Clinical Informatics Dashboard with AI Prediction

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The Data Incubator Project Proposal

Motivation & Business Value

Motivation

- **Getting a rapid understanding** of a **patient's overall health** has never been more critical during **the COVID-19 pandemic**
- **A patient in distress / unresponsive** may not be able to provide information
- Assessing and predicting health outcomes is **critical for both hospitals and patients.**

Business Value

- The U.S.'s **ICU spending** is **$80 billion per year, nearly 1% of GDP**
- **ICU cost** consists of **20~40% of hospital costs**
- **Marginal improvement in critical care** could lead to both **huge financial** & **health benefits**

Project Abstract

This **project builds a clinical informatics dashboard**, which helps healthcare providers assess patients faster with **guided AI predictions**. **Data:** MIMIC-III & MIT's GOSSIS containing patient data from **the first 24 hrs of ICUs**

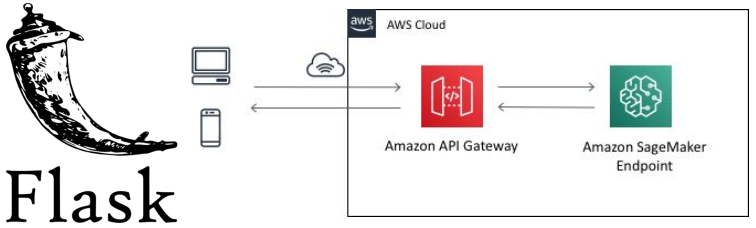
- Aims to develop three different predictions and deploy them online

1) Diabetes Prediction

2) Length of Stay / Mortality Prediction

3) Early Prediction of Sepsis

- **Real-time predictions** on a web-UI dashboard providing inference via a REST API.
- Using **Flask** + **Sagemaker Endpoint**



Example - Diabetes Prediction

On-going datathon on Kaggle led by the WiDS (Women in Data Science) initiative team at Stanford University.

Developed and assessed a draft model

Preprocess: Missing values handling, Encoding, Imputation, Upsampling, FE

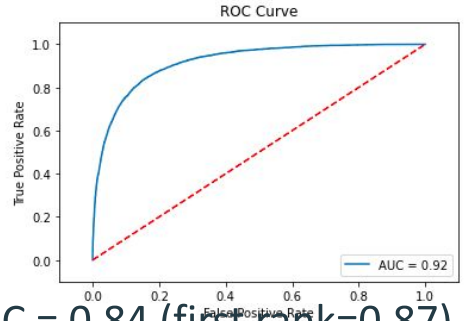
Predictive Modeling: **XGBoost**

Code: Link

Result

ROC curve =>

AUC = 0.92



Kaggle Real-test AUC = 0.84 (first rank=0.87)

Future Work

- More feature engineering, and improve the AUC score up over 0.90
- Build Length of Stay / Mortality Prediction - achievable in a short time

Early Prediction of Sepsis

PhysioNet Challenge 2019 ignited the development of Sepsis prediction models.

Requires the start-of-the-art development on scientific discovery & AI

Many startups are currently building the solution, and the system has not been implemented in most hospitals yet.

PhysioNet

PhysioNet Computing in Cardiology Challenge 2019

dascena

H2O.ai

LifeBell AI

Future work

- Develop sepsis prediction model

Thank you