



SENIOR PROJECT

ANONYMOUS PUBLICATION
SUBMISSION AND REVIEW
PLATFORM USING
MACHINE LEARNING

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Problems

Biased reviews

- Reviewers personal preferences, affiliations and etc.
- Possible unfair evaluations, including unjustly favored or rejected

Delays

- Delays in publication due to time-consuming reviews
- Detrimental in fast-moving research fields

Reviewer Matching

- Possible reviewer mismatch due to lack of relevant expertise
- Less qualified feedback and value of peer review process

Project features



1

Preventing biased reviews

The web platform uses machine learning to anonymize submissions, eliminating biases related to author identity and ensuring reviews focus solely on content and research quality.

2

Fast review results

Streamlines the review process with machine learning, automating tasks and managing reviewer workloads to speed up publication.

3

Assigning most relevant reviewer

Utilizes machine learning to match submissions with reviewers based on expertise, ensuring more thorough and relevant evaluations to enhance review quality.



Tech Stack

BACKEND

- ▶ Utilized Django framework for building REST APIs
- ▶ Constructed relational scheme of application's database
- ▶ Utilized FastAPI framework to deploy ML model as an independent microservice
- ▶ Developed endpoints for user authentication and authorization with built in tokens

MACHINE LEARNING

- ▶ Built a two-step machine learning model that finds best matches for review
- ▶ Trained classification model on 1.2M papers from arXiv dataset with 150+ categories
- ▶ Utilized text similarity (TF-IDF) method to rank the authors by their expertise
- ▶ Deployed ML models to FastAPI server

FRONTEND

- ▶ Created User Friendly design of the application's pages
- ▶ Implemented Sign up and Sign in functionalities and connected with backend
- ▶ Utilized ReactJS and Tailwind frameworks for designing and implementing the layouts
- ▶ Additional features like calendar



Evaluation

Classification

Classification model was evaluated quantitatively by measuring the accuracy of the predictions. As top-3 classes are assigned to the paper, classification was considered correct if at least one of them was true. By increasing the size of the dataset and tuning the model's parameters we were able to achieve the accuracy of 92.67%.

Scoring and Ranking

Quality of scoring and ranking mechanism was evaluated manually by observing the relevance of the papers to their assigned reviewers by the system. We created 30 reviewer profiles with different research areas and created corresponding papers in those areas. In 26 out of 30 cases, papers were assigned to correct reviewers.



Conclusion and Future Work

1

We believe that we have made a step forward in automating the peer-review process. Consulting with the Program Chairs (PCs) of different real-world conferences is needed to further ease the paper-reviewer assignment processes. Gaining deeper insights into how the peer-review process works would give us a chance to unify the peer-review processes into an all-in-one platform, where no paper would be left without attention, which must be the next goal.

2

In the wake of Large Language Models like GPT, it is fair to suggest the creation of the automated AI reviewer, which would allow authors to gain initial feedback on their papers. Since the peer-review process sometimes might be a costly process, having an AI bot that would allow the paper to be perfected before its first submission would give the chance to the papers that might have never been seen by the world otherwise.

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THANK YOU FOR YOUR ATTENTION