Enhancing Sequential Recommendations system for MOOCs base on Heterogeneous information networks

Phạm Đức Hiếu

University of Information Technology

What ?

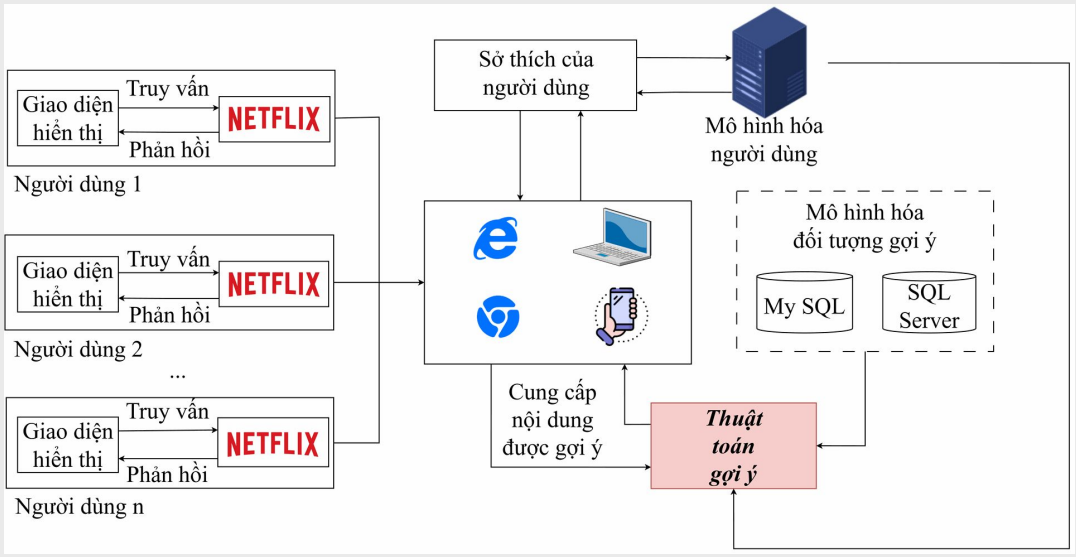
We introduce a framework to enhance sequential recommendation systems for MOOCs, in which we have:

- Proposed a robust method to integrate and model heterogeneous information networks (HIN) for MOOCs data.
- Built a comprehensive dataset combining user interactions, course metadata, and contextual information from multiple sources.
- Evaluated several advanced sequential recommendations algorithm to ensure personalized and accurate course suggestions.

Why ?

- In the context of MOOCs (Massive Open Online Courses), understanding user behavior is critical for improving learning outcomes and providing personalized course recommendations. Sequential recommendation systems play a key role in identifying users' learning preferences and guiding them through a more effective learning path.
- However, most studies in this area have focused on simple user-item interactions, rather than leveraging the rich and heterogeneous information available in MOOCs, such as course content, instructor profiles, and peer interactions.

Overview



- Data collection
- Model Building
- Test and evaluation

Description

1. Data Collection

- Learn behavior history: Courses taken, completion rate, learning time, action such as clicks, lecture views, discussions.
- Assessments: Comments, reviews of the courses, emotional and senmantic analysis to understand learner concerns.
- Courses content: Title, description, keywords, learning materials, and content connections between courses.

2. Model Building

- HIN model: Represent components, such as learners, courses, and relationships between them as edges.
- Incorporating Deep Learning: Apply Graph Neural Networks (GNN) or Graph Attention Networks (GAT) to exploit relationships between components
- Use sequential models such as RNN or Tranformers to predict future behavior based on history.

▪Optimization: Incorporate additional features such as emotions from reviews of course ratings to increase accuracy

3. Test and Evaluation

- Testing data: Using actual datasets from MOOCs or publicly, divined into training, testing, and validation sets.
- Evaluation criteria:Precision, Recall, F1-score
- Model comparison: HIN assessment improves with traditional models such as Collaborative Filtering or Content-Based Filtering.
- Analyze the results: Present with charts, figures, and suggestions for improvement.

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Phạm Đức Hiếu– Trường Đại học Công nghệ Thông tin - ĐHQG HCM

TEL : 0705973403 Email : 21520856@gm.uit.edu.vn