COVID-19 ICU Admission Prediction Analysis

Group 9
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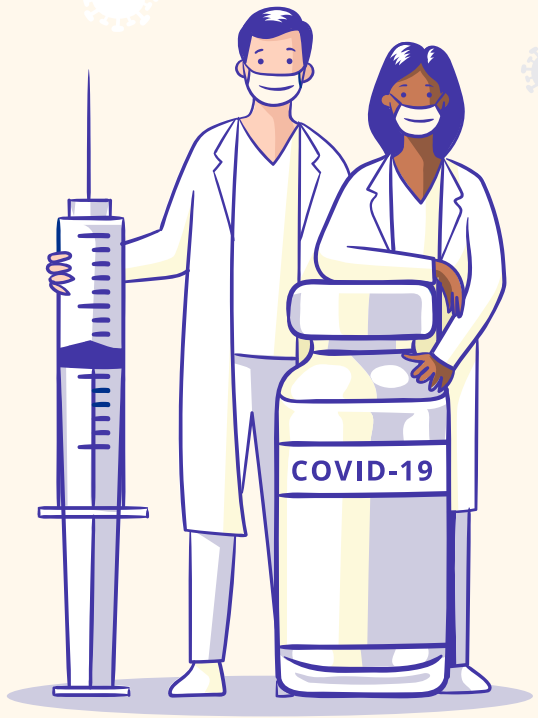

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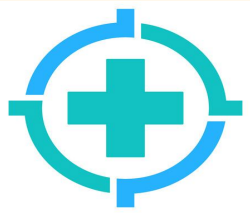
Scope of the project

- Health care systems are currently overwhelmed with the high demand in ICU beds, professionals and other health care resources.
- There is an urgency to make better predictions to prepare and avoid the collapse in health care systems.



AIM: To predict admission to the ICU of confirmed COVID19 cases.

Motivation

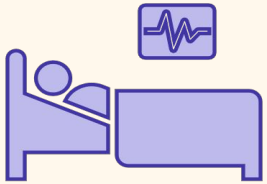
- Used artificial intelligence (AI) to predict Covid patients' oxygen needs on a global scale
- The research was sparked by the pandemic and set out to build an AI tool to predict how much extra oxygen a Covid-19 patient may need in the first days of hospital care, using data from four continents

Article:
https://www-news--medical-net.cdn.ampproject.org/c/s/www.news-medical.net/amp/news/20210915/Hospitals-use-artificial-intelligence-to-predict-Covid-patientse28099-oxygen-needs.aspx

Why ICU prediction is important now?

> “
> ICU capacity should be thought of not as an inflexible number but as a ceiling that can be adjusted by changing the operating conditions in a hospital

> “
> ICU beds are highly likely to ‘run out’, but as hospitals fill with Covid-19 patients, the overall quality of care will decline and other services will be massively affected



Article: The Irish Times - What happens if ICU beds run out in Irish hospitals?

Dataset

The dataset contains anonymized data from Hospital Sírio-Libanês, São Paulo and Brasilia. All data were anonymized following the best international practices and recommendations.

- **Source:** Kaggle https://www.kaggle.com/S%C3%ADrio-Libanes/covid19
- **Shape:** 1925 Rows X 231 Columns
- **Features:** 54 features
  1. Patient demographic information (03)
  2. Patient previous grouped diseases (09)
  3. Blood results (36)
  4. Vital signs (06)

- The features are expanded to mean, median, min, max and relative difference
- Except 6 columns, all the other columns have null values
- Data has been cleaned and scaled by column according to Min Max Scaler to fit between -1 and 1.

Expected Outcomes

We make use of AWS components to build, train, and our deploy model.

We upload our Covid ICU dataset and create a new notebook via sagemaker to compare results and deploy model for ICU bed prediction.

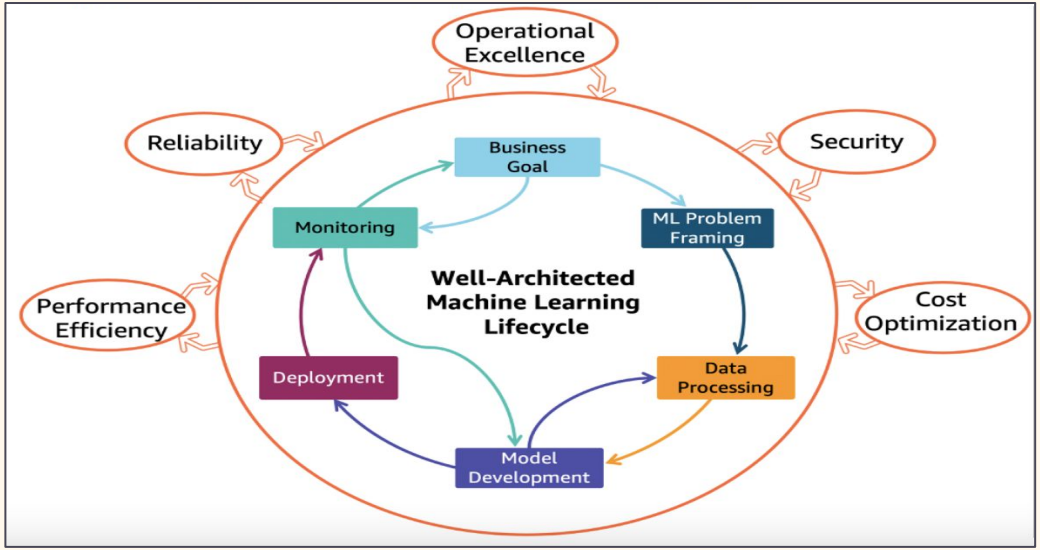
AWS Components

1. **S3**
   - ❑ S3 as the object storage service
   - ❑ Cost-effective storage classes
   - ❑ Easy-to-use management features
   - ❑ Creation of the bucket for storing the data

2. **AWS Sage Maker**
   - ❑ To build, train, and deploy machine learning (ML) models
   - ❑ AWS Sage Maker uses notebook and Python with boto to connect with the S3 bucket

Logical Architecture

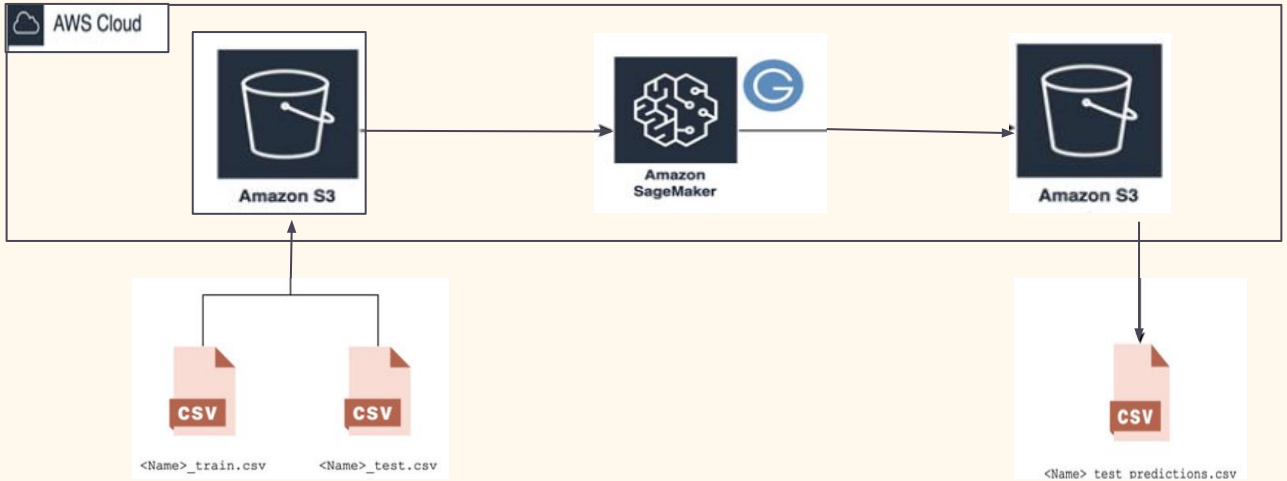
Problem is framed as ML problem: what is observed and what should be predicted (target variable).We then deploy using AWS services.



Architecture

The pipeline will be implementing will be as followed:

- The pretrained machine learning model will be developed since all the data processing and data modelling will be performed on on-premise.
- AWS S3 will be used for storage purpose to store the data and serialized model.
- The pretrained model will be fed to the AWS Sage Maker to perform predictions.



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THANK YOU