Swiss National Science Foundation

MATCHING PROPOSALS TO REVIEWERS

AFIRE AI Sprint

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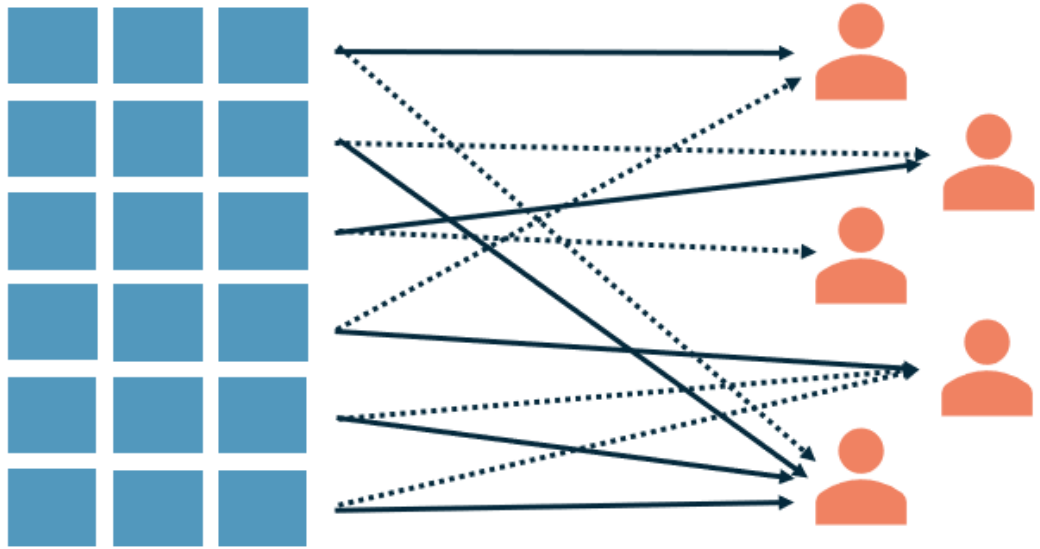
Project: Matching grant proposals to reviewers

- **Use-case for experimentation with AI:**
  - Find the most similar proposal – reviewer pairs
  - Leverage the benefits of AI to **support** this core process
  - Cost-benefit analysis



Grant Proposals

Proposal text

Potential Reviewers

Publications text

Text similarity

AI → Text vectorization

Cosine distance

SNSF

Approach: Natural Language Processing (NLP)

- **Text Embeddings:**
  - Representing text as a full word sequence
  - Text vectorization via **transformer models** (Vaswani et al., 2017)
  - SPECTER2 model pre-trained on scientific texts
  - Implementation notebook on GitHub: grant_similarity_transformer.ipynb

snsf-grant-similarity

GitHub Repository

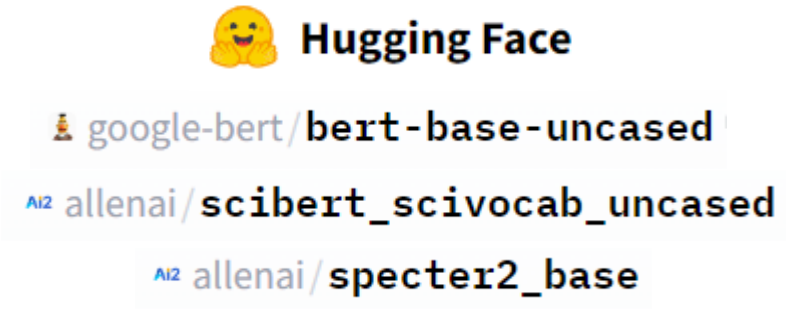
- **Matching Procedure:**
  - Download publication metadata from a bibliometric database (Dimensions.ai)
  - Compare texts of reviewers and applications using text embeddings
  - Match reviewers to applications based on the highest text similarity
  - Balance number of proposals across reviewers
  - Validation of matching results by scientific officers

ACL Anthology

Validation Study

Results: Validation study

- **Validation Data:**
  - Scientific officers matched reviewers manually – “golden dataset”
- **Outcome Measure:**
  - Overlap between the manually assigned and AI-suggested reviewers
- **Methods:**
  - BERT, SciBERT, SPECTER2



Overlap Probability	Model 1: BERT	Model 2: SciBERT	Model 3: SPECTER
Overall	**76.2%**	**80.1%**	**85.9%**
LS	82.9%	86.2%	91.9%
MINT	77.6%	81.6%	88.4%
SSH	57.9%	63.2%	68.4%

Table 1: Probability of an overlap (in %) between manually matched reviewers and top 5 reviewers from Transformers.

Conclusion: Limitations and future experiments

- **Limitations**:
  - Availability of bibliometric metadata differs across disciplines
  - Matching in SSH disciplines is particularly challenging
- **Future Experiments**:
  - Leverage internal data for tailored fine-tuning of the model
  - Incorporate disciplinary information into the matching procedure
  - **If** we leverage internal data and incorporate disciplinary information, **then** we can improve matching for SSH
- **PICO:**
  - Population: Grant proposals
  - Intervention: Model fine-tuning and new data source
  - Comparison: Identical set of grant proposals
  - Outcome: Overlap between manually assigned and AI-generated reviewers

Thank You for Your Attention!

ARTICLE FREE ACCESS

Attention is all you need

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