Job Market Finland

Using AI in matching jobs and jobseekers

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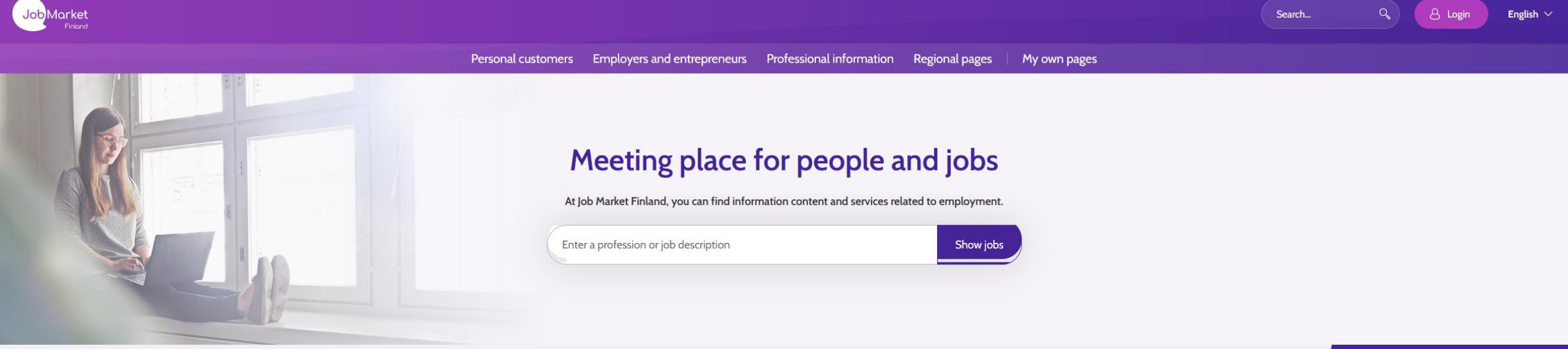

Job Market Finland is a labour and expertise service

- **Fast and high-quality matching of jobs and jobseekers.**
- Information on training services and skills development for both employees and employers.
- Information on the labour market, occupations and future working life.
- Uses ESCO classifications of skills and occupations
- Front page to PES e-services

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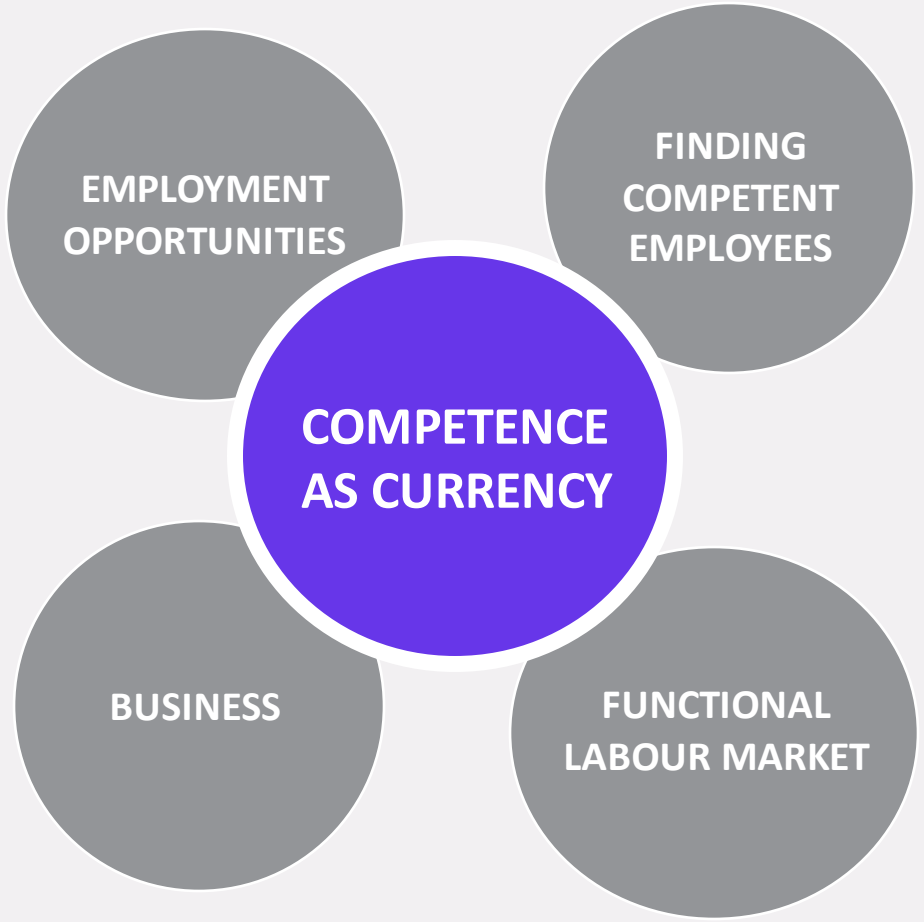
Meeting place for jobs, people and services

JOB SEEKERS

Find jobs that match their competence and skills more easily and faster. They are better able to keep their skills and competencies up to date.



EMPLOYERS

(private / public sector/third sector)

Find the employees they are looking for more easily and faster. Receive support in growing their business.

SERVICE PROVIDERS

(private / public / third sector)

Can offer their services for a wide range of users. Gain information with which they can develop their services and find new business opportunities.

SERVICE ORGANISERS

(government)

Are able to monitor the fulfilment of objectives and the performance of service providers. Receive statistical data that helps with planning and organisational responsibilities.

Publicly funded service

Free of charge

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Fast and high-quality matching of jobs and jobseekers – AI solutions

- Job Market Finland ´s AI-services are NLP-services
- Job Market Finland’s matching algorithm uses a combination of structured information, such as skills and occupations, and natural language used in the profile and job postings
- Relevant skills and occupations are recommended to the users based on the natural language processing
  - Uses ESCO classifications.
  - Makes skill recognition easier
  - Implemented on job applicant profile and on job announcement

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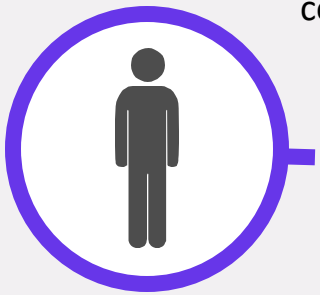
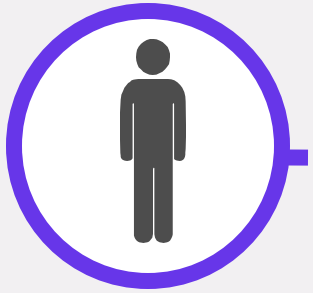
Overview: How Job Market Finland's matching works

Job seeker

Creates a competence-based job applicant profile. The description of a job seeker's competence is important as the Job Market Finland's matching service is competence-based.





Employer

Creates a job posting. The competence required by the role is described using the same classification by which the job seekers describe their competence.

MATCHING

Job Market Finland's job suggestions are based on an automatic score calculated by an algorithm.

The most suitable applicant appears on the employer's list first. Correspondingly, the vacancies suggested to the job seeker are listed in an order based on suitability.

Receives targeted open job suggestions on reported vacancies.

Applies for open jobs in the manner defined in the job postings.

Contacts job applicants.

Job Market Finland suggests to the employer job seekers whose competence matches the requirements of the job posting.

- Selecting and arranging job applicants in an order based on the information in their job applicant profiles.
- Browsing suggested **anonymous** profiles.
- Sending messages to candidates.

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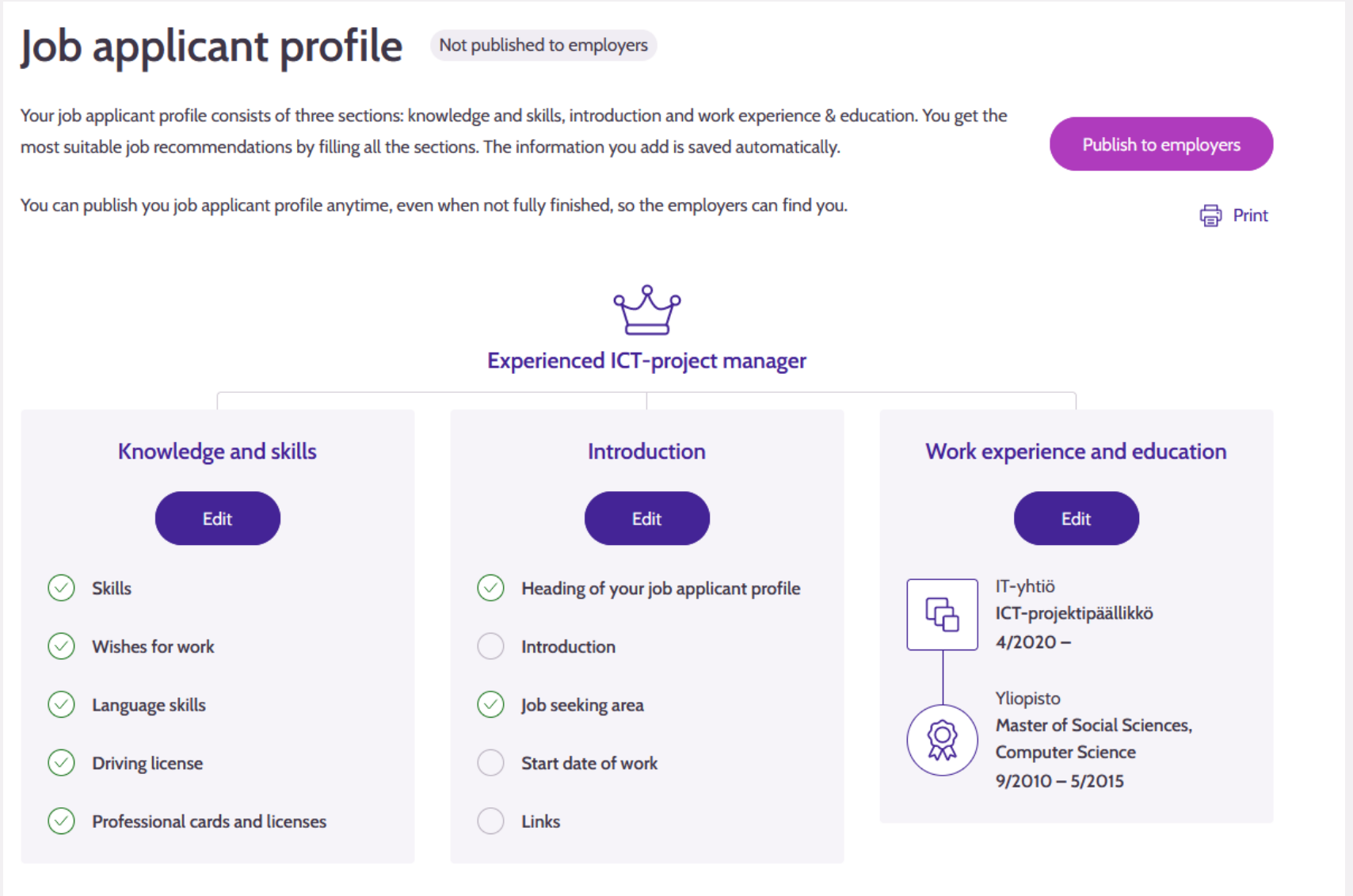
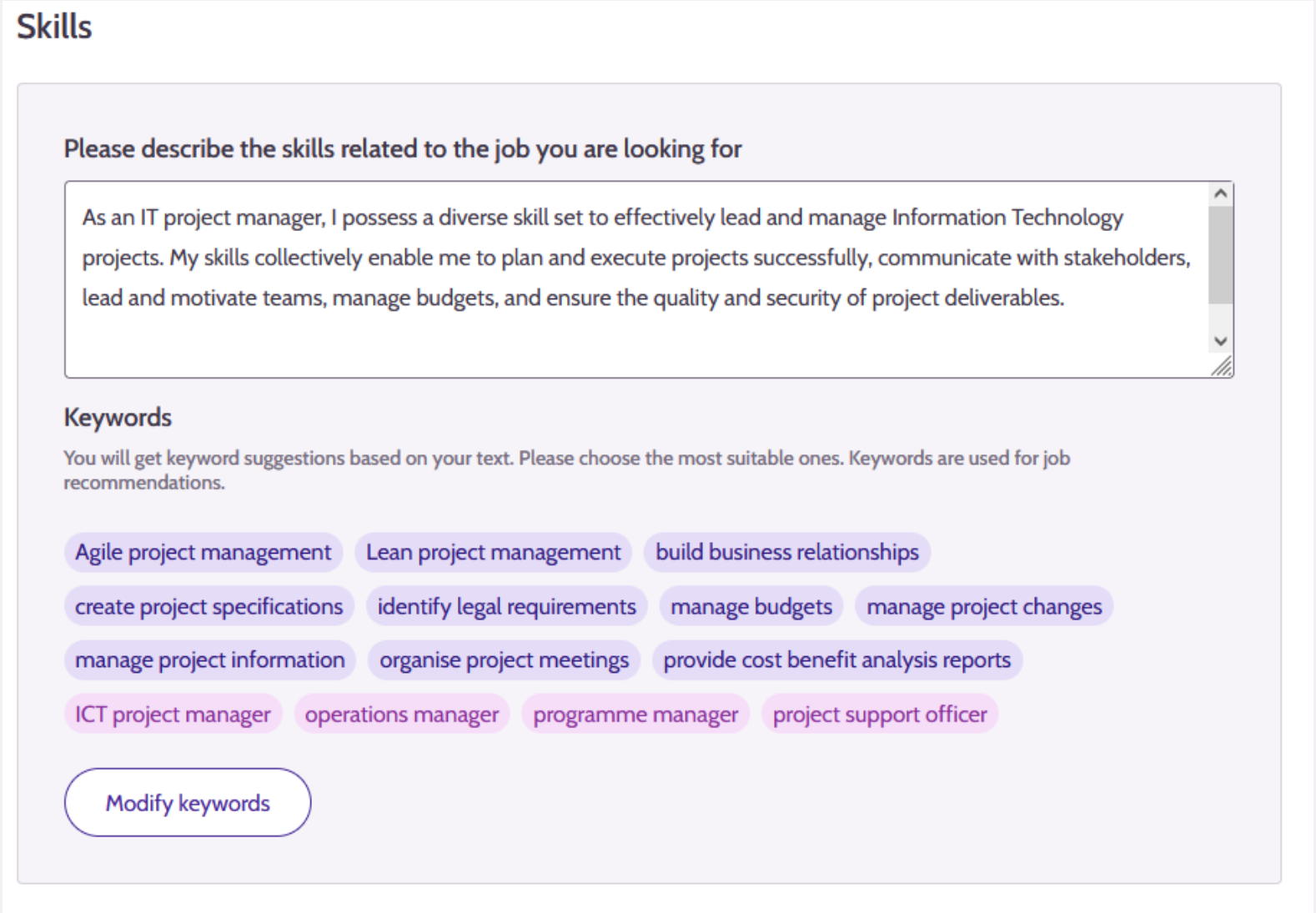
Creating a job applicant profile

- Available in Finnish, Swedish and English
- Knowledge and skills
- Introduction
- Work experience and education
- You can create profile yourself at https://tyomarkkinatori.fi/en and see job opportunities in Finland



Utilising the AI in competence recognition

- Relevant skills and occupations are recommended to the users based on the natural language processing (NLP)
  - Makes skill recognition easier
  - Based on ESCO classification´s names and descriptions
  - TF-IDF text search is made for few letter word parts i.e ngrams
- Helps applicant to understand one's competence
- Same competence recommender is available to employer when creating an open job posting.



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Creating skill & occupation recommender

1. Preparing the data set
    1. ESCO competence´s names and descriptions were divided into few letter ngrams
    2. Same steps were performed to ESCO professions (3 000 professions) and 600 professions already in Job Market Finland
2. TF-IDF search (term frequency – inverse document frequency) suggests ESCO skills and occupations based on written text
    - Available in Finnish, Swedish and English
3. User selects the ESCO skills and occupations
4. We can match profiles and job postings based on selected ESCO skills and occupations = **occupation search**
    - Relies on selected skills and occupations
    - Isn´t language specific

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Using NLP-services for matching jobs and jobseekers

- Jobseeker can also enter free text on skills and work preferences, and we wanted to improve the matching based on written free text. We use few different NLP- services and tools.
    - Relevance model and combining TF-IDF search, FastText –search with previously introduced Occupation search
- **Relevance model:**
    - Job postings often include words and phrases that don´t describe the job in question.
    - Requires pre-processing the job postings with relevance model before applying NLP-searches
        - Model only extracts the words that really describe the job and the suitable applicant
- **TF-IDF search**
    - Searches few letter ngrams and how often most relevant ngrams appear in each job posting or profile.
- **FastText search**
    - Creates clusters of words related to same subject by converting words in job postings and job profiles to numeric vectors
- **Combining the results from TF-IDF search, FastText search and Occupation search to get the best NLP-matching results for jobseekers and employers.**

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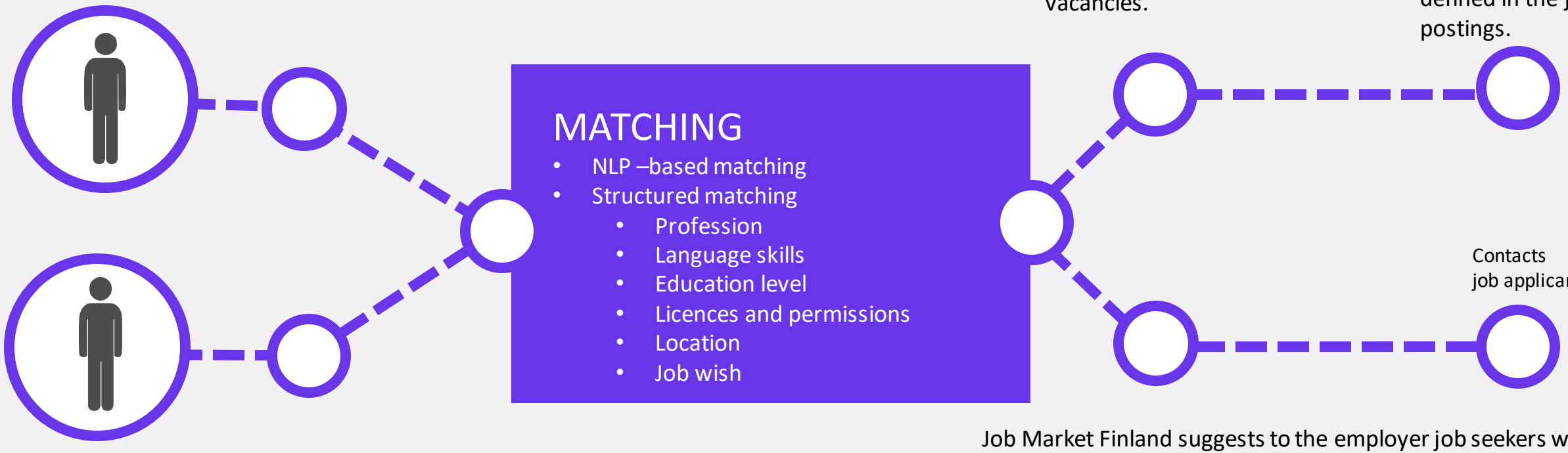
Overview: How Job Market Finland's matching works



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At Job Market Finland...

500 000

people in a month
on average
visit the site.

25,000

open jobs posted
on average.

287 000

users have created
a **job applicant**
profile.

26,000

of these profiles
have been
published to be
seen by logged in
employer users.

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Questions?

Check out Job Market Finland
https://tyomarkkinatori.fi/en

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