

INFERNO: PROACTIVE KNOWLEDGE-BASED RECOMMENDATION ENGINE FOR ESL COMPOSITION

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A dissertation submitted in partial fulfilment of the requirement for
Bachelor of Engineering (Honours) degree in Software Engineering

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in collaboration with

University of Westminster, UK

2020

Abstract

Although composition in English is a highly acclaimed and sought-after skill in the current world, it is often a daunting challenge for ESL (English as a Second Language) students. As non-native speakers undertaking studies in the English medium, these students go through a plethora of issues during English composition, out of which the most combatted issues are grammar errors and poor readability. This is evident by the huge number of writing assistance platforms available currently, such as Grammarly, Hemingway Editor etc. Nevertheless, statistics show that one of the most pressing issues faced by ESL students currently is content generation and narrative building. Although existing research has made great strides in conquering this challenge, these systems are often computationally expensive to develop and deploy, and most often require massive datasets to function accurately.

Thus, the proposed system, INFERNO, utilizes a knowledge-based approach coupled with a hybrid similarity matching algorithm and a fuzzy normalizer for human-centric rule-based reasoning to determine the most relevant domain knowledge that can be integrated into the user's composition context and presents them to the user proactively upon request. The system uses a combination of techniques such as concept extraction, dynamic query generation and verbalization to generate meaningful and readable recommendations. For research purposes, the composition is kept domain-specific, where a domain ontology has been created for the Solar System domain due to freely accessible knowledge from trusted institutions. The system is successfully tested and evaluated against end users and expert evaluators for accuracy, performance and low computational cost, making INFERNO a novel approach to proactive knowledge-based recommendation systems development and a viable solution for a major challenge faced by ESL students.

Keywords

Recommendation Systems, Knowledge-based Recommendations, Natural Language Understanding, Natural Language Generation Knowledge Modelling, Ontologies, Ontology Verbalization, ESL