

Framework for Dynamic Text Presentation in eLearning

Integrating Eye Tracking into Adaptive eLearning Environments

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Why Adaptive eLearning?

- Education offered more through online mediums
- Less face-to-face interaction with students
- Need additional forms of student monitoring
- Detect under-performing to provide remedial help
- Detect over-performing to provide advanced material to maintain engagement

Eye Tracking & Adaptive eLearning

- An effective way of analysing human behaviours - particularly reading
- Examples of eye tracking in adaptive eLearning include of this is iDict, a reading aid designed to help readers of a foreign language and “The Reading Assistant” that uses eye gaze to predict failure to recognise a word and provides auditory pronunciation.
- These applications work do not look at overall text comprehension or provide feedback about the overall comprehension.

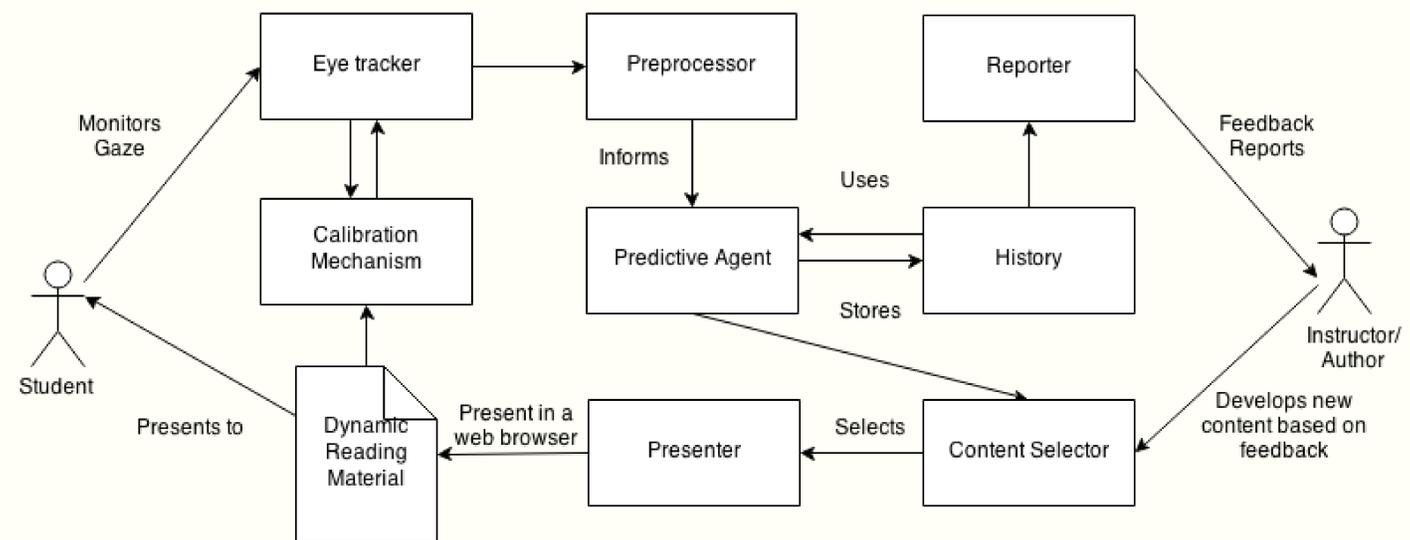


Eye movements patterns for reading are unique; a sequence of fixations (when visual information is taken in) and saccades (jumps between fixations). Eye Movements reflect comprehension difficulties and text complexity.

Framework for Dynamic Text Generation

We present a framework for a system that dynamically generates text based learning material on predictions made from eye gaze recorded from an eye tracker. In such a system a commercial eye tracker would be used. The framework is described in the following diagram below. The Predictive Agent checks comprehension levels, confidence, engagement and familiarity. The student's previous learning behaviour is accessed to make an overall calculation of the student's current learning state. The current learning state is output to a content generator.

The Content Generator is prefilled with texts that different versions of the same content. The different versions will include different levels of text readability, concept difficulty as well as remedial and advanced level supplementary material. Based on the student's current state, as calculated by the predictive agent, a choice of version of the material is made by the content generator. The content is formatted by the Presenter and displayed to the student in the eLearning environment.



Helping Students Learn

- If a student has thoroughly read the area of text explaining the concept and if they perform poorly on assessment of the concept the system can give the student remedial help via explanations of the concept in simpler terms.
- If the student has skimmed over key paragraphs of text the system can dynamically send the student to another presentation of that concept so that the concept is re-iterated to them to ensure that they understand it.
- If a student is observed to be excelling at the content and also bored by it the system can dynamically select advanced level content material that will stimulate the student.

Conclusion & Further Work

The generation of text will be based on the students comprehension levels, confidence, as well as other factors such as familiarity to topics and engagement in the material. The goal of dynamically generated text in eLearning is to promote efficient learning that is individually targeted at each students learning and reading behaviours. Future work is to experimental validate whether dynamically generated text is beneficial to the learning process.