FATIGUE DETECTION DURING ONLINE LEARNING USING FACIAL FEATURES

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ABSTRACT

During pandemic Covid-19, university students continuing their study from home to prevent the virus from spread even more. As good as it sounds that students can study from their comfort of their home, there are students suffering from fatigue due to it. This project is to detect if the students having fatigue by using facial to detect it. This is done by using webcam during online classes or online learning where students usually getting fatigue from prolonged visual workload and cognitive activity. The classifier that being tested in this project are Support Vector Machine (SVM), K-nearest Neighbour (KNN) and Extreme Gradient Boost (XGBoost). Feature such as Eye Aspect Ratio (EAR), Mouth Aspect Ratio (MAR), Pupil Circularity (PUC) and MAR over EAR (MOE) being extracted from facial features and fatigue will be evaluate based on Real-Life Drowsiness Dataset. In experiments the results of training and testing the classifiers, SVM shows higher accuracy and F1 score comparing to KNN and XGBoost. The accuracy that the system achieved while tested with the users are 85% of accurately detecting the non-fatigue class and fatigue class. This result shows that the capability of the system in detecting the classes can be reliable

PROBLEM STATEMENT

In existing facial expressions recognition, the researchers are recognizing the facial expressions by using data that in highly controlled situation which will give the high resolution of frontal faces. Since the detection of fatigue is by using standard webcam, the quality of images that need to be process are low quality. Research using webcam also available but there is no research about detecting mental fatigue in students during online learning using facial features. The researchers are more focusing on detecting fatigue during driving. Using webcam to detect the fatigue by using facial features of a person will help them improving their learning during online learning which they can take a short rest when being assessed as fatigue to improve their acceptances of the courses.

METHODOLOGY

Figure 1: Waterfall model

OBJECTIVES

i. To design and develop a web-based system to assess fatigue during online learning using facial features.
ii. To evaluate the accuracy of classifier algorithms which are Support Vector Machine (SVM), k-nearest-neighbour (KNN) and extreme gradient boost (XGBoost) in fatigue detection using facial features.
iii. To test and evaluate the performance of the system in accurately detecting fatigue using webcam.

IMPLEMENTATION

Home Page

Fatigue Detection page

Report page for Not Fatigued class

Report page for Fatigued class
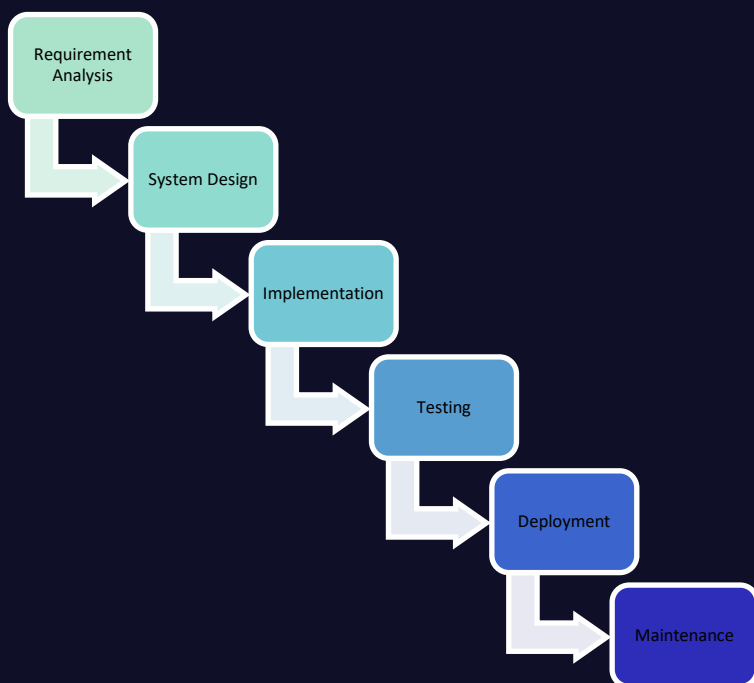
CONCLUSION

The project already fulfilled the objectives that mentioned successfully. The limitation of this project is the testing phase were limited because of the system only can be tested and accessed through local host and pandemic making the users that being tested for local host limited. For future work, the web-based system will be able to implemented into online learning platforms such as Coursera, OpenLearning and Udemy.