

Ideas for Capstone Project II

1. Covid-19 Crisis Lessons

I have gathered a lot of covid-19 data combined with datasets including mortality, population, gay marriage legalization status, religions, climate, geography, governance from WHO or World bank.

The goal is to find insight into why certain countries are badly hit and some are not. What is the major game player, health condition in the past, climate, moral value, religion, government, etc.? This may provide a lesson for the world to learn.

Dataset sources:

'https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_confirmed_global.csv',

'https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_deaths_global.csv',

'https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_recovered_global.csv'

2. Furnace Heating Automation

High temperature furnace heating profile includes temperature, electric current, voltage, heating rate. All varied with time. Each sample or row corresponds to each experimental furnace run with different load. The load is a sintering setup that can have different material composition, geometry, electrical conductivity that all have an effect on heating profile.

Data source: A collection of all the heating profiles from my own past experimental runs with the furnace.

The goal is to achieve better furnace automation control to follow a predefined heating schedule. For example, I want a heating rate of 100C/min from room temperature to 1000C and hold at 100C for 10min. The heating curve does not follow perfectly using current control logic built in the machine or the furnace. The machine learning might help develop a better physics model using all features like current, voltage, conductivity, real-temperature, heat capacity, heat loss due to radiation, etc.

3. Voice recognition

Separate each instrument and human singing/voice. Identify a person by the uniqueness of voice.

Kaggle has a bird call dataset: <https://www.kaggle.com/c/birdsong-recognition>

I'll reject this one for now but leave for future learning.