

# Recommendation System Algorithm Application to Increase Interdisciplinary Undergraduate Course Collaborations

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## Abstract

### CABPortal:

- Web-based application that promotes interdisciplinary collaborations and helps to solve community problems.
- Uses collective intelligence, human computation, and gamification

### Goal:

To create a recommendation algorithm that:

- Connects faculty across disciplines
- Connects based on shared interests. (Non-Departmental)

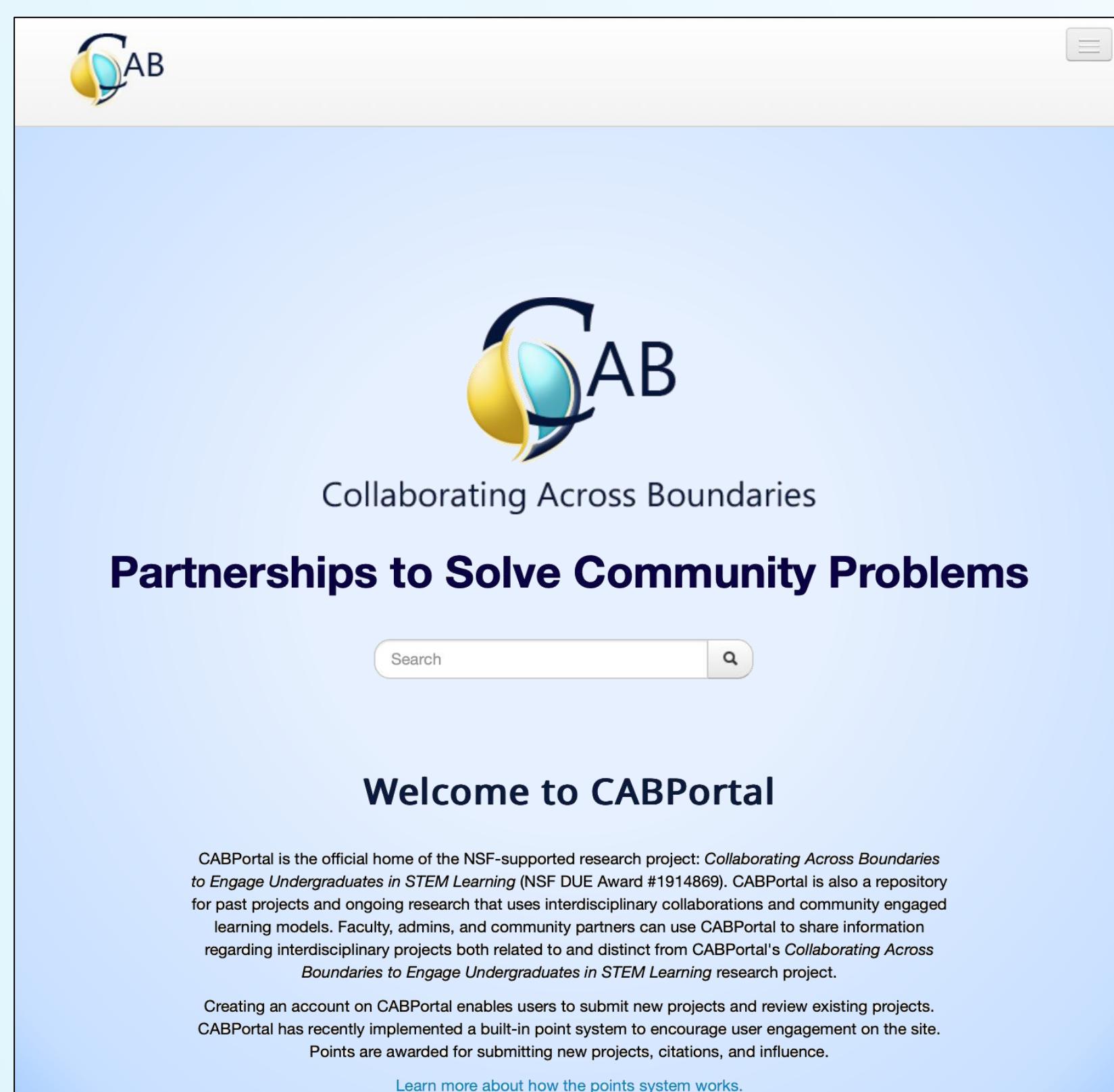


Figure 1: CABPortal Landing Page

## Methodology

### Faculty-Centric:

Matching faculty from different disciplines, but with similar interests. Example:

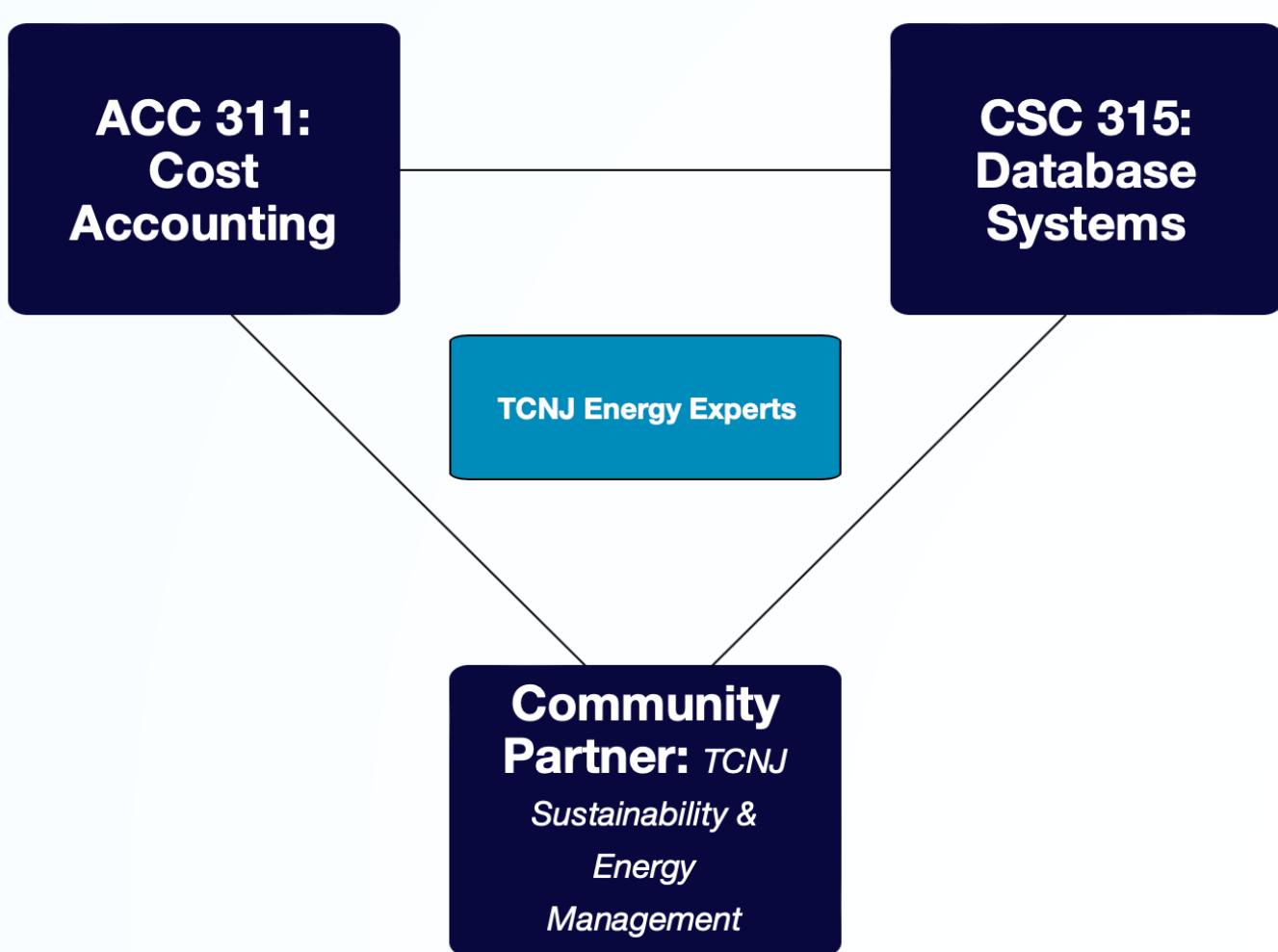


Figure 2: Sustainability Project

### Natural Language Processing:

For smart matching of academic interests

### Human Computation:

To bridge the gap in what the computer can recommend

### Gamification:

A rewards system to engage and motivate users.

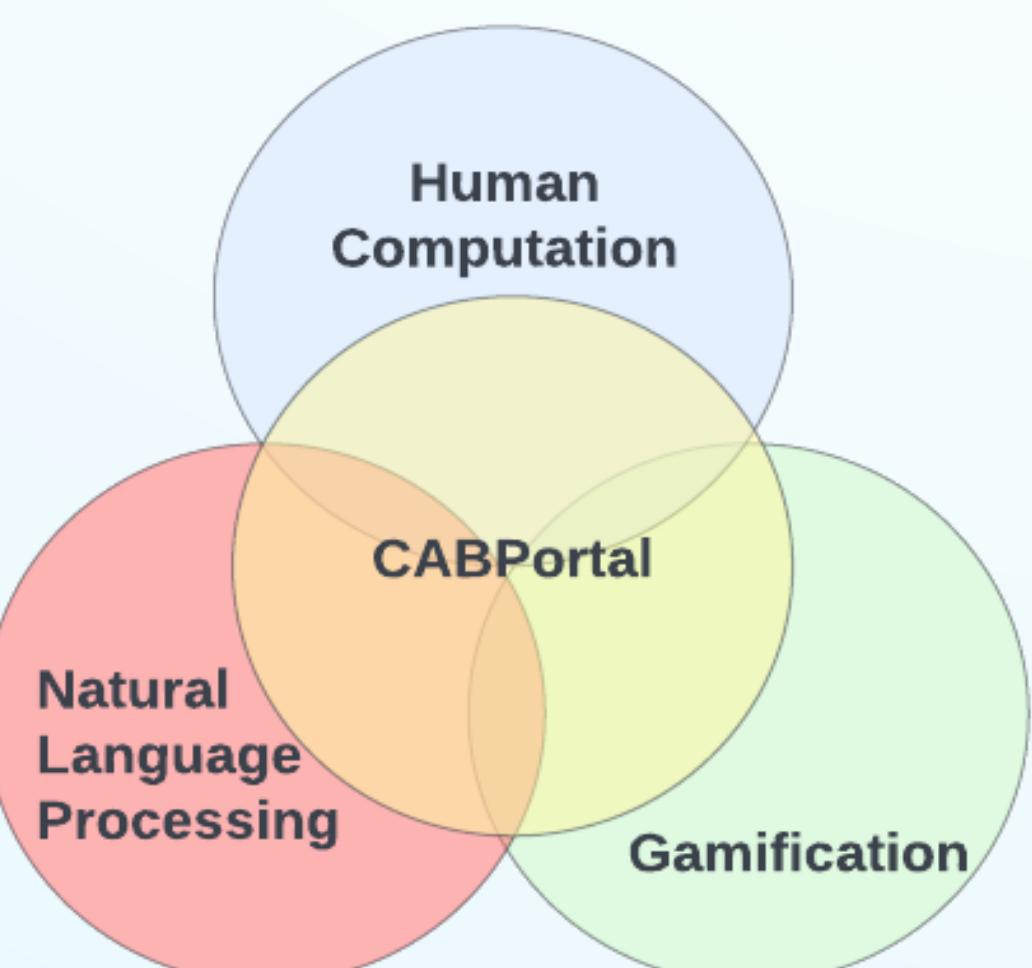


Figure 3: Research Methods

## Results

The Hybrid Filtering approach emerged as the most effective since it combines collaborative and content-based filtering.

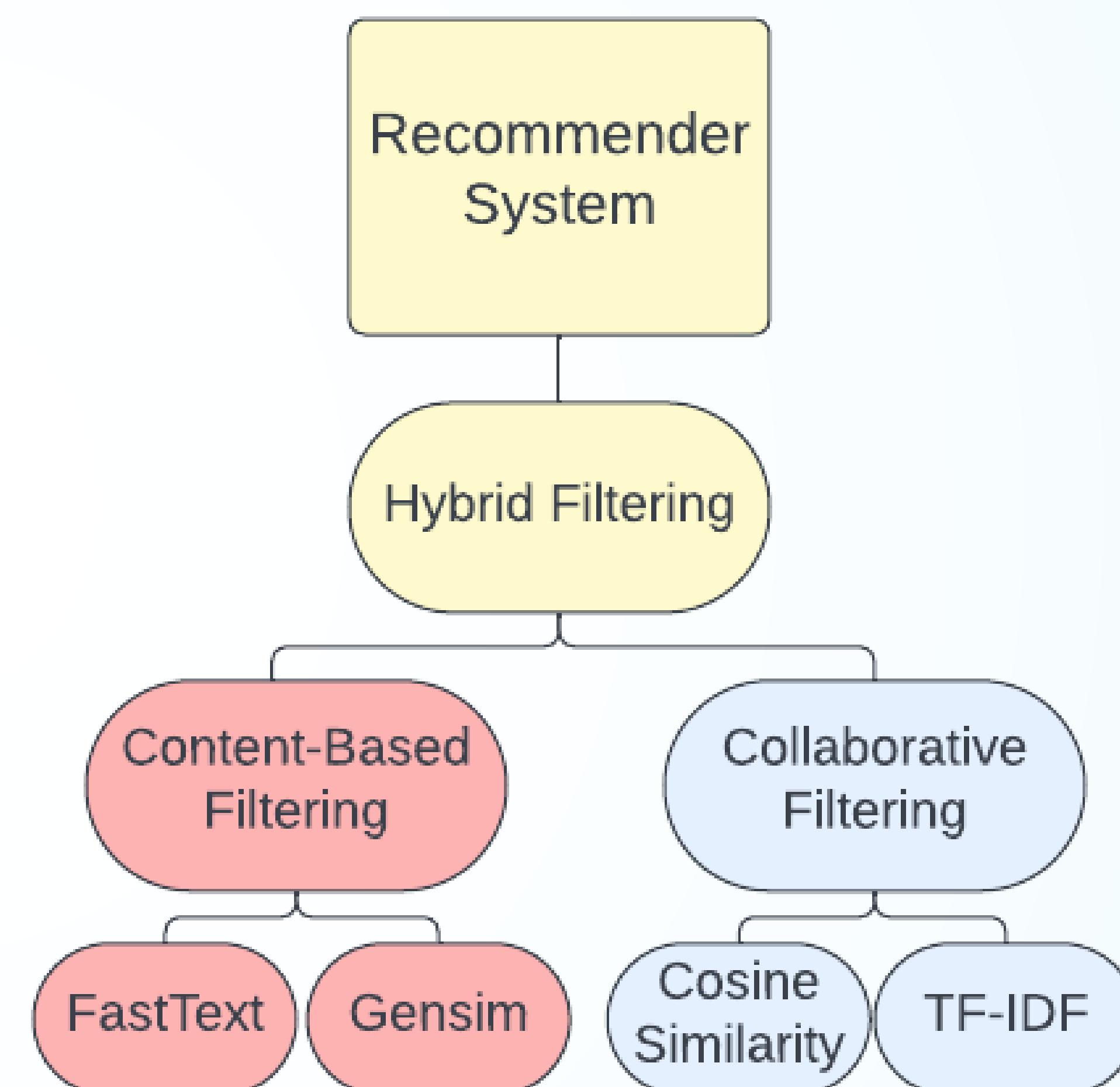


Figure 4: Recommendation Techniques

**Machine Learning:** The system improves its recommendations over time, as it learns from an increasing volume of user data, using this weighted hybridization formula:

$$P_{u,i} = \sum_{f=1}^c \sigma_f p_{u,i}^{(f)}$$

Figure 5: Weighted Hybridization Formula [S. Suriati et al 2017]

## Conclusion

**Weighted Hybridization:** Initial tests confirm that our weighted hybridization model yields interest-based interdisciplinary recommendations.

**Ongoing Challenge:** Despite the effectiveness of our algorithm, the 'cold start' problem remains an area for future refinement.

## Ongoing Research

We are employing generative AI to generate large amounts of real-world data to:

- Improve recommendation system accuracy
- Improve gamification motivation
- Allow for comprehensive testing

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