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| **PROJECT OVERVIEW** | **Project Name:**  Google Brain - Ventilator Pressure Prediction | **Project Manager:**  Sunanda Singareddy |

**STATEMENT (POS)**

**Problem/Opportunity:**

This project gives me an opportunity to address the current pandemic (Covid) situation to simulate a ventilator connected to a sedated patient’s lung. As a result, ventilator treatments may become more widely available to help patients breathe. With above opportunity the research question I ended up with is:

***What would be the predicted airway pressure in the respiratory circuit during the breath?***

Also, my purpose of this project is to participate in Kaggle open competition and check the competency level.

**Kaggle competition link:** <https://www.kaggle.com/c/ventilator-pressure-prediction/overview>

**Kaggle dataset:** <https://www.kaggle.com/c/ventilator-pressure-prediction/data>

**Goal:**

From above research question my goal is to predict the airway pressure in the respiratory circuit which will in turn help in ventilator treatments not only during this pandemic situation but also it will have a positive impact in health industry and target to improvise patient’s health.

**Objectives:**

* + As per above goal my objective in this project is to try predicting the pressure in the respiratory circuit based on the actual pressure values available in the dataset.
  + Timeline as per Kaggle Competition is as below:
  + September 22, 2021 - Start Date.
  + October 27, 2021 - Entry Deadline. You must accept the competition rules before this date in order to compete.
  + October 27, 2021 - Team Merger Deadline. This is the last day participants may join or merge teams.
  + November 3, 2021 - Final Submission Deadline.
  + The dataset contains the train and test files, so based on the train files I will be training a model using supervised Machine learning algorithms and apply the trained model on test files.
  + There are several parameters in dataset which can have an impact on pressure released through valves to lungs like R (states air volume per time), C (how complaint the lung is), u\_in (control input for inspiratory valve which ranges between 0 to 100) and u\_out (control input for exploratory valve either 0 or 1).
  + Once the model is trained mean absolute error is calculated between the predicted and actual pressure during inspiratory phase of each breath.
  + The metrics measure which is used in this evaluation is |X-Y| where X is the predicted pressure and Y is the actual pressure across the breaths in test set.

**Success Criteria:**

The success criteria can be measured as below:

* + Participating, Completion and submission of project in the given timelines of both Kaggle Competition and Capstone final project.
  + The final score calculated must be nearly equal to the ones who are on top of the leaderboard in competition.
  + The pressure value predicted based on the trained module and train dataset on test dataset should be as expected as per the competition which will help in achieving the goal.

**Assumptions, Risks, Obstacles:**

Assumptions in this project is we can achieve the prediction score and value using supervised machine learning algorithms. Also, the completion of project and deliverables will be in time as per the time guidelines / deadlines. Risk associated with this project is, if the predicted pressure value is not accurate then it will have an impact on patient’s health and can also cost their lives. If the model is not trained properly then it will be an obstacle for the project as there won’t be an accurate pressure prediction which will risk patients live.

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| **Prepared By** | **Date** | **Approved By** | **Date** |
| Sunanda Singareddy | 29-Sep-2021 | Dr. Christelle Scharff |  |