

ULearn: Understanding Student Engagement/Emotion/Frustration using ML

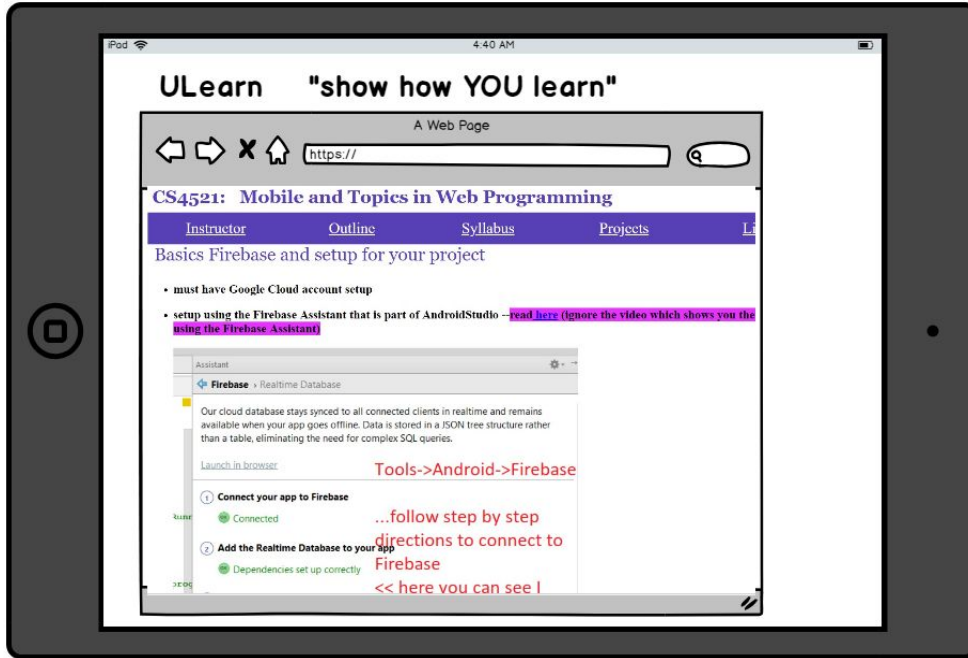


Abstract

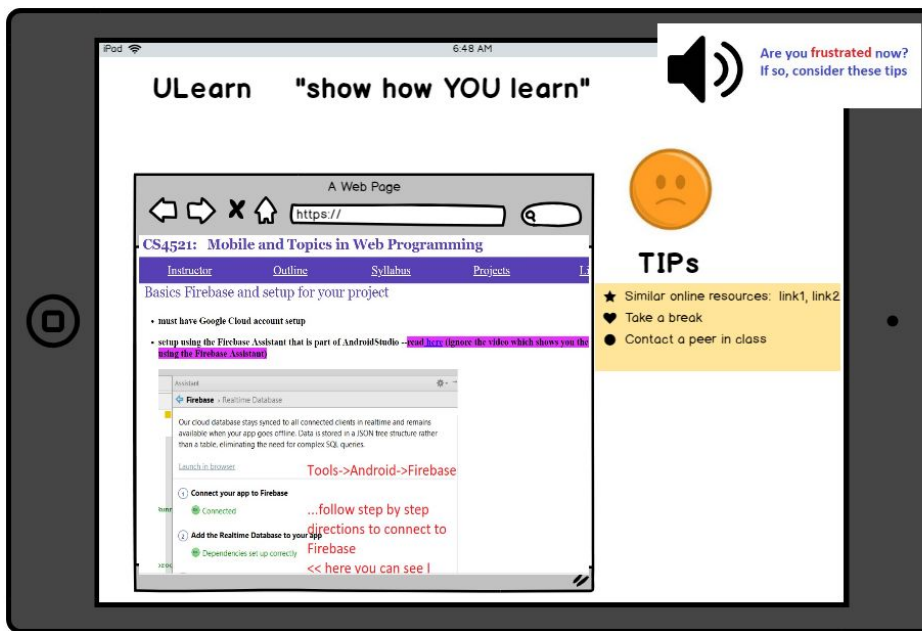
The goal of this work is to provide feedback to students regarding their engagement/emotion/frustration while utilizing web-based instructional material using computer vision and machine learning techniques. An Android Application will be developed that will present a simple user interface of a web-browser to the student. Based on computer vision machine learning the students facial expressions interpreted. If the student seems to be experiencing frustration or anger the user is presented with a pop up giving different suggestions. If the corresponding web Page has title, keywords and meta description tags those will be used to form Google search links or wikipedia links. Future versions will explore the use of Google NPL Text analysis or other web services for AI based tip generation.

Concept

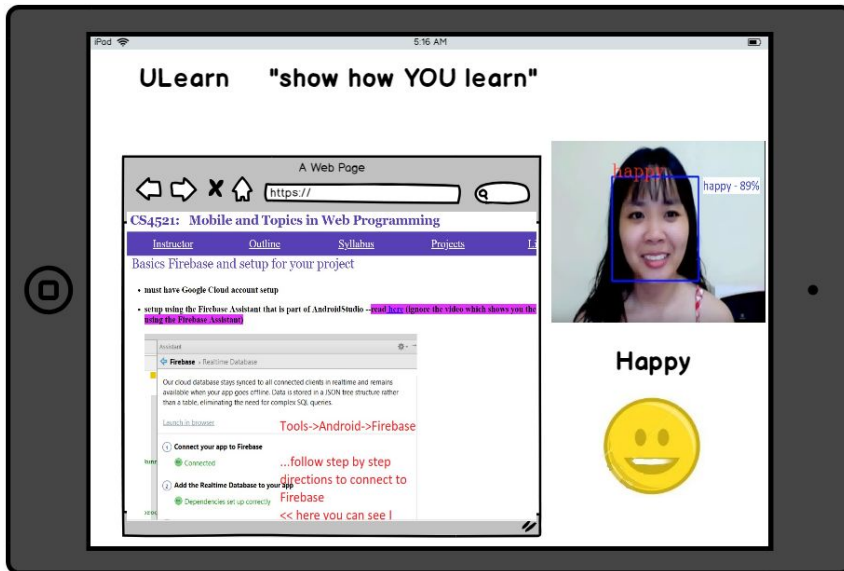
Running Mode - no frustration sensed



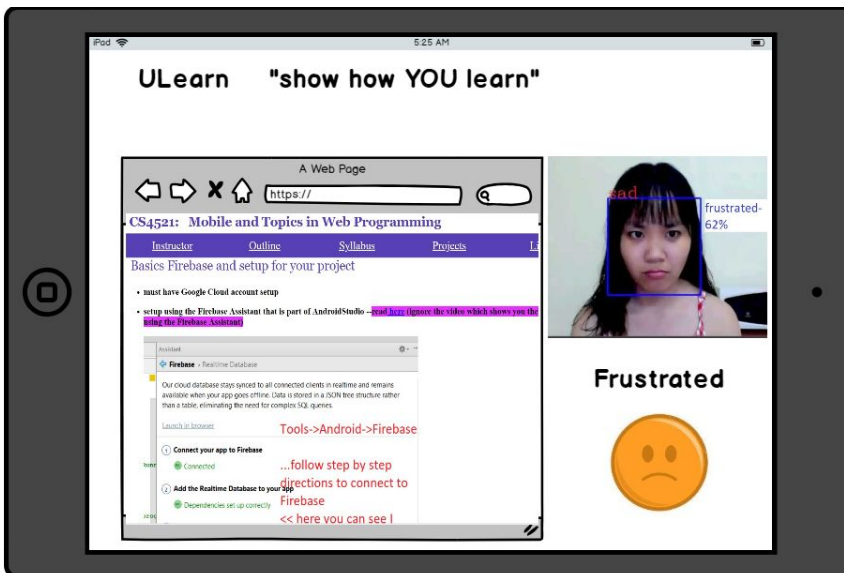
Student based View - "frustrated" case



Diagnostic Mode - "happy"



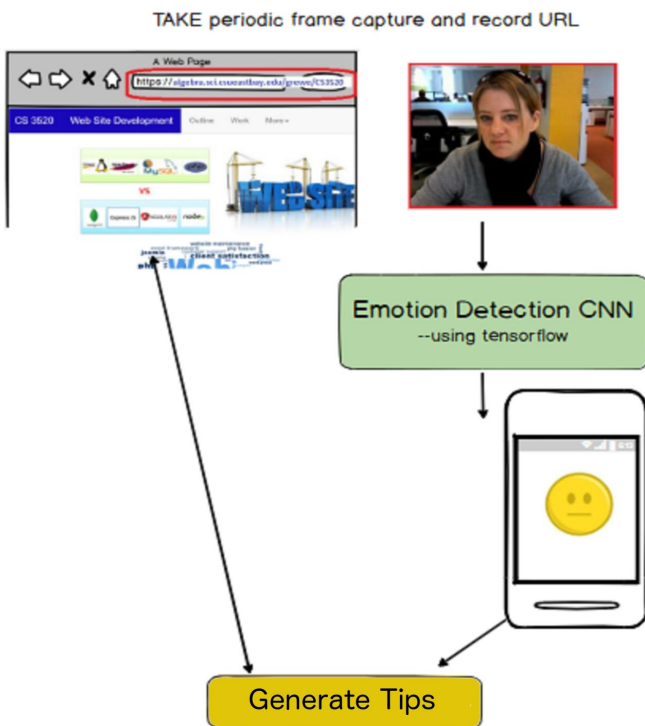
Diagnostic Mode - "frustrated"



Versions

Version 1 - short 2 week deadline Implement as above and choose either Version 1.A or Version 1.B based on availability: Version 1.A : utilize tensorflow CNN Version 1.B: utilize Google Cloud Face Detection service
Version 2 In addition to version 1, add some kind of customization where faculty can in head section of HTML provide custom tips for this - maybe description is enough but, could look at more elaborate options
Version 3 Enhanced training - more time and/or with additional data beyond FER2013
Version 4 Integrate NLP semantic understanding for a AI approach to generation of tips

How it Works



General Issues

This is a proof of concept idea and would need to be tested at the University as a research project. Providing similar links to material use Google Search API is a challenging problem and involves Natural Language Understanding which is an unsolved research problem.

Budget Issues

Use of Google services both NLP and Vision are not free