VDAB

samen sterk voor werk

Next Steps @ VDAB

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MANCHESTER 2017/12/

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VDAB in 2017

- 200.000 Jobseekers
- 600 000 Vacancies published
- 2.000 Counsellors - 213.000 Jobseekers counselled
- 1.000 Trainers - 70.000 Vocational trainings
- Website 100.000 visits/day

InnovatieLab

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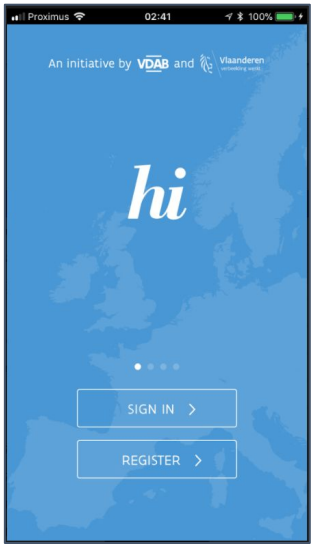
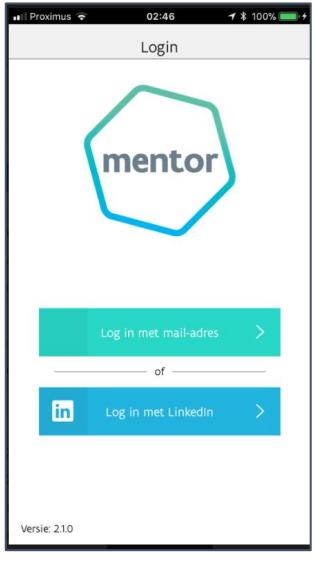
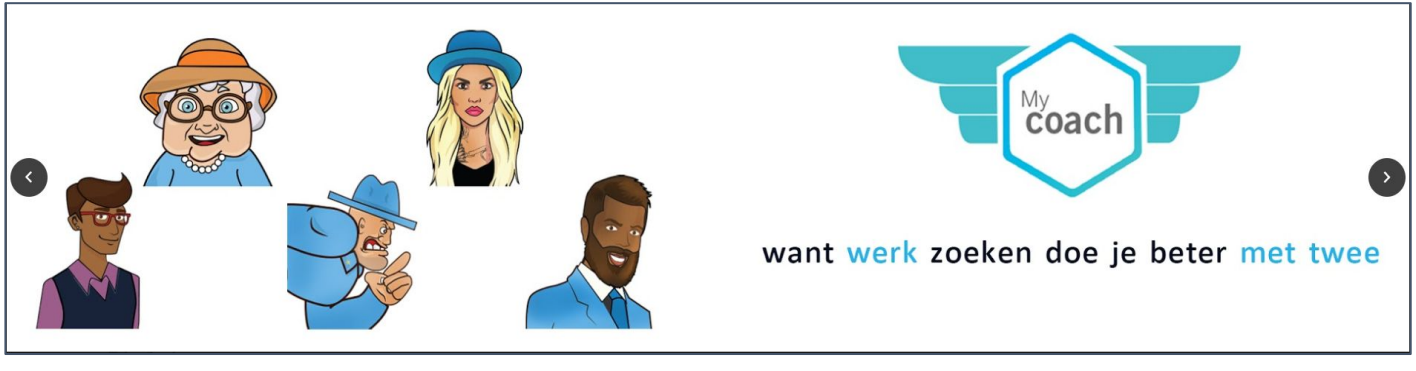
next steps







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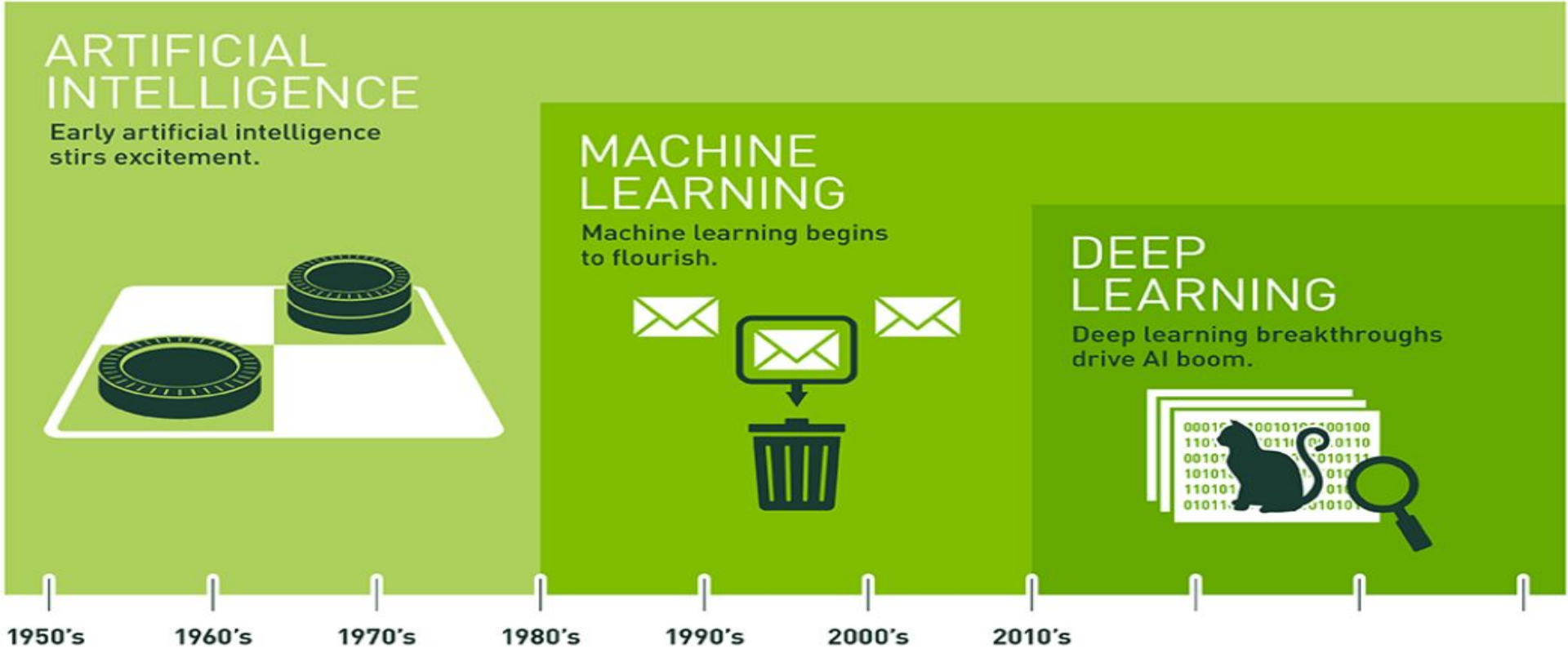

Predictive Modelling

Neural Network

Next Steps

Jobnet

Proactive Profiling

Datamining: predictive model

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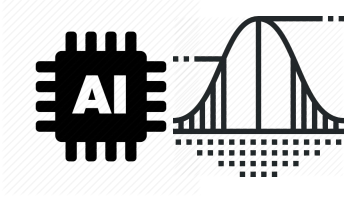
Dossier data

Clickdata

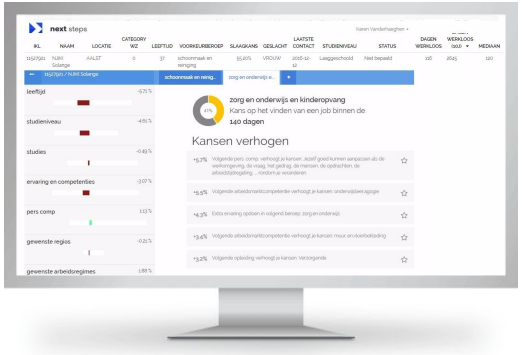
External data

Statistical analysis
Machine Learning



overview of **all** the customers

overview of **one** customer



How Long Will I Be Unemployed ?

Data ?

Unemployement Periods

- ID Job Seeker
- Date entering
- Date leaving
- Status on entering
- Status on leaving

VDAB dossier data

- Age
- Region
- Sex
- Nationality
- Drivers Licence

- Studies
- Work History
- *Stages*

VDAB Dossier Data

- Interest
- Languages
- Labour Market competences
- Personal competences
- Vocational Trainings

- Desired jobs
- Desired region
- Desired Labour regime
- *(References)*
- Certificates
- MLB auditlog
- SIP / SMP+ auditlog

Searched Vacancies

On Line logdata

next steps

- **What ?**
  - Personal Estimation of the chances of employment
  - Personal recommendation to possible next steps
  - Support of the vdab consultant

- **How ?**
  - Based on 700,000 job-seeking paths
  - Last 3 years

- **Status ?**
  - **Prototype:** in real life test 2017/05
  - Real life tests with 100 counsellors (Antwerp and Ghent)
  - Up to date (weekly) for 40,000 active job seekers

next steps

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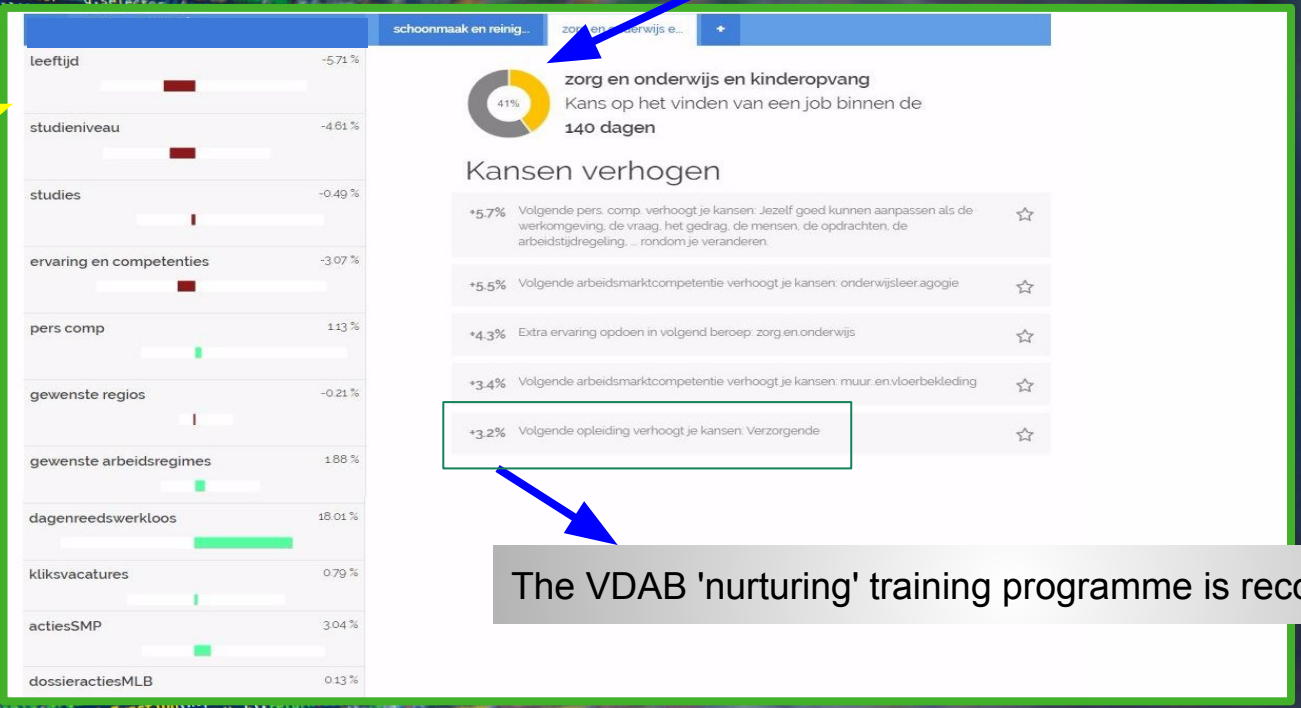
Demo

Jan seeks work in the healthcare sector.

Only 41 % Chance for Jan to find work within 140 days

His age and level of education are a disadvantage



The VDAB 'nurturing' training programme is recommended.

The customer's chances of success in a single view.

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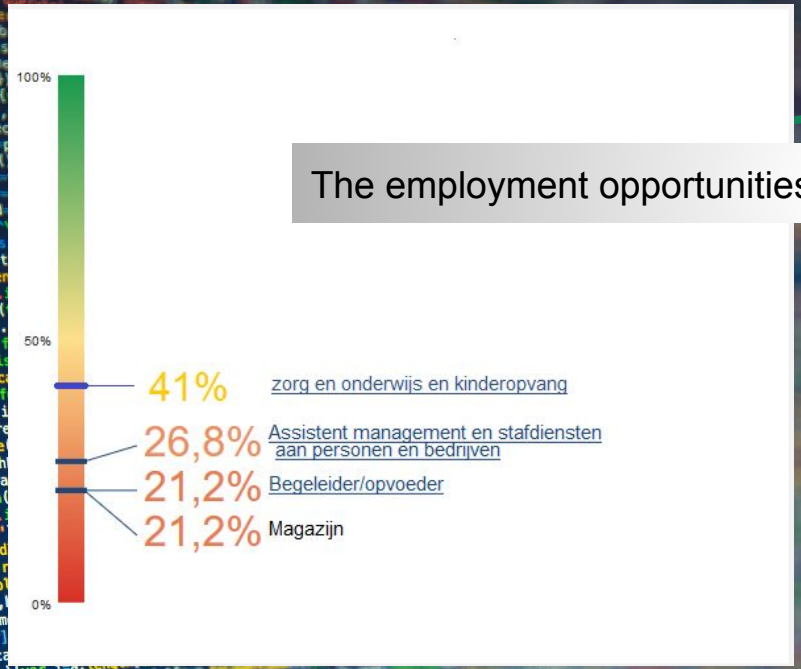
The employment opportunities for all Jan's desired occupations



Customer orientation by profession with the highest probability

A look at the customers of the Ghent VDAB office

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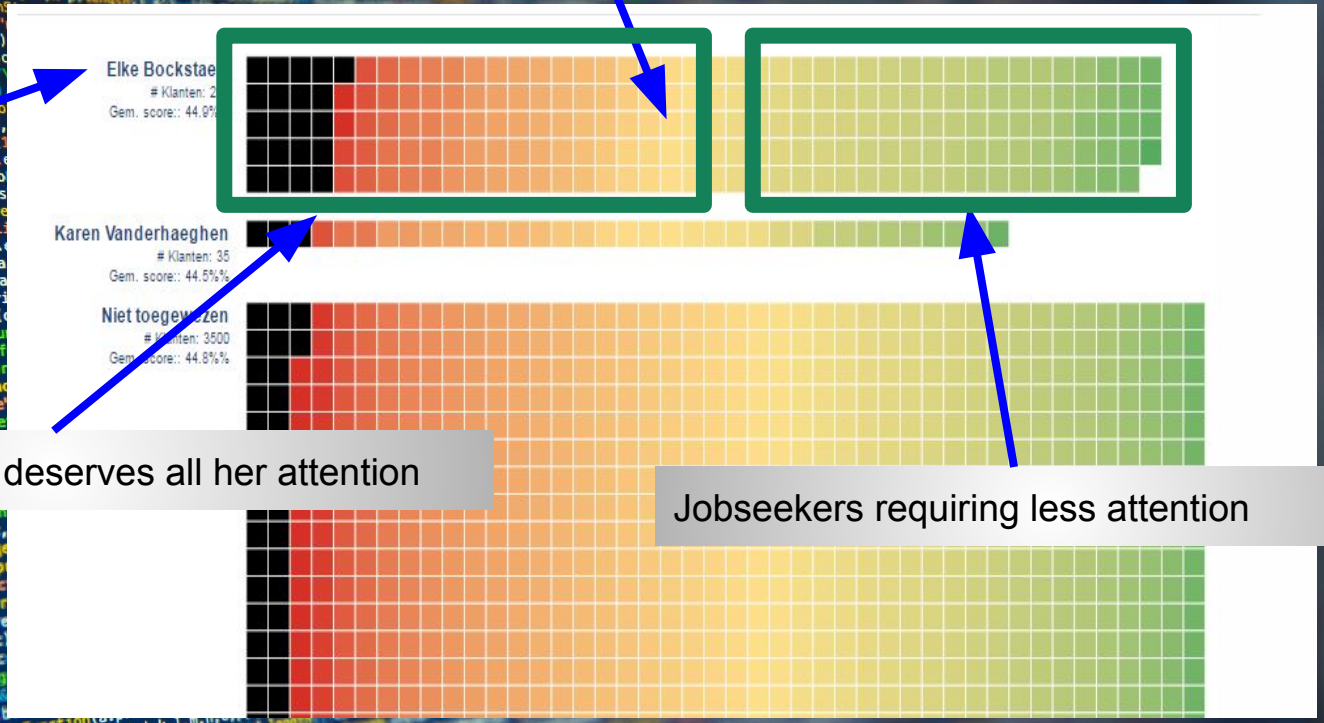
Jan

Counsellor Elke can focus on priority customers



Elke's jobseekers that deserves all her attention

Jobseekers requiring less attention

The chances of all customers at a glance

In de werkwinkel worden klanten gepositioneerd volgens **kans op werk** en **impact** van begeleiding.

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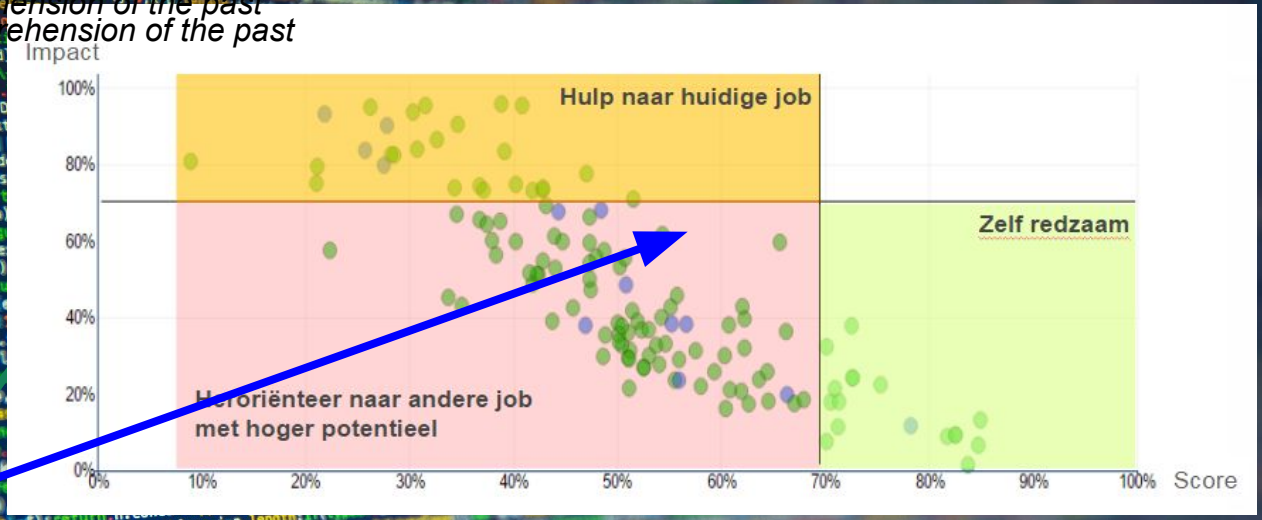
Mathematical comprehension of the past

Mathematical comprehension of the past

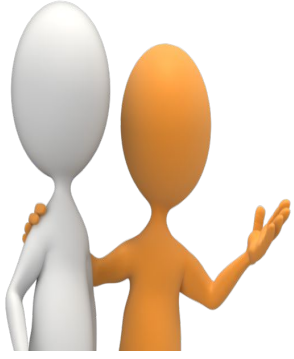


Jan

Kans
op werk

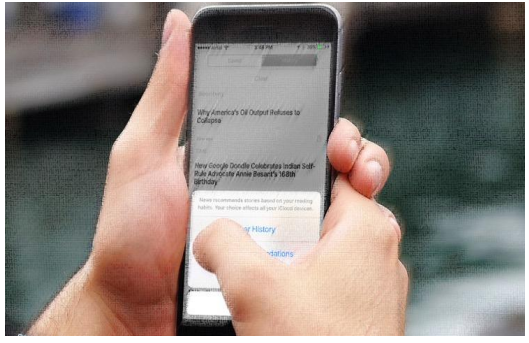
Handvaten naar efficiënt beleid

Next Steps Improving the quality and efficiency of our current service model



- **Risk scoring** gives way to efficient prioritisation
- **Workload of the consultant** can be reduced as he/she will be provided with a birds-eye view with tailored insights on a jobseeker. Less time spent on dossier analysis means more time for personal contact.
- The model gives way to a variety of **tailored advice** leading to enhanced quality
- The model gives insight into the main job chance **risk drivers** for policy makers (Risk Drivers per region /sector /type of jobseeker ….)

Next Steps - Making job seekers increasingly self-reliant

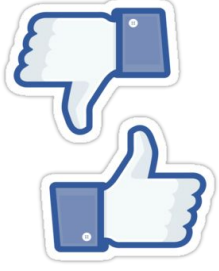


- The next steps model is able to target jobseekers and give **personalized** advice.
- It is a main building block of a future solution in which such advice can be offered **directly to the jobseeker**.

Challenges for the Model

We don’t know the exact profession of the job seekers, AFTER they leave VDAB’s counseling

> EX-POST communication with Job Seekers
> Text Mining CV data ?



Certain evaluations or recommendations will not be accurate. We will use feedback (like/dislike) from our counselors to make it a **learning** model.

We lack insights in the jobseekers **emotion**, **motivation**, ...

Prototype
vs
Realisation

Prototype vs Realisation

- First model up&running december 2017
- Optimal combination of Jobseeker & Counsellor & Model
- From segmentation to Individualisation
- Proactive Profiling (Fraud Detection)

Prototype vs Realisation

- **First model up&running december 2017**

  Next Steps **Assessment Model** for jobseekers

  -> production model is nearly build

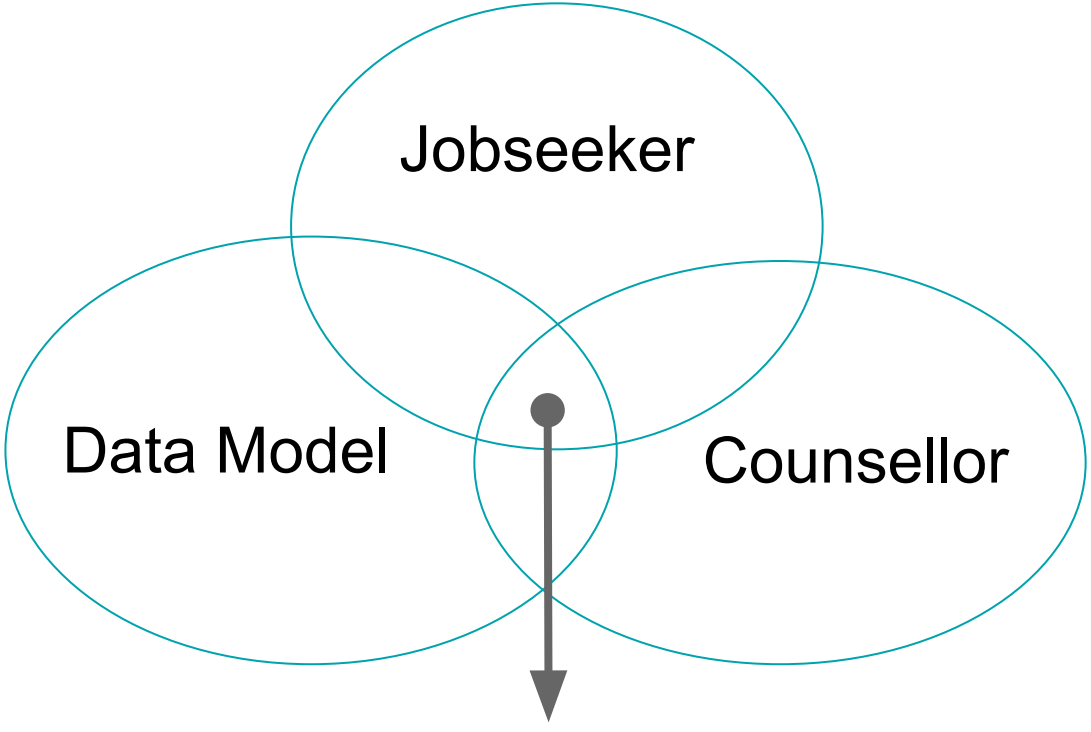
  -> Roadmap on the assessment model predictions:
  - the chance of finding a job @ day 35
  - the chance of finding a job @ every day
  - the Jobseekers best fit to a sector or specialised counselling

  -> in test (Benchmark) from december 2017

  -> 72 % (AUC) slightly better then our counsellors (day 35 / 90 days period)

Prototype vs Realisation

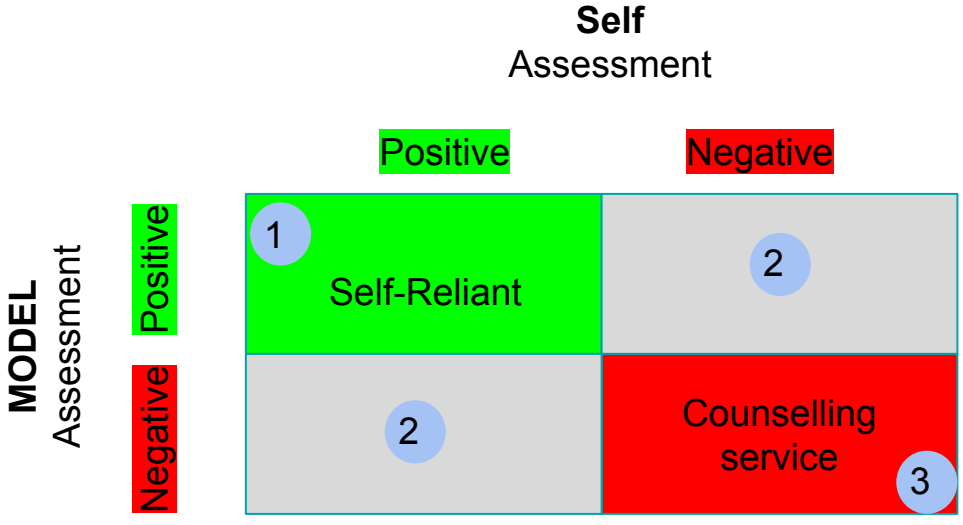
- **Optimal combination of Jobseeker & Counsellor & Model**



Optimal Assessment

Prototype vs Realisation

- **Optimal combination of Jobseeker & Counsellor & Model**

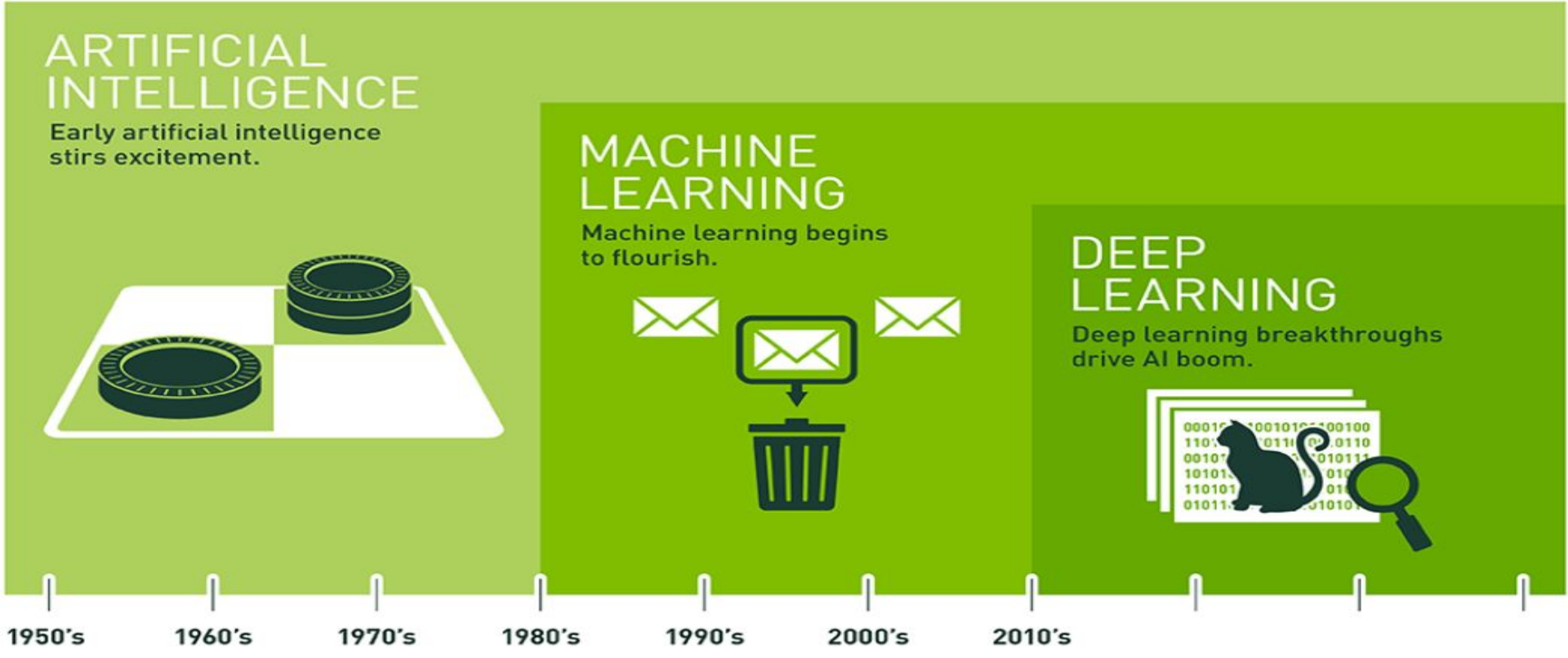


Prototype vs Realisation

- First model up&running december 2017
- Optimal combination of Jobseeker & Counsellor & Model
- **From segmentation to Individualisation**
  - **Nect POC from our InnovationLab**
    - adapt the model to advise services
    - define services
    - target jobseekers

Prototype vs Realisation

- First model up&running december 2017
- Optimal combination of Jobseeker & Counsellor & Model
- From segmentation to Individualisation
- **Proactive Profiling (Fraud Detection)**
  - 3 different POC's
    - can we profile fraud on historic cases ?
    - profile "activity monitoring"
      - build services on behaviour & touchpoints
    - Neural Network



Predictive Modelling

Neural Network

Next Steps

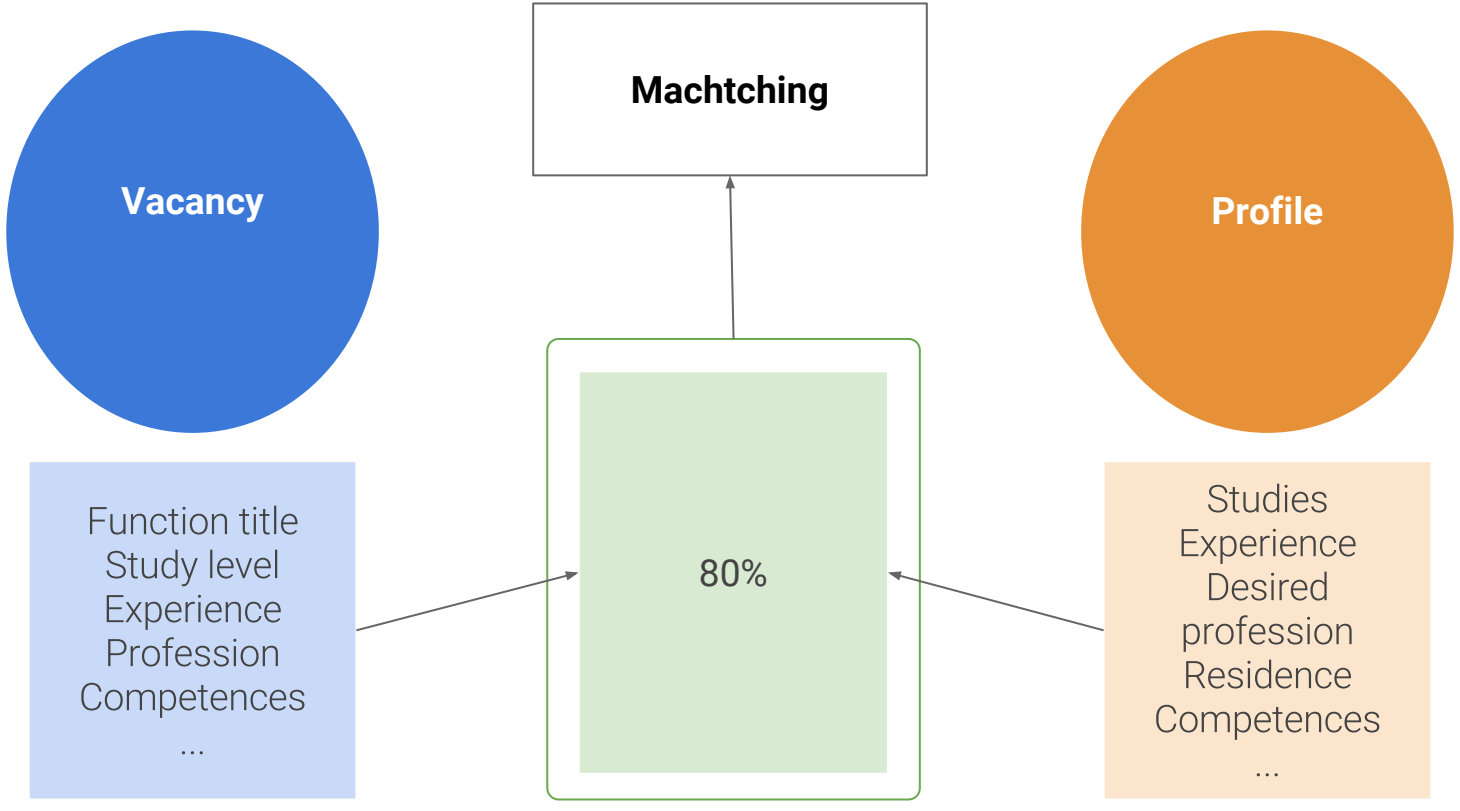
Jobnet

Proactive Profiling

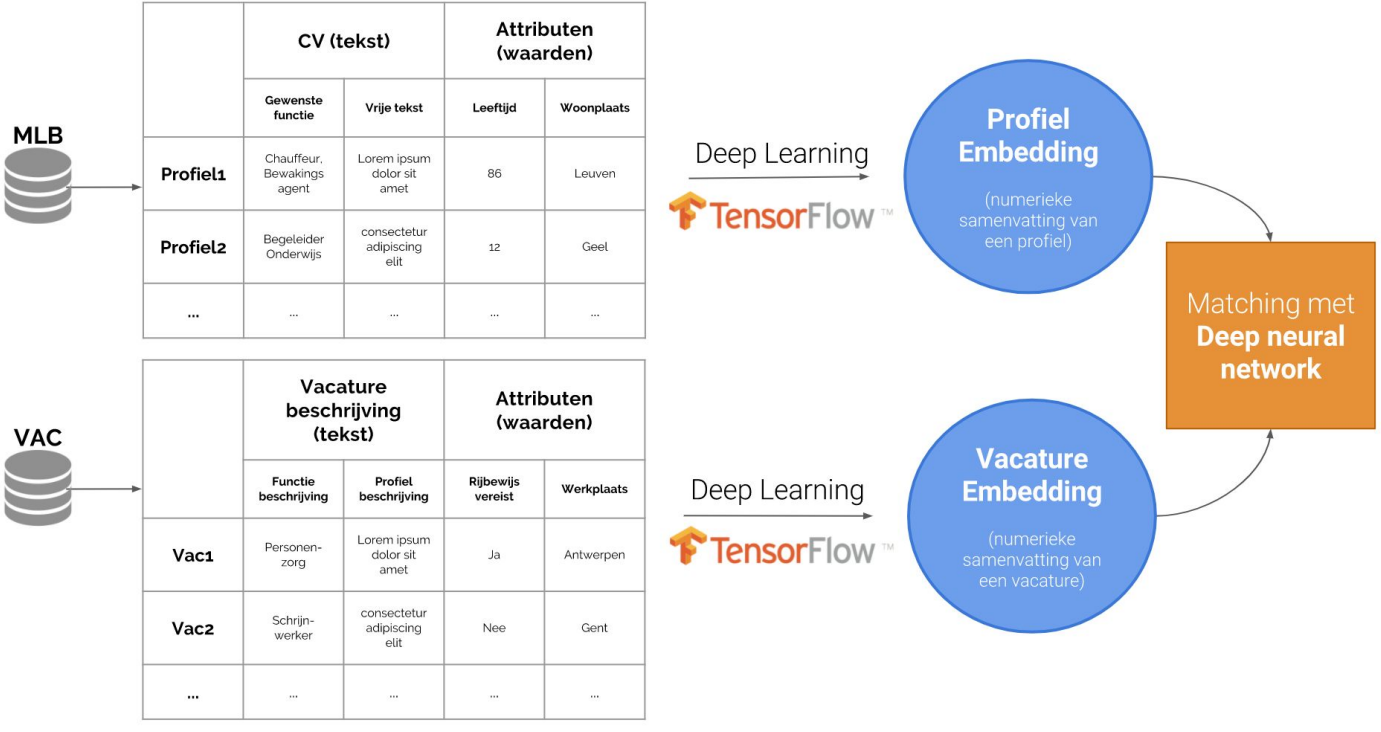
JOBNET

Use the possibilities of deep learning technology to use our mass of historical data on job vacancies and profiles to train an algorithm for the Flemish labour market.

Klassieke VDAB matching

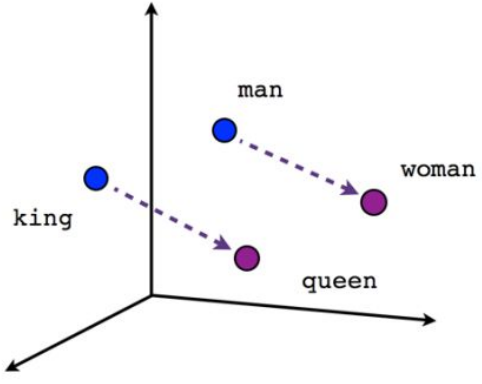


JobNet – Matching on Deep Learning Neural Network

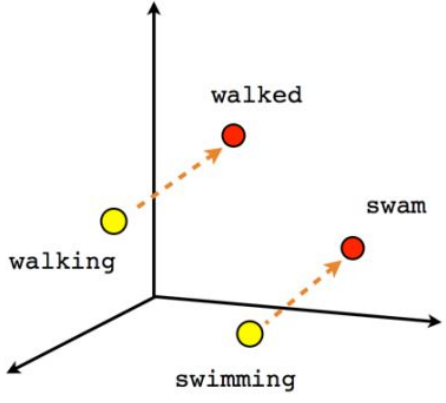


JobNet — Data pipeline: word embeddings

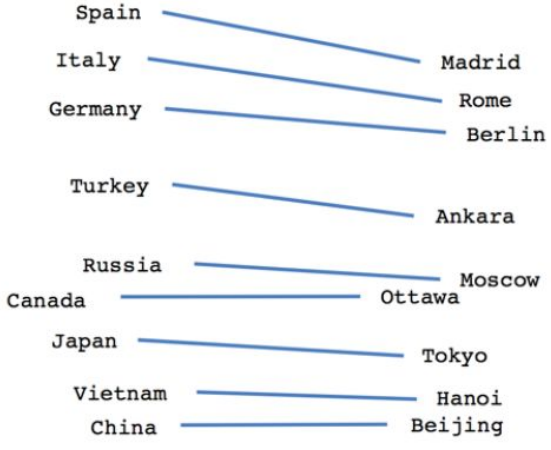
```
king  = [2, 3, -4, …] (300 dimensies)
queen = [1, -6, 5, …]
king - man + woman = queen
```



Male-Female



Verb tense



Country-Capital

The Jobnet algorithm has learned to

- Match Semantic: can be matched both in terms of content and contextual
- Dynamically take the location into account: some people prefer to work close to home, while others have no problem not doing so.
- to match over more than 10 languages

- Process with trial and error
- Data is Key
- Mix of own Data Scientists (self-training) & External Consultants
- Highly specialised technology
- Fast moving technology
- Advanced Analytics Platform
- Experiment / Explore / Exploit

- Essential for Digital Transformation