency of the counselling process
2. Increase the effectiveness of the use of funds (service, support, guidance)
3. Standardize the granting of funding (vs. arbitrariness)

What is AMAS?



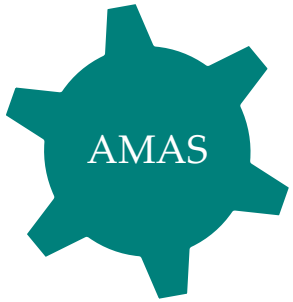
- Variables
  - Gender: Male / Female
  - Care obligations (only women): Yes / No
  - Citizenship: AT / EU / Non-EU
  - Age group: 0-29 / 30-49 / 50+
  - Health impairment: Yes / No
  - Occupational group: Production / Service
  - Highest level of education
  - Regional labor market
  - Prior occupational career

What is AMAS?

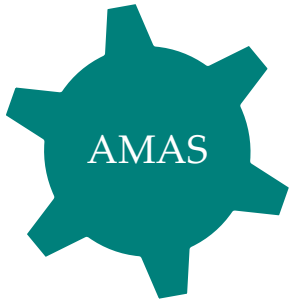


- 2 temporal dimensions (short term, long term)
- 12 milestones (from registration with the AMS until 48th month)
- 4 populations
  - full data
  - limited data, because of
    - 'migration background'
    - young age (under 25)
    - others with limited data

Quality of AMS



- Claimed objectivity
  - big data analytics as truthful representation of reality following the ideal of mechanistic objectivity (Rieder & Simon 2016)
- Precision as performance indicator
  - standard technical procedure vs. significant value judgements
  - AMS highlights high precision rates
  - But precision rates only known for high and low segments
  - For other segments, precision rates between 69-94%, frequently 80-85%
    - approx. 120,000 people with wrong results
  - Errors not distributed equally

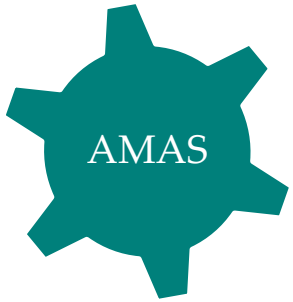


Bias in computer systems

- Technical bias
  - Technical assumptions and limitations
- Emergent bias
  - Use of systems in practice over a period of time
- Pre-existing bias
  - Embedding of social values through institutions and their practices and attitudes

(Friedman & Nissenbaum 1996)

Technical bias in AMAS



... through abstraction of variables

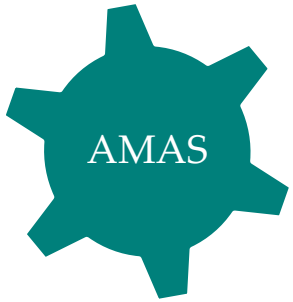
- hard thresholds, standardizations, exclusions

… through the (unfounded) assumption of homogeneity of chances within constellations

- low statistical significance of comparisons with few observations

… through discrepancies in error rates

- e.g. between subpopulations / constellations
- minorities particularly affected



Emergent bias

- Use of systems in practice over a period of time

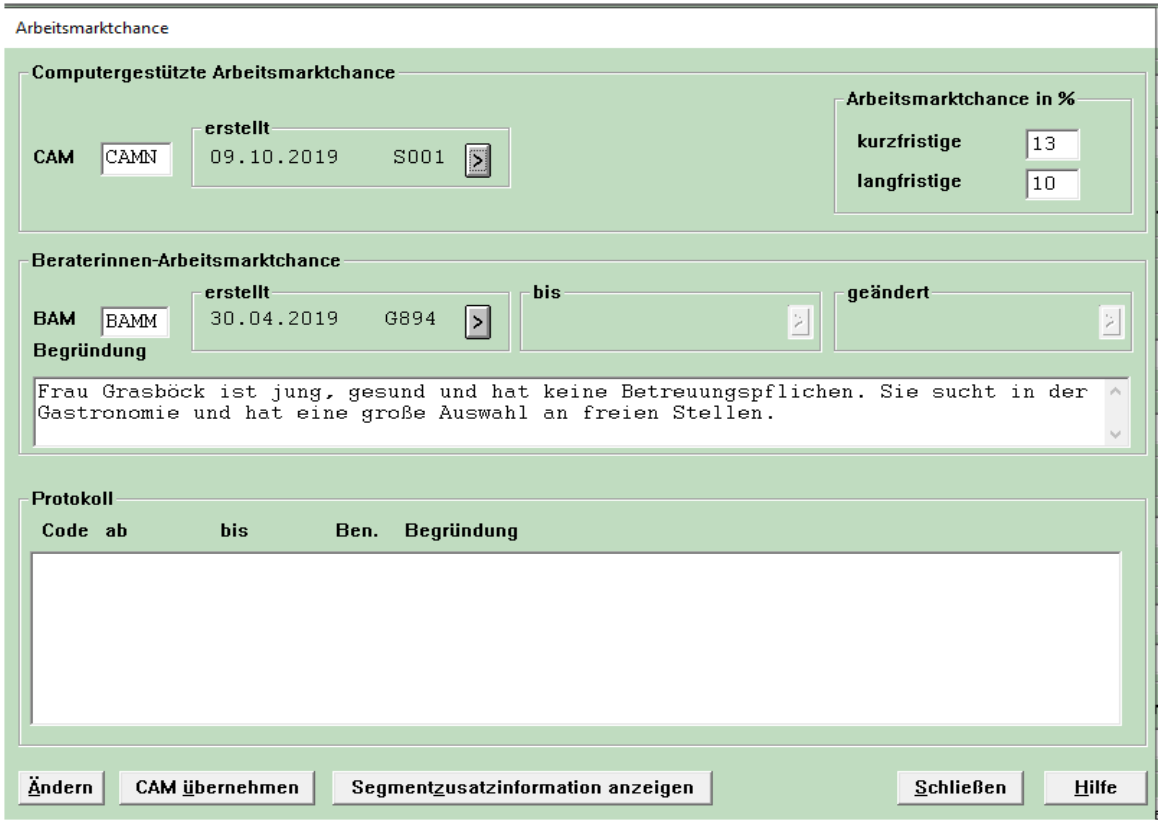
- Regular changes in the labor market
  - change of social values, e.g. third gender option
  - extraordinary events, e.g. recession 2008, COVID-19
  - legislative changes, e.g. the 'Aktion 20,000'
  - local changes, e.g. the bankruptcy of a larger company

Pre-existing bias

- AMAS reflects the high degree of inequality on the labor market
  - structural unequal treatment
  - historically long-lasting and cumulative disadvantage
  - ➢ marginalized groups systematically get lower IC-values
- Person variables
  - e.g. women at the beginning of unemployment approx. twice as often as men in the low segment (N)
- Proxy variables (e.g. RGS type)
- Subpopulations
  - e.g. people at beginning of unemployment with an incomplete database almost twice as often in the N-segment as with a complete data

interaction: counselor - job seeker

Business function 'job market opportunity'



Criteria for adding a ‚BAM'

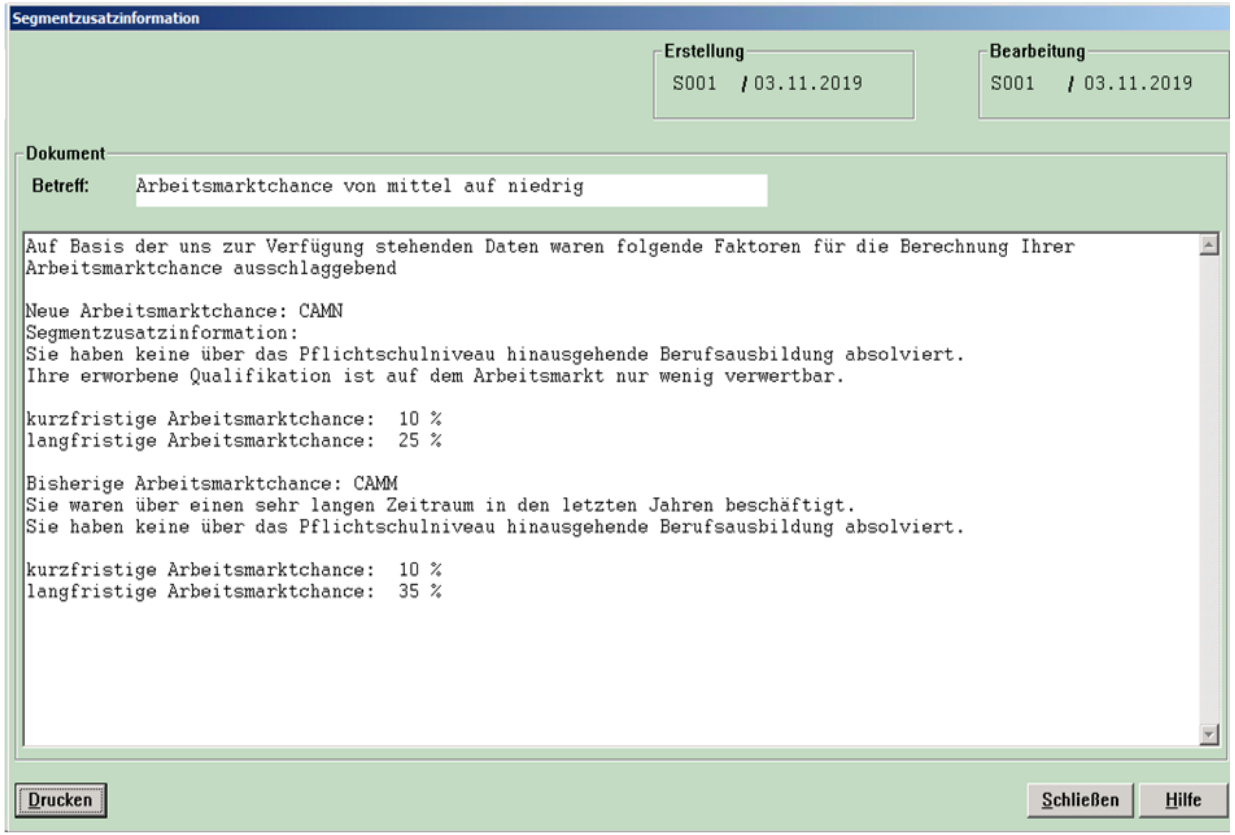
- Important factors not taken into account in AMAS: motivation, existing / missing qualification that is not recorded in the system, alternative occupations possible

- Changes while client was unemployed: care obligations taken care of / arose, regional mobility improved / worsened, health restrictions changed, periods of employment abroad, better / worse labor market situation

- Integration chances improved due to funding: can the use of funding improve labor market integration?

interaction: counselor - job seeker

Additional segment information



Schifteh A.

Counselor:
- compares IC value with biography
- no explanatory texts displayed
- based on education and sector, client is upgrade (adds BAMM + reason)
- despite very good job prospects, CAMN only suggests upgrade to M
- after upgrading, various training options become available

Client
- client expects good chances and plans to respond to job offers
- After being classified as low and upgraded, she has doubts
- client accepts course

Variables

Gender: female
Education: Matura +
State: third countries
RGS type: 5 (1100)
Sector: Services
Population: partially valid (migration background)

IC value: 22%
Segment: N (Low)

Result of the operational implementation
- Upgrade from N to M
- Demotivation of client, expects that additional training is necessary
- Delayed job applications due to increased contact intervals and course

Technical Bias
- significant underestimation of IC due to modelling of variables (e.g. training: Matura + also includes higher training levels; and sector)
- comparisons with completely different personal backgrounds
- client is in the subpopulation with 'partially valid data due to migration background', there are no explanatory text

Objectives of the AMS
- deterioration of efficiency and effectiveness expected in this case
- Interaction is complicated by contradicting assessments
- missing explanatory texts make the evaluation of extent of error difficult
- insufficient upgrade to middle segment leads to increased expenditure of time and resources

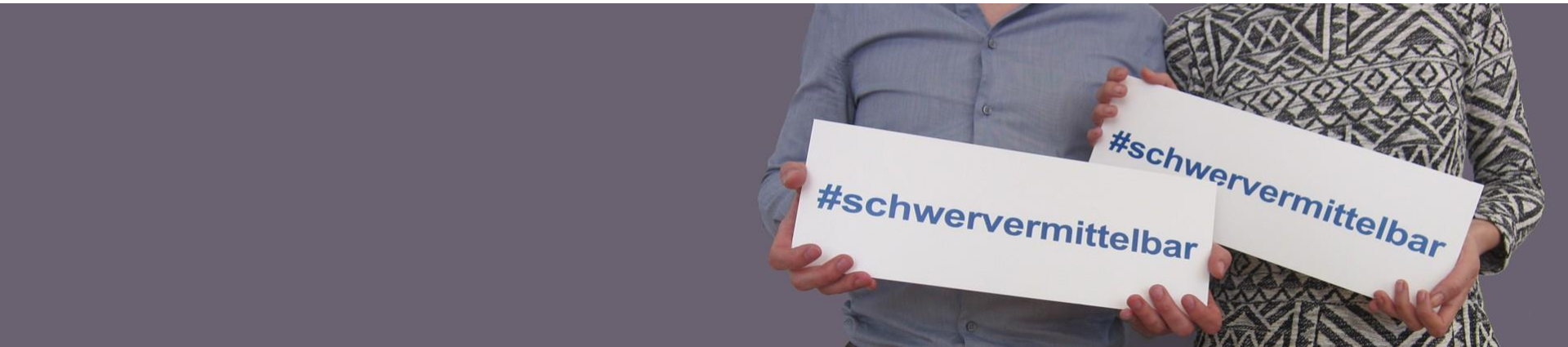
Integration of AMAS into counselling process

- Support of case workers vs undermine experience and consultation
- AMAS as ‘second opinion’ and case worker as ‘social corrective’
- Notion of social corrective in tension with notion of objective truth
- Case workers may find themselves torn between:
  - Following algorithmic suggestions vs overruling algorithm
  - Bias may contradict experiences vs foster human prejudices
- Finally: legal implications – semi-automated decision making system escapes GDPR and Equal Treatment Act since it is not fully automated (Lopez 2019)

interaction: counselor - job seeker

Individual biography of job seekers versus IC value

- Biography and skills reduced to seemingly 'objective' value
- Employability framed as being largely tied to the individual
- Limited agency to change the classification due to choice of variables -> danger of stigmatization of different groups
- Claims of quality through precision vs value-laden selection of variables, categories, thresholds and performance indicators



Does AMAS meet organizational goals?

agency: AMS

Objectives as stated by the AMS:

1. Increase the efficiency of the counselling process

2. Increase the effectiveness of the use of funds

1. Standardize the granting of funding (vs. arbitrariness)

- Risk of routine adoption of CAM counteracts service orientation of agency
- Coarse profiling of clients into three group counteracts goal of effective use of resources
- Hardly any measures to avoid bias and unequal treatment in the system‘s design

Thank you!

Contact:
Dr. Doris Allhutter
Twitter: @dallhutt
dallhutt@oeaw.ac.at
oeaw.ac.at/ita