Team Name: Codezilla

Team Members:

1. Scrum Master & Developer: Rohan Mahesh Jagiasi
2. Product Owner & Developer: Aishwarya Teegulla
3. Developer: Sunil Krishna Kumar Komadam
4. Developer: Sanjiti Bhargava
5. Developer: Spoorthy Kanduri
6. Developer: Zaid Pervaiz Bhat
7. Developer: Samiksha Marne

Customer/Client Interactions: Zoom Meetings:

Meeting 1: April 7th, 2021
Time: 4:15-5:00pm
Zoom Video Recording:
https://drive.google.com/file/d/1i4PA_DTs95A2XlI9OgbvI2tnWHx2Y7dt/view?usp=sharing

Meeting 2: April 13th, 2021
Time: 4:15-5:00pm
Zoom Video Recording:
https://drive.google.com/file/d/1wvgtwXFUtHjlVjcIESBdSj_Ctp53U5VG/view?usp=sharing

Meeting 3: April 20th, 2021
Time: 4:15-5:00pm
Zoom Video Recording:
https://drive.google.com/file/d/15LYUEf1l2PUWoQhOpw0pjrA5XOPjlS69/view?usp=sharing

Customer Requirement:

The customer has 20 second video samples for which they need to generate “transitional bilingual observation protocol” reports which includes teaching strategies, curriculum, physical group, activity structure, mode, language content, and language of instruction. These reports are used to analyze the quality of education. Since it takes time to manually make these reports, the customer suggests using machine learning to experiment with making some part of reports generated automatically. We intend to experiment with this idea and do a proof of concept for the same.

Implementation:

Iteration 0:

For this iteration, we study the feasibility of the project. Out of the many features in the proposal, we have shortlisted two features, namely “Physical group” and “Language of Instruction” for creating a POC. Depending upon the quality of data provided, we will be choosing one of the features for initial experimentation.

Physical Group: System would be using object detection on the pre-recorded videos to distinguish between a small v/s large group of students involved in a certain activity. For separating small groups from large, a predefined limit for the number of students will be defined in the system. We will perform some initial experiments to output the desired features with satisfactory accuracy. We plan to experiment with pre-trained models to detect students in a video without loss of frame rate to work seamlessly on recorded videos. We then perform analytics to give feedback to the client based on the output from the object detection module.

Language of Instruction: Using voice recognition on the pre-recorded videos, the system will update the language of instruction for the lecture.

As per the current data, we have two modes of instruction for the classroom: English and Spanish. We can run a text-to-speech recognition model on the videos to obtain the preliminary data. (Link) Post that, we can run another language-classification model to identify the language. (Link)

Some of the APIs are paid and don’t have much free trial available. We intend to use open source libraries. However, running them locally might get a bit complicated.

Github Repository: https://github.com/rjagiasi/TBOP
Pivotal tracker account: https://www.pivotaltracker.com/n/projects/2495399

User Stories:

- Feature: Analyze the data provided by the clients. Identify the potentially achievable features using machine learning for one of the above categories.
    - As a reviewer
    - So that we can select a category in TBOP
    - We want to identify one potential feature in the data which can be selected to automatically fill in the TBOP.
- Feature: Based on the feature selected, pre process the data. This includes cleaning the data, converting the raw audio/video file into the correct format for the ML model.
    - As the system
    - So that we can train the model on this processed data

- Feature: Apply the models involved in audio/video processing to classify language/physical groups.
    - As a reviewer
    - So that we can get a desired output which classifies the given data
    - We want to identify the participation of students with the teacher in a given activity
- Feature: Perform post-processing analytics to the outcome of the ML model to provide relevant results as feedback
    - As a reviewer
    - So that we provide output understood and relevant to the client
    - We want to analyse the results from the ML model and process it as expected in TBOP

Custom grading approach:

- As per the customer requirements, a **Proof of Concept** has to be modelled for the project. Thus the working approach would be intended to create a realization of an idea or a certain method to demonstrate its feasibility or to verify that this idea has some practical potential.
- It is different from a SAAS project. The project would be based solely on a Machine Learning model to observe and analyze the data provided by the customer and aim to improve the performance measurement **without the need** or requirement of any **User Interface**
- The project does not provide any existing legacy code but is a new project to be started from scratch.
- The project is not supposed to be evaluated based on the accuracy of the model but on the feasibility analysis of whether a chosen idea works or not.
- In this project, testing would be done based on the performance analytics conducted after training the model, a bit different from the SAAS way.

Considering the above parameters a custom grading approach would be the best suited approach for this project as it defies the basic norms that other projects might be based on.