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Recommendation Engine of Learning Contents and Activities Based on Learning Analytics

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Introduction

- **Recommendation engines**
  - suggestion to users for different items
  - based on the analysis of the behaviors of that user or other users.
- **Learning analytics** - students' behaviors to be analysed by using tracking.

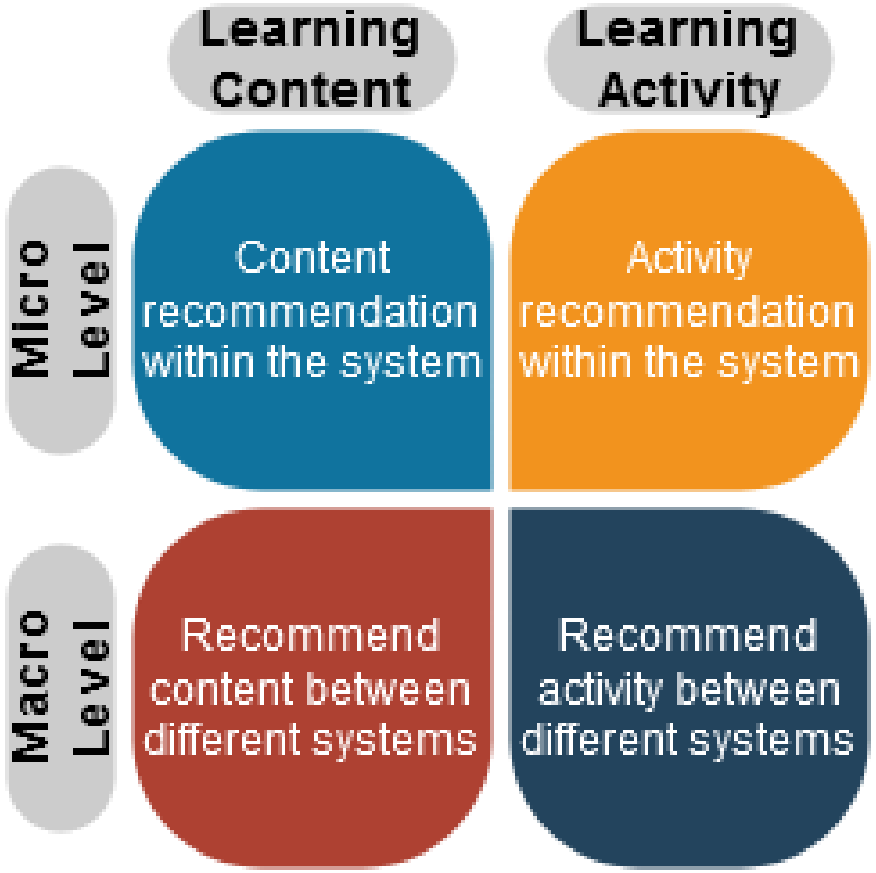
Study Contribution

- ***Aptitude project:*** is to design and implement the platform, which is based on learning analytics from learning management systems (LMS) and educational games, to recommend and adapt the learning content and activities.
- ***Paper goal:*** to propose software architecture for a recommendation engine based on learning analytics, which has an impact on two main parameters: learning content and learning activities.

Related Works

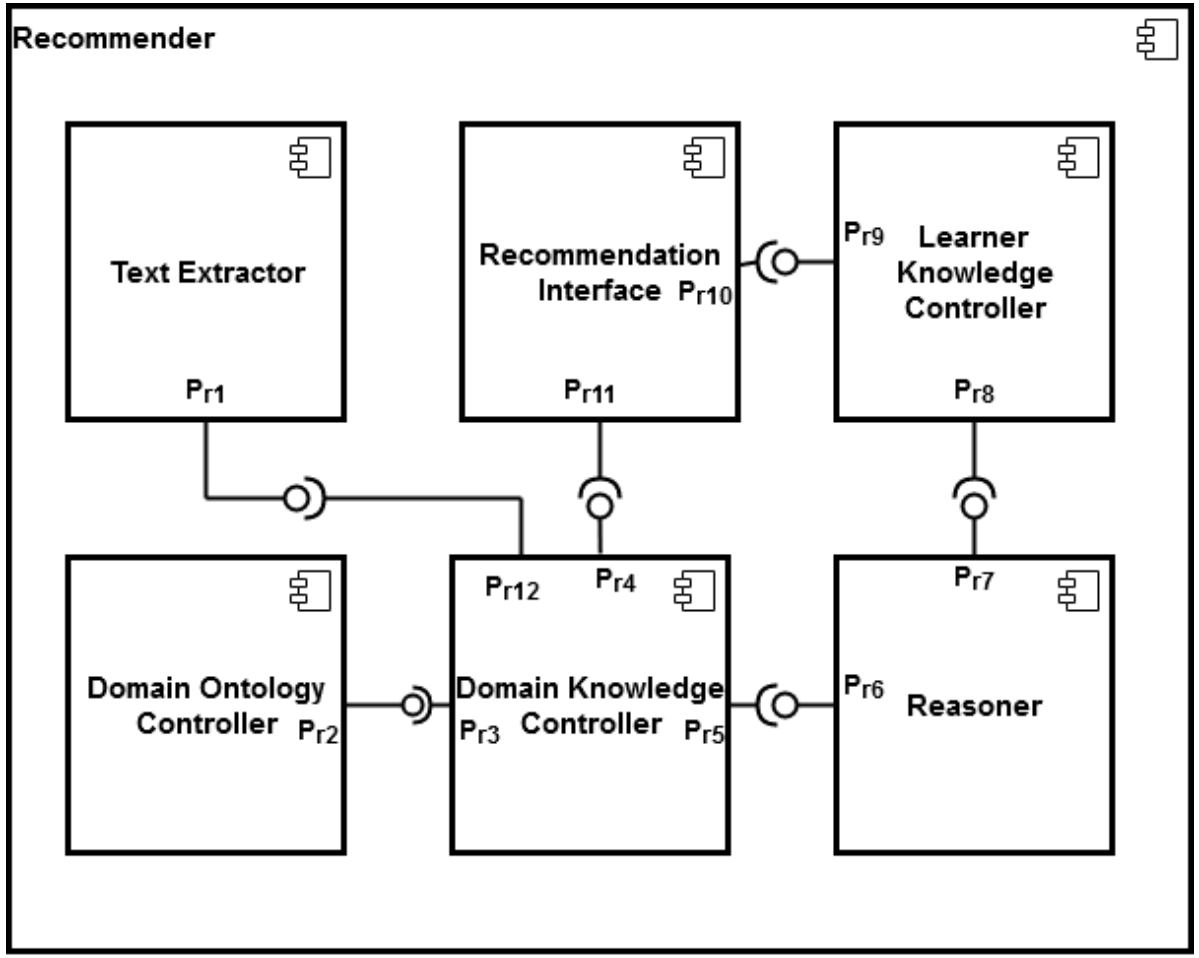
- ***Recommendation algorithms:***
  - Content-Based Filtering (CBF)
  - Collaborative Filtering (CF)
- ***New recommendation approaches:***
  - a hybrid recommendation algorithm;
  - a heuristic hybrid recommender method;
  - a learning path recommendation model;
  - a ranked list of Learning Objects following a simple keyword-based query.

Aptitude Recommendation Process



- ***Variables:*** learning contents and activities
- ***Levels:*** micro and macro

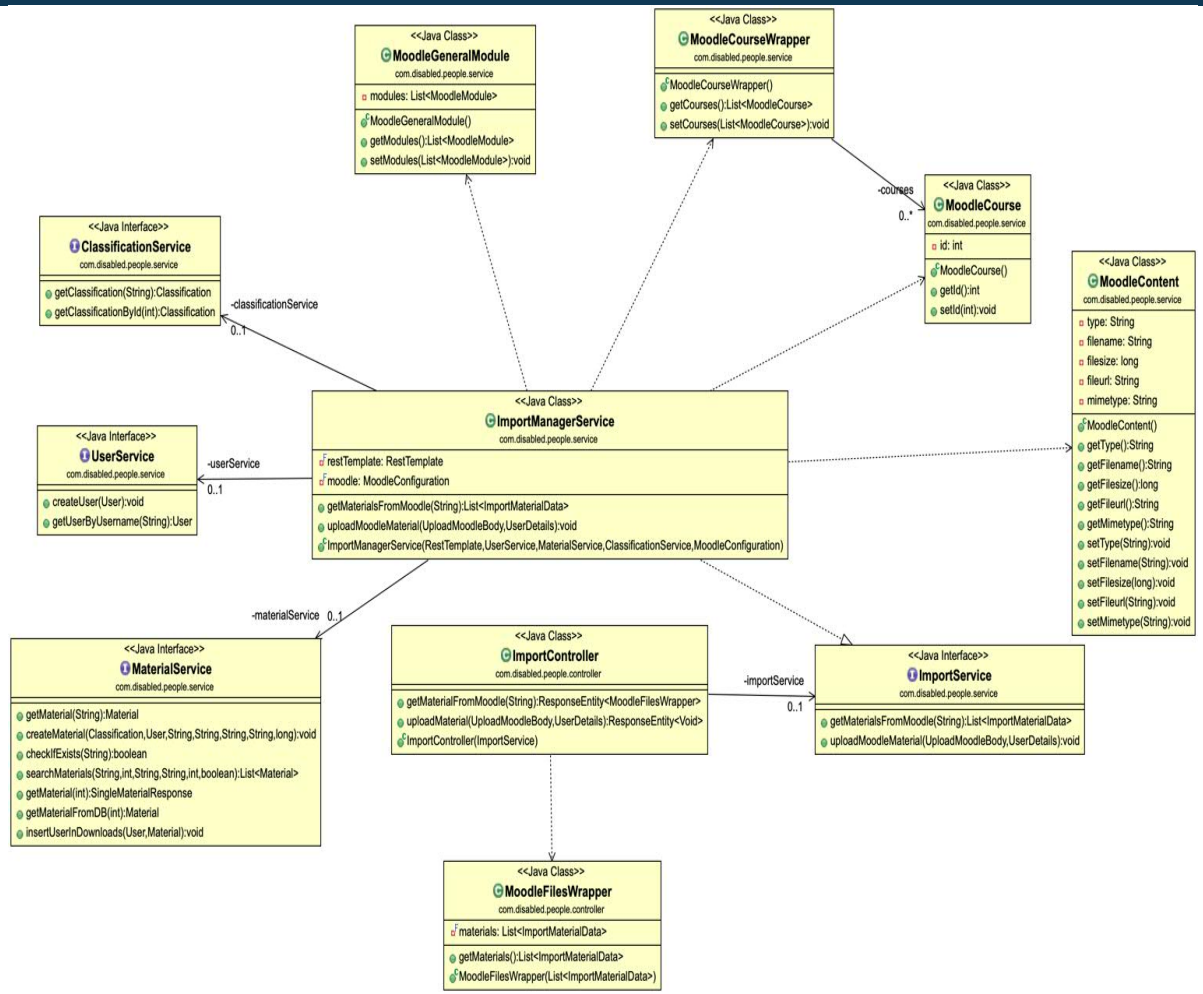
Aptitude Recommendation Engine



Case-study

- a source of the learning resources (the client of the web service) - Moodle system
- a server - the Aptitude Recommender

Class Diagram of Moodle Resources Extract Service



Metrics for Measuring the Learners Behaviour

- Getting information about courses
- Getting summary information from the log table about course visits
- Getting information about tests
- Receiving information about test grades
- Getting information about learning resources
- Getting detailed information from the log table on course attendance
- Getting information from the log table on resource views
- Loading resource texts

Main Services

- **Semantic Recommender** - provides relevant learning activities calculated by the Apriori method;
- **Semantic Search** - enables learning content searching by terms in the subject area ontology;
- **Semantically Similar Resources** - provides a list of similar learning resources according to their cosine similarity.

Conclusion

- The proposed software architecture - to be independent from other systems, tools or services which are sources of learning content and activities.
- To achieving high student results through the delivery of appropriate learning resources.
- The recommendation of both learning content and learning activities which are internal or external to the system.

Thank you!

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