Learned about the Pest Analysis PEST stands for Political Economical Social Technical. Also got familiar with Insilico medicine which is an artificial intelligence-driven pharma-technology company with a mission to accelerate drug discovery and development by leveraging our rapidly evolving, proprietary platform across biology, chemistry, and clinical development. This Pharma.AI platform has the potential to rapidly bring novel breakthrough medicines to patients with decreasing costs and increasing probabilities of success.

**ML Landscape for Pharmacy**

There are many university-based ML labs working across the globe to study theoretical and applied aspects of machine learning in various domains. The aim is to explore and understand artificial intelligence, including machine learning, deep learning, numerical optimization, and natural language processing and to perform research on their applicability in various domains. The top 3 university-based ML labs are Stanford University, the University of Michigan, and the Massachusetts Institute of Technology (MIT). There are a lot of corporate ML labs like the In Data Labs, Indium Software, and ITECH Art.

The analysis was done using manual fitting of the model. The framework used for the Pharmacoepidemiology-based project is Linear Regression. Godelization discovered by Kurt Gödel has been used to convert giving numbers to alphabetical variables in the data collected. Programming and coding from scratch were difficult. So used Sci kit Learn as a framework. Linear Regression between isolate and the factors was done. In the case of neural networks or biomimetic networks or spiking neural networks, correlating input and output variables does not give the probability with the collected data.

**ML ALGORITHMS USED IN HEALTH CARE**

AI and ML have wide usage in giving the appropriate and optimized drug for better outcomes for the patient. It has various applications in case of disease diagnosis, personalized treatment, drug discovery and epidemic outbreak prediction. It has the potential to improve clinical pharmacy care by reducing the cost and improving the interventions. ML can also be used for helping the pharmacy professionals with proper Medication Therapy Management and Pharmacokinetic-guided dosing and eventually decisions on dosage in real-time. ML models like linear regression can be used for clinical trials.

Some of the ML models used by the Pharma companies include Regression, Classification, and Clustering method. Both supervised and unsupervised learning have been used by Pharma Companies.

SCIKIT LEARN - FRAMEWORK

The framework Sci kit Learn is a user-friendly, well-documented, and robust ML library. It contains a set of useful algorithms which can be used that can easily be implemented and tweaked for the purposes of classification and other machine learning tasks. There are inputs and outputs in Machine Learning in which the inputs are referred to as features whereas outputs are referred to as labels.

Classification is a type of Supervised Learning in Machine Learning in which the sample belongs to two or more classes and we want to learn from the already labelled data how to predict the class of unlabelled data. Unsupervised Learning is where data is fed to the network unlabelled and the network must try to learn for itself what features are important. Classification is used for Spam detection, and image recognition.

Clustering is another ML-based framework in which data is divided into a number of groups such that the data points in the same groups are more similar to other data points in the same group and dissimilar to the data points in other groups.

Regression is another technique used for investigating the relationship between an independent and a dependent variable. And it is also used for predictive modeling in machine learning.

Linear Regression – Model

Linear regression is the model for investigating the relationship between an independent and a dependent variable. It is the most common ML-based model used in supervised machine learning. Correlating the independent variable with the dependent variable and fitting them into a linear scale. It is used as the model for developing the UTI CDSS which is a predictive model.

UTI CDSS

The repeated organism in the data set was E.coli, due to skewed data we have excluded the top recurring UTI causing organisms from the data set and have developed the UTI CDSS. The UTI CDSS developed for predicting the potential possible organism causing UTI for a patient coming with symptoms of UTI and was based on four parameters such as the type of locality, gender, and the age of the patient.