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Abstract

In the British higher education economy, special significance falls to allocation of study places to applying students. Universities may need to decide on short notice about offering study places to prospective student based on limited information.

In this paper, we propose to use a case-based reasoning (Aamodt and Plaza, 1994) system to assist administrative staff with this decision. We will analyse the factors based on which subject specialists decide on offering study places to at a university and argue that a case-based reasoning system is in principle able to make a recommendation.

We deem CBR as a useful AI-technique for this purpose, especially so as CBR allows to use the normally complex and partly unstructured data involved in the decision making process, following the principles of the experience web (Smyth *et al.*, 2009) as well as experience management in partly unstructured data (Bergmann, 2002).

Introduction

The correct allocation of conditional and unconditional offers of study spaces to prospective students is generally a critical part in a British higher education institution. Generally, universities are incentivised to attract the best students, while at the same time trying to fill all spaces. A major part of allocating study spaces efficiently falls to the interpretation of previous academic performance of individual students, e.g., school results such as A-levels, certifications such as B-Tec, or similar.

The interpretation of previous performance is generally understood to require subject knowledge in the prospective field of study. However, subject specialists are often not immediately available as a significant numbers of offers are made during so-called clearing, that is, during the final few weeks before the beginning of a term when study places that have not been previously allocated by UCAS are left for universities to fill. Offers need to be made as soon as possible after student enquiry: The faster the prospective student gets an answer, the more likely is the student to accept the offer.

To this end, we aim to develop a case-based reasoning (CBR) system supporting administrative staff with interpreting previous academic achievement towards a potential study offer for prospective students. The system will be implemented using a customised version of the industry standard tool myCBR 3 (myCBR-project, 2015). Following a successful evaluation, the system may be extended for other subjects, the interpretation of international grades and certificates, or the acknowledgement of prior learning for student admissions with advanced standing and similar.

Aims and Objectives

Our research aims to develop a CBR system for the interpretation of home student applications in computing. To this end, the initial research objectives are as follows:

- Model the formal criteria for the allocation of study places at our institution in computing.
- Design a data collection method towards the capturing of knowledge from subject area experts who previously worked in clearing, and elicit their knowledge for the CBR system.
- Implement and evaluate the CBR system based on the previously collected knowledge.
- Provide the CBR system to help decision makers in time-intensive, high volume phases, such as clearing sessions.

Conclusions

In this poster, we discussed the development of a CBR recommendation system. We outlined the potential for a system supporting administrative staff in decision-making for the allocation of study places by leveraging knowledge from computing subject specialists with previous experience in interpreting previous academic performance of prospective students.

Further, we described an initial approach for knowledge gathering using two stages of data collection: In the first stage, qualitative data is collected to identify main criteria for the interpretation of applications. Based on the analysis of this data, a quantitative survey will be developed in order to capture specific numerical and logical relationships of the identified main criteria. Based on this quantitative data, the CBR system will be implemented, and then evaluated to make it available to clearing support staff as well as lecturers, supporting the decision making process in high volume phases, such as clearing, where a prompt and well-informed reply is key to successful recruitment.

Methodology

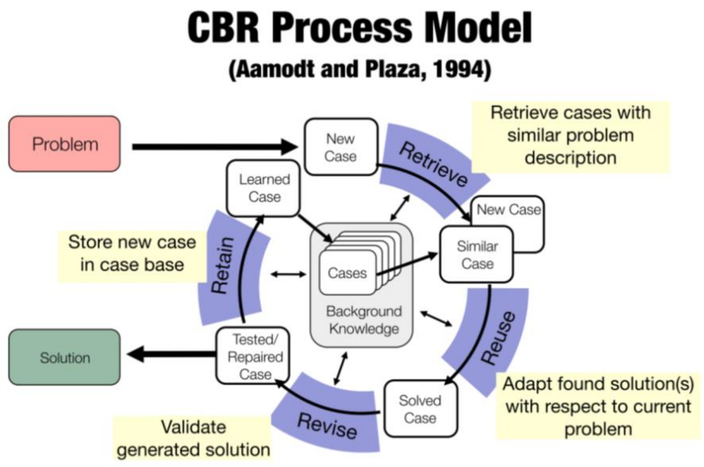
The data for the intended knowledge model will be acquired by a qualitative data collection phase using interviews, followed by a quantitative data collection phase using questionnaire

Currently a set of qualitative and quantitative questions for this purpose is developed and integrated in our interview strategy.

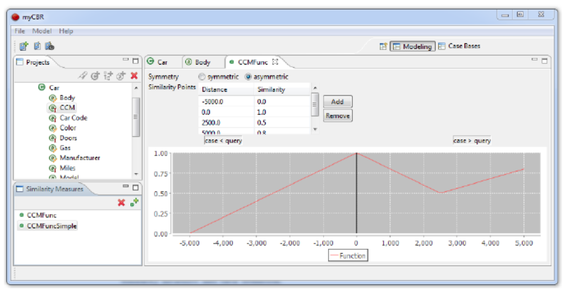
Having acquired the necessary data and expert knowledge from lecturers and involved University bodies we will use Action Research to implement prototype software and knowledge models on which we will further develop the recommender systems following the rapid prototyping and agile development approaches (Avison *et al.*, 1999).

In our knowledge model we will see previous applicants and their qualifications, alongside the course they applied for, as a problem description of a “case”. We further see the decision made for the applicant (accept, no accept, further detailed decisions) as the solution part of a “case”.

Following the idea that similar problems have similar solutions we will then create a CBR knowledge model to reuse the gathered experience on application decisions to aid future decisions on applications. The CBR model outlines the approach to this experience reuse:



The knowledge model that our system will use will be modelled using the myCBR 3 tool, which is a joint development effort between the CBR competence centre at the DFKI (Deutsches Forschungszentrum fuer Kuenstliche Intelligenz, German Research Centre for AI) and the School of Computing and Engineering at UWL.



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Key development in the knowledge model are the similarity measures it will use, which will be developed based on the captured data and expert knowledge made available by the data elicitation phase enabled by conducting controlled interview sessions.

The final recommender software will be available as a Java application and hence be usable on any laptop and desktop involved in clearing sessions.

Results

At the current stage of the project we have created and verified interview questions to enable the knowledge acquisition form the human experts, e.g. academics and university bodies involved in clearance and admission.

We further have developed a controlled interview strategy alongside agreed measures to establish sufficient grades of information saturation to ensure adequate knowledge capture before we start implementing the knowledge model.

We have successfully implemented a first selection of custom similarity measures in the myCBR 3 software.

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