



*Chair: Mukundan*

(Judges: James, Mukund, Fabian)

10.30	10.45	Alex Widogast (BSc Hons)
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10:45	11:00	
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Binary Search Trees are widely used in all areas of computer science, and have been modified in many different ways to support additional operations or better efficiency. The motivating example, the Order-Statistic Tree, stores at each node the size of its subtree, allowing efficient queries relating to the rank of each element without compromising the space or time complexity of other operations. The aim of this

Despite having been proposed more than sixty years ago, progress in judgment prediction has only quickened within the past decade. The most significant development is the prediction of judicial decisions on the basis of natural language descriptions of the facts of cases. The literature has focussed on explainable artificial intelligence methods, including support vector machines and linear regression, although less explainable models have also been used. Due to the difficulty in obtaining access to factual information upon which judicial decisions are based, most researchers have used the text of final judgments to make predictions, a method which does not generally permit prediction of future decisions. The concerns relating to access to data are likely to hinder future development in this area.

In this research project, a machine learning-based pipeline that is used to recognize and classify traffic signs would be built based on an existing innovation project owned by Verizon Connect. With this pipeline, data captured from truck-based cameras would be used as the input, and the type of traffic sign and its geo-information would be the output. This input video data will be sourced from the Berkeley Deep Drive video library, licensed by Verizon Connect. Deep learning techniques will be implemented in

a baseline weighted-linear regression model achieving an MAPE of 32.29. The flood heuristic annual surface water percentage was compared against the Joint Research Centre (JRC) surface water occurrence map giving a Mean Absolute Error (MAE) of 7.04. These results demonstrate that the proposed model is

In Aotearoa New Zealand, assessment of programming for the national NCEA standards is carried out manually by teachers, many of whom are not experienced programmers. In an attempt to decrease teacher workload, we have adapted Moodle CodeRunner to assess a widely used recently released high school programming standard. This presentation explores how we have automated the new standard, including dealing with judgement calls for the more subjective criteria.

We then report on interviews with experienced programming teachers who were shown example tasks from our system, as well as model answers for each example. We found that teachers were enthusiastic about using automated assessment to assess the standard, and while there wasn't one agreed upon interpretation of the standard, teachers were happy with how the system supported marking. We also found no universal agreement among the level of context desired in programming questions to assess the standard, despite the small sample size.

A recent study in psychology suggested that people sometimes reject overly generous offers due to perceived phantom costs (i.e., imagining hidden reasons and motives) in seemingly generous transactions. Phantom costs arise when a person appears unusually generous without a clear rationale. In our first study, we examined this phenomenon by having an agent (either a human or a human-like robot) offering participants either a cookie or a cookie plus \$2, justifying the offer by stating that they were eating cookies with friends. Results showed that participants were more likely to accept the cookie alone, supporting the idea that transparency (here, the reasons why the agent offered money) is crucial in social exchanges with

cookies with friends) undermined transparency. We plan to further investigate how the implausibility of explanations provided by robots influences the perception of phantom costs and how this, in turn, affects human decision-making during interactions with robots.

Visual odometry estimates the pose by analysing images captured by it and is integral to autonomous navigation. However, when devices operate outdoors, the large changes in brightness may cause localisation failure. This short-coming motivates us to find methods that ensure visual odometry can function in high dynamic range environments. To offset the negative impact of operating in high dynamic range environments, researchers proposed automatic exposure algorithms to select a camera exposure time that maximises their selected quality metric. However, direct comparisons between the selected image metric and visual odometry performance is scarce. Many of the proposed algorithms go through multiple steps, making it difficult to determine whether the improved pose estimation accuracy is the result of optimising the metric. In this submission, we generated sets of synthetic images in a simulation environment at different exposure levels. We estimate trajectories ten times for each data set

and compare the resulting errors with the image quality metrics. Our tests showed that none of the selected image quality metrics had a strong, negative correlation with absolute translation error. The findings suggest that the current automatic exposure algorithms have yet to find an image quality metric that truly impacts visual odometry performance. Ongoing research should consider alternative metrics or metric combinations

Recent studies on Explainable Artificial Intelligence (XAI) in education show benefits for student learning. However, integrating XAI in AI-based education (AIED) systems requires understanding students' explanation needs. Some approaches to adding XAI to AIED systems include participatory design and co-design involving learners. This study presents a participatory approach to implement explanations in Active Video Watching (AVW). We designed explanations based on the requirements on timing and presentation of explanations and additional feedback from learners during the participatory activity. The implemented explanations support students who made low to medium-quality comments on video content by explaining how comment quality was determined. Furthermore, explanations included recommendations to improve future comments. We present the results of a pilot study on explanations in an AVW platform.



Soft skills (such as the ability to communicate or work in a team effectively and efficiently) are essential in most professional domains, including healthcare, software and technology development. Training soft skills (either for students at universities or professionals in industry) is challenging. Gamifying soft skills training can increase engagement and learning. We present a systematic mapping study to analyze the state of the research of gamification to enhance soft skills training: We examine game elements used, which soft skills they target, who the training is for, how gamification affects engagement and skill development, and tools used to implement gamification. Based on the analysis of 17 primary papers published up until 2023 we found that Points, Badges, Leaderboards, Levels, Narratives and Characters are dominating game elements in gamified soft skills training. Undergraduate students are the primary type of learners targeted by gamified soft skills training, while industry professionals as a type of learners are less explored. Our findings also indicate that gamification can have a positive impact on soft skill development and increase learner engagement in training activities.

Test anxiety is a significant challenge for tertiary students, often hindering academic performance and mental well-being. This is preponderant in Computer Science (CS) and Software Engineering (SE) education, especially during programming assessments. This project explores the potential of gamification as a tool to help students manage and reduce test anxiety in these contexts. We propose the development of a digital, gamified solution specifically designed for CS and SE students, with the goal of assessing its effectiveness in lowering test anxiety and enhancing academic outcomes.







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