



Analysis & Prediction System for Global Mental Health Disorder

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Recap

Background and Objectives of this Project



RECAP

Mental health conditions are widespread, undertreated and under-resourced

WIDESPREAD



1 in 8

live with a mental health condition

UNDERTREATED



71%

people with psychosis do not receive mental health services

UNDER-RESOURCED



2%

of health budgets, on average, go to mental health

Source: IHME, 2019 (98); WHO, 2021 (5).

- ❑ Mental health is an integral part of our general health and well-being and a basic human right.
- ❑ In spite of the increasing proportion of people with mental issues, mental health services seem to have not spent worthy care for those issues, which leads to the gap between patients and treatment resources and condition
- ❑ Analysis and prediction system for the Global Mental Health Disorder based on data cited by Our World in Data and estimated by the **Institute for Health Metrics and Evaluation** reported in the Global Burden of Disease Study.
- ❑ Generate dashboard providing analytic reports different disorders and predict futuristic data about disorders.

⇒ Our project focuses on providing authorities with **history-related data on health disorders** and also **making predictions** to assist governments and relevant organizations in tackling increasing mental health disorders.



RECAP on Dataset

- ❑ The dataset provides information on the estimated number of cases on different types of mental health and substance use disorders among adults who are male and female at averaged-age.
- ❑ Including major depressive episodes, serious mental illness, and substance use disorders as well as the self-harm rates and mortality rates.
- ❑ Across different countries in various continents.
- ❑ These datasets are freely available on the public.



RECAP on Preprocessing

- ❑ Some values are missing because the government did not have the data for certain years.
- ❑ The data in the years before 1990 is approximately estimated and most of them are lacking, so we cut off those rows of years. We also restrict our geographical scope to ASEAN countries, particularly Thailand, Vietnam, Laos, Cambodia, and Myanmar for prediction session.
- ❑ Then, filling the missing data in those selected features and drop non-valuable columns that are unnecessary to process the datasets.
- ❑ Once the preprocessing was done we got optimized datasets in the perspective of self-harm rates, mortality rates, disease burden as well as number of cases by gender followed with each types of disorders.

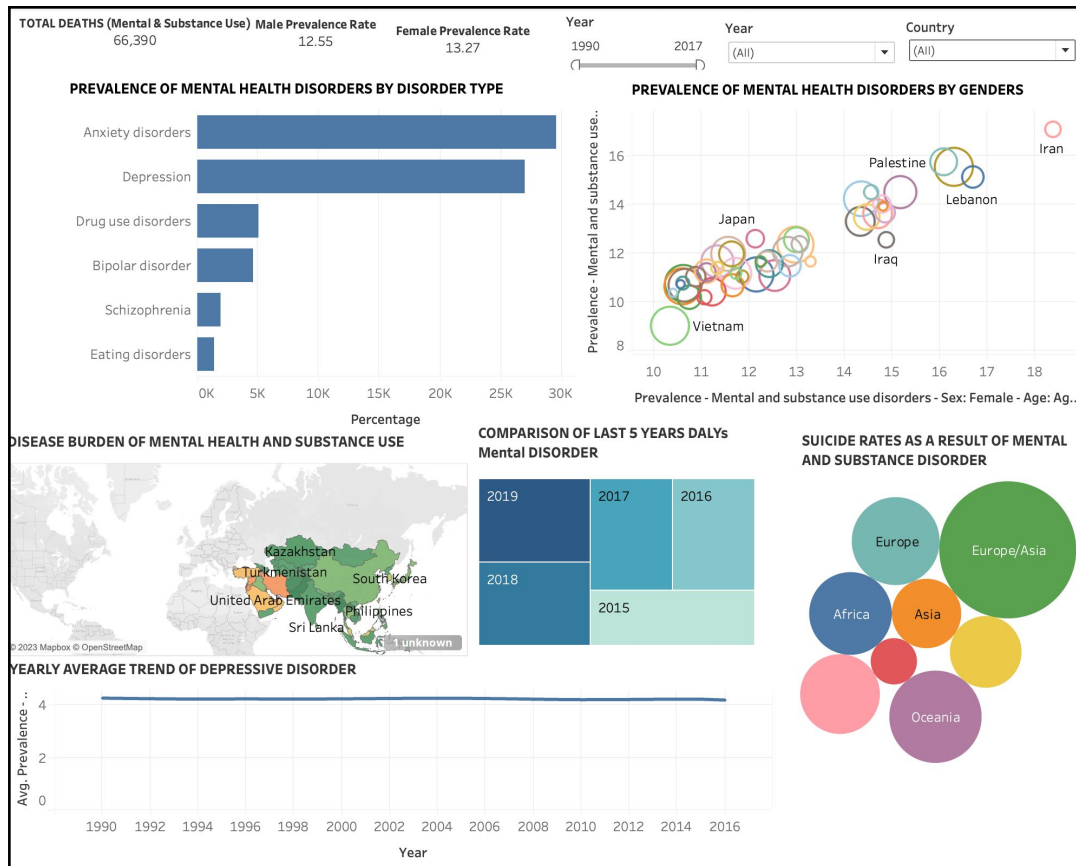


Descriptive Analysis

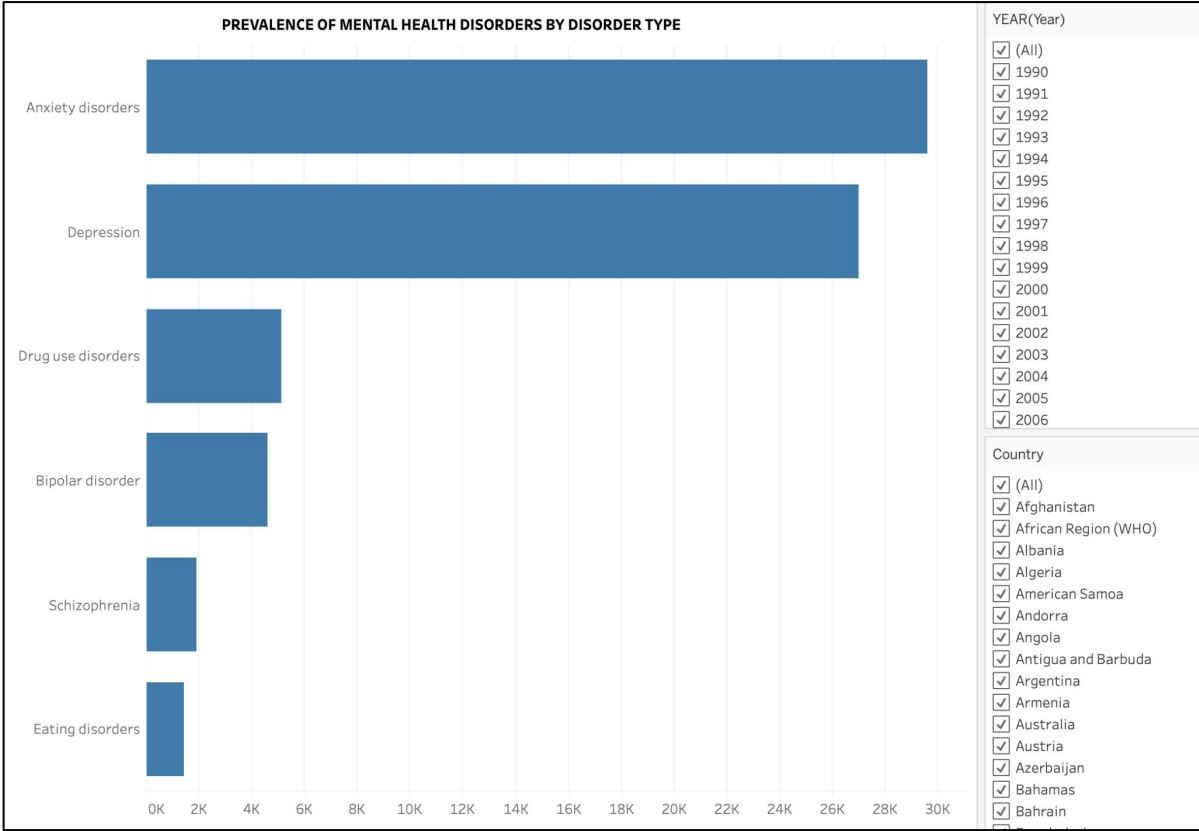
Data Visualization for Descriptive Analysis
of Global Mental Health Disorder



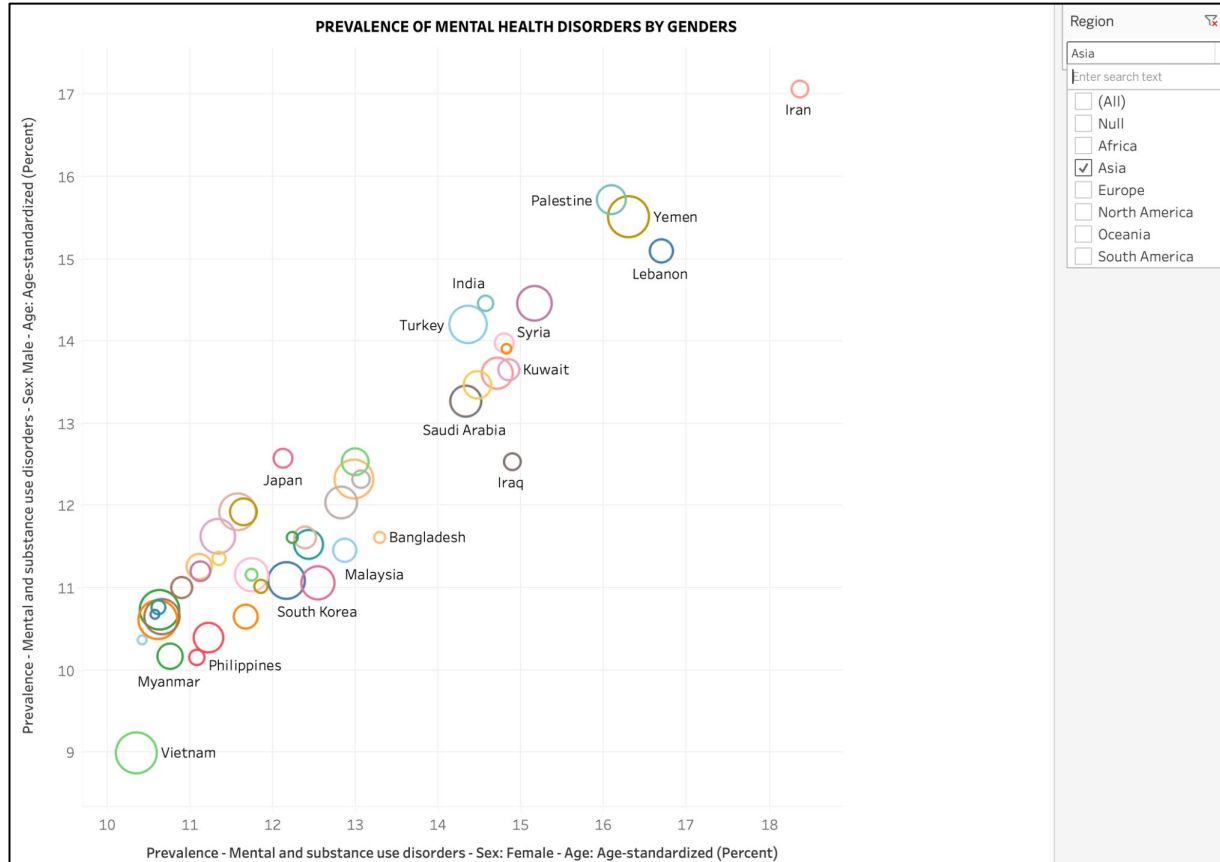
Interactive Mental Health & Substance Use Disorder Dashboard



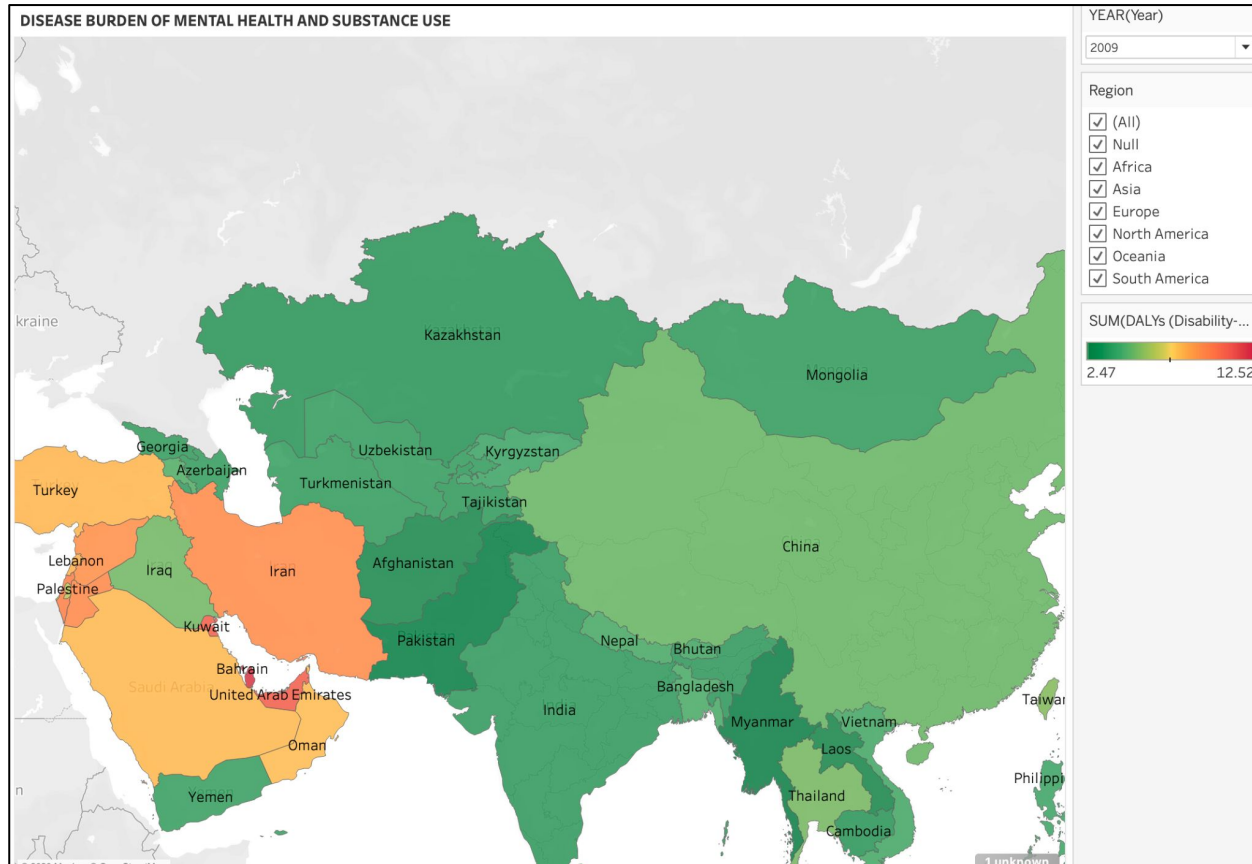
Disorder Type for Mental Health Disorder Prevalence



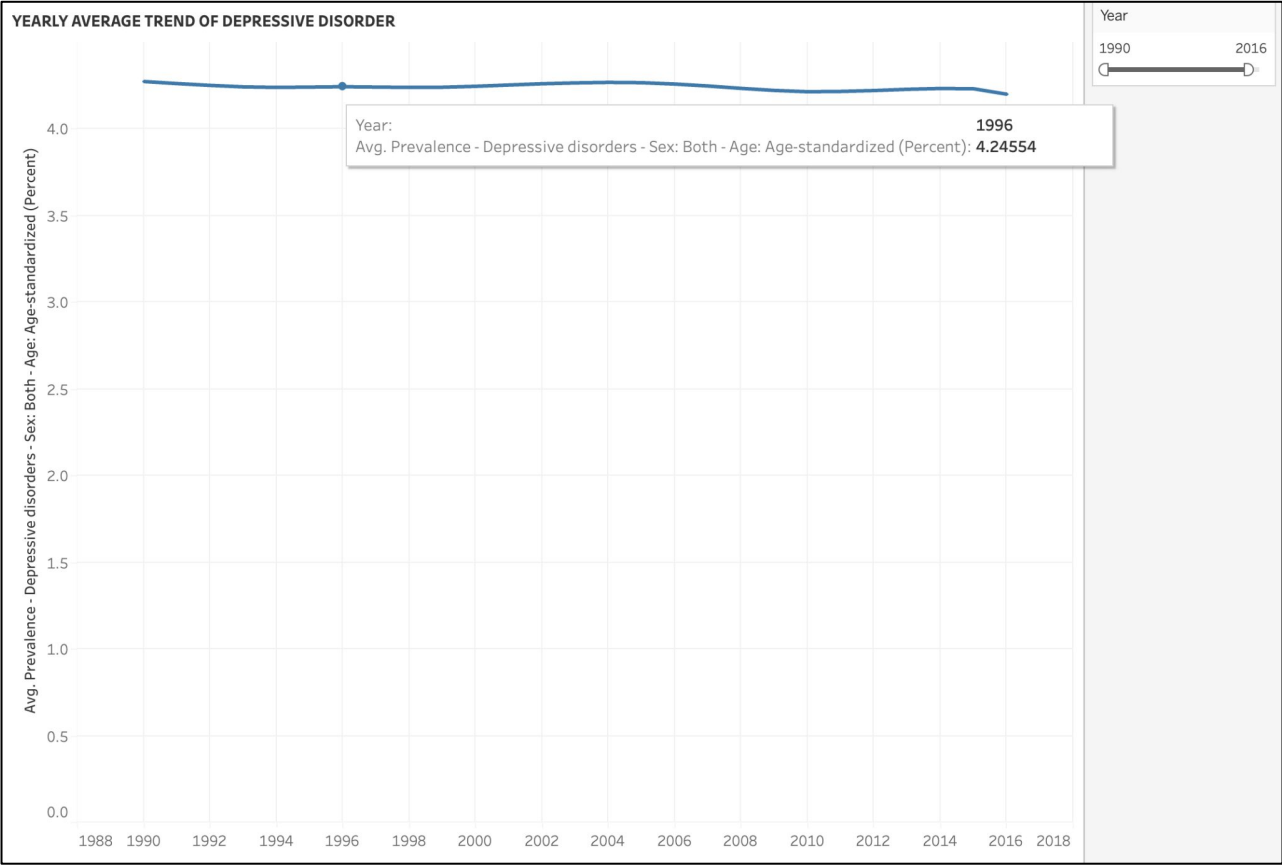
Prevalence of Mental Health Disorder based on Gender



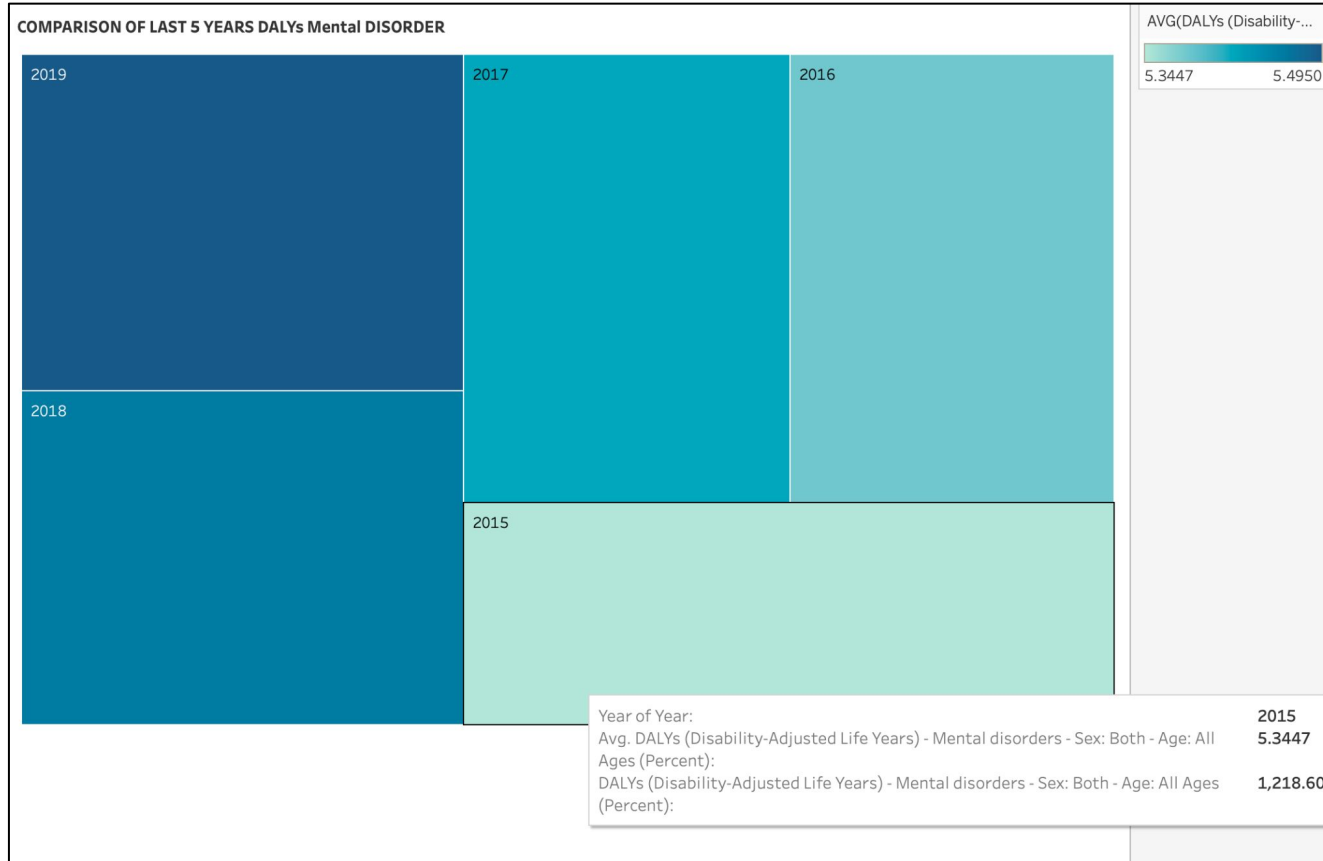
Disease Burden of Mental Health and Substance Use



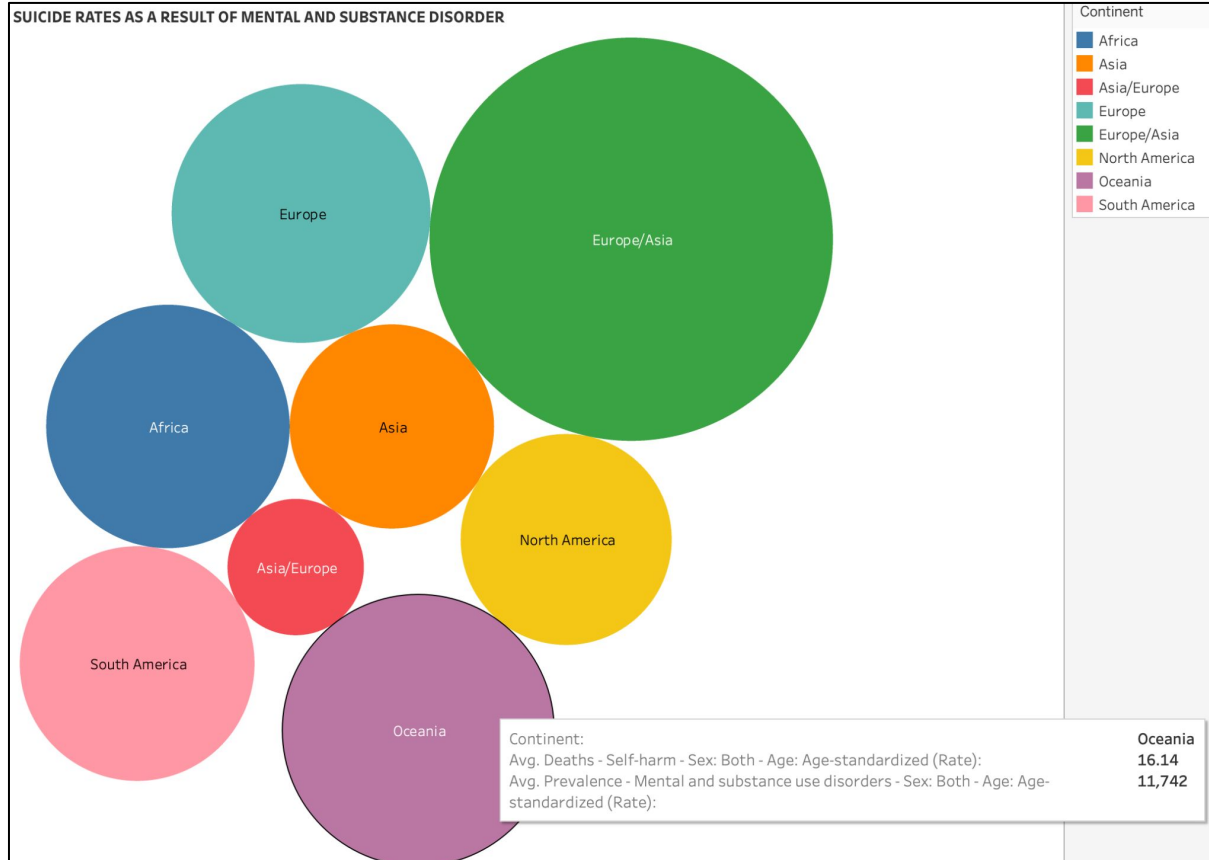
Yearly Average Trend of Depressive Disorder



5 Year Comparison of Disability Adjusted Life Years Mental Disorder



Suicide & Death Rates due to Mental and Substance Use Disorder





Predictive Analysis

Predicting on selected key factors for future behaviours

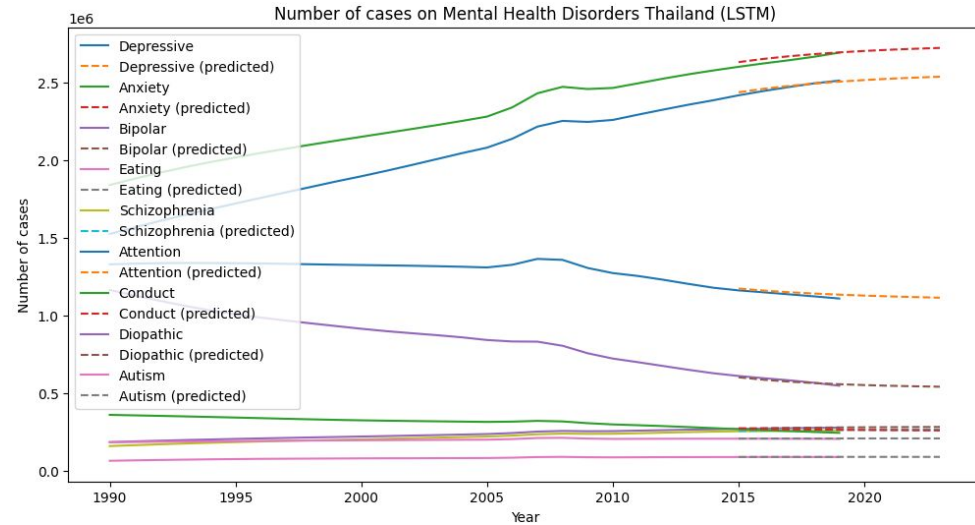
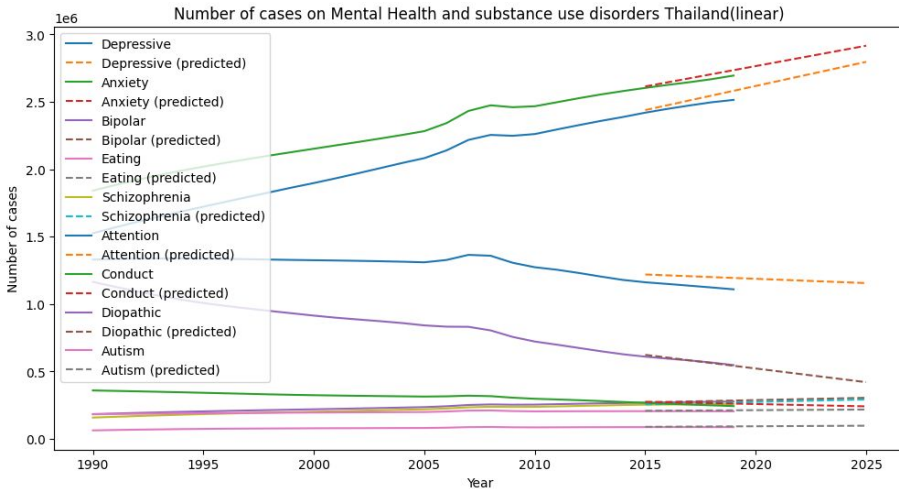


Comparison between Linear Regression and LSTM

Test-Loss	Linear Regression	LSTM
Number of Cases	0.3705	0.0608
Mortality Rates	0.5210	0.3156
Self-harm Rates	3.2280	1.1066

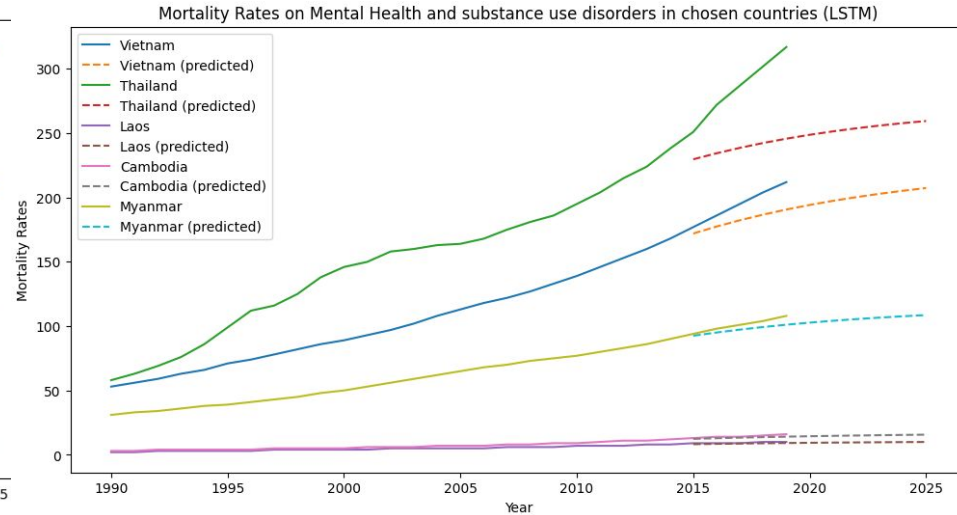
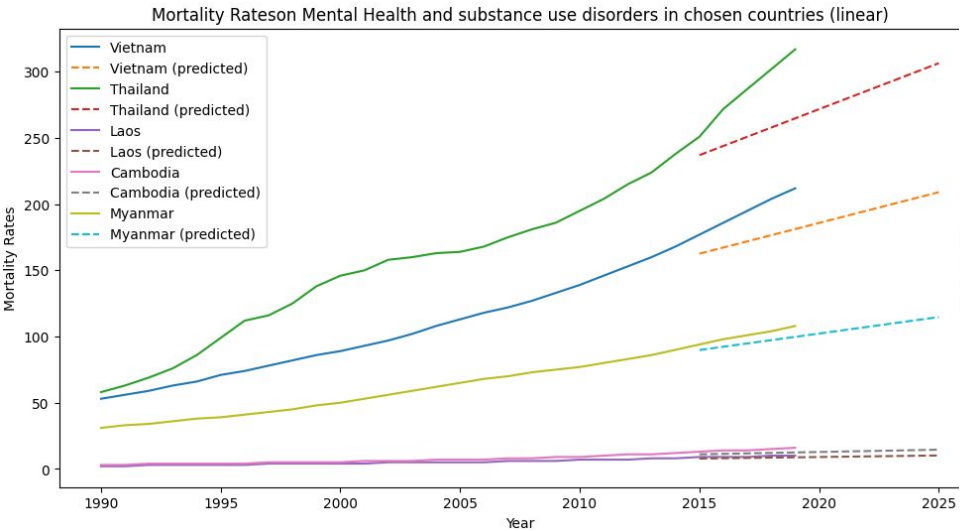
- The test loss the LSTM model is lower than that of the linear regression.
- => The LSTM model is better at predicting the outcomes.

Prediction on future trends for number of Cases in Thailand



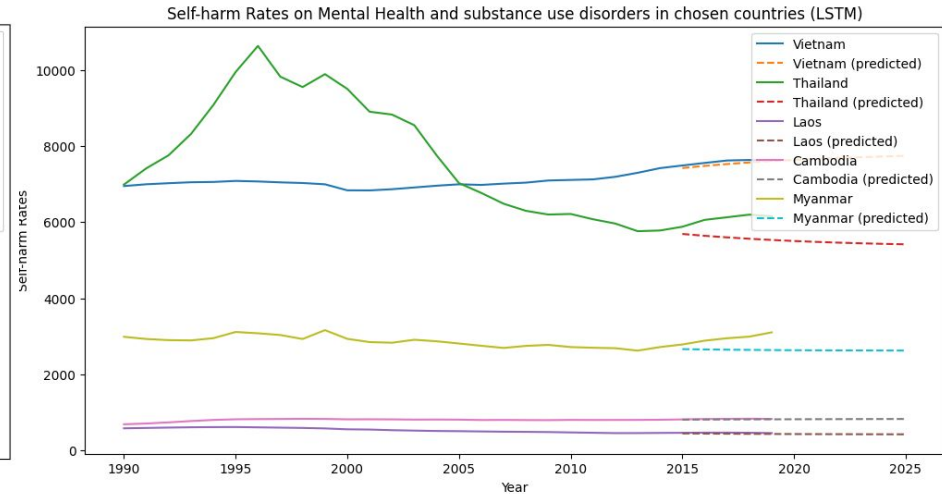
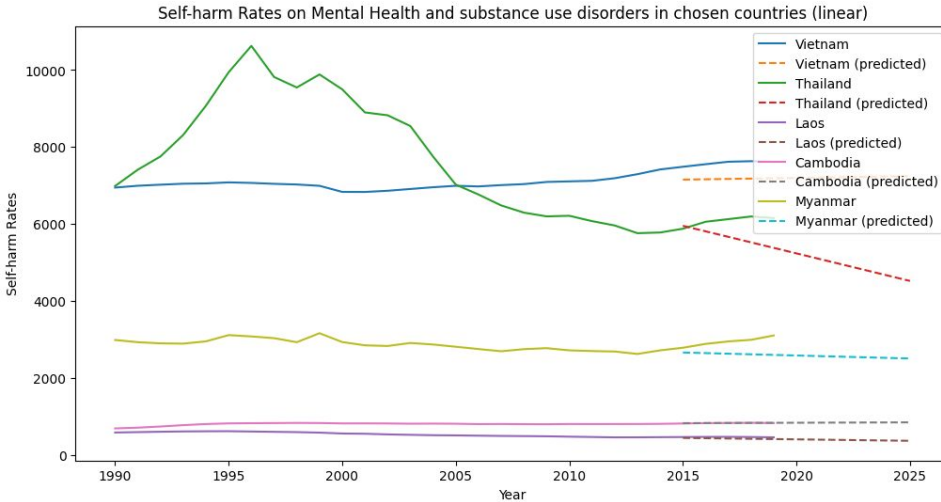
- 2 models have very good prediction results but LSTM has better prediction results and is consistent with actual data from 2015 - 2019
- Disorder types tend to decrease
- Depression and anxiety are still very high and show no signs of decreasing

Prediction on future behaviors of Mortality Rates



- The prediction result is correct in 2 countries Laos and Cambodia
- Prediction results are not good for Vietnam and Thailand
- In general, mortality rates are very high in Vietnam and Thailand when compared to the other 3 countries. These two countries mortality rates tend to continue to increase in the coming years while Laos and Cambodia still maintain this ratio while Myanmar increases slightly.

Forecasting on future trends of Self-harm Rates



- LSTM has better prediction results and is more fit with actual data from 2015 - 2019
- In LSTM, predicted results seem really nice in case of Vietnam, Laos and Cambodia. However, it is not matched with validating data in case of Thailand and Myanmar.
- Overall, the future behaviors of most selected countries tend to decrease slightly, except Vietnam. In Vietnam, the future trend of self-harm rates is more likely to increase slightly and this rate is also the highest one when compared with other countries.



Suggested Solution

Propose possible solutions based on the collected information from descriptive analysis and predictive analysis



SUGGESTED SOLUTION

- ❑ Based on the descriptive analysis and predictive analysis above, we can foresee that the number of people who have mental issues are likely to increase constantly in at least the next few years
- ❑ Before jumping directly into suggested solution, let's take a snapshot of key gaps which are contributing to making the increasing number of patients

Gap Issue	Description
Governance gap	Inadequate policies, plan, laws and misplaced priorities: two out of every three dollars spent on mental health goes to running psychiatric hospitals
Resource gap	Scarce workforce: in low-income countries, there are fewer than one mental health worker per 100.000 population Digital divide: most households in least developed countries do not have internet access
Services gap	Poor treatment coverage: 71% of people with psychosis do not receive mental health services Limited range and quality of services: Few countries provide psychosocial interventions in primary care

SUGGESTED SOLUTION

Suggested solutions which we believe it would have a notable positive impact on current situation:

1. Advancing public healthcare:

Investing in mental health can greatly reduce suffering and improve the quality of life, social functioning and life expectancy of people with mental health conditions

2. Organizing mental health workshops, and short-term courses for young people:

Mental health issues, especially depression is having a rejuvenation trend. We can take advantage of adverse factors and protective factors information to design suitable information transformations approach for young people.

3. Building public awareness and interest:

Building public awareness and interest through education, campaign is essential to transform and scale mental health care.

Level	Adverse Factors	Protective Factors
Individual attributes	Low self-esteem	Self-esteem, confidence
	Cognitive/emotional immaturity	Ability to solve problems & manage stress or adversity
	Difficulties in communicating	Communication skills
	Medical illness, substance use	Physical health, fitness
Social circumstances	Loneliness, bereavement	Social support of family & friends
	Neglect, family conflict	Good parenting/family interaction
	Exposure to violence/abuse	Physical security & safety
	Low income & poverty	Economic security
	Difficulties or failure at school	Scholastic achievement
Environmental factors	Work stress, unemployment	Satisfaction & success at work
	Poor access to basic services	Equality of access to basic services
	Injustice & discrimination	Social justice, tolerance, integration
	Social & gender inequalities	Social & gender equality
	Exposure to war or disaster	Physical security & safety



Conclusion:

Derive conclusion of our project



CONCLUSION

- ❑ Along with the development of society, mental health problems also tend to increase at a considerable level
- ❑ This project aims to not only deliver the audience with a better understanding of the seriousness of the current mental health situation but also try to figure out feasible solutions to contribute to controlling this trend through education, propagation, and campaign
- ❑ Experience shows any condition would become better if the authorities and global health organizations truly take into account that matter step by step



Limitations

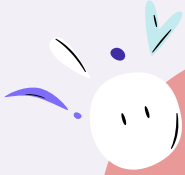
Pinpoint current limitations of our project





Limitations

- ❑ Lack of available data for the testing set, which may result in an unreliable evaluation of the performance of the models as well as a risk of overfitting or underfitting the models.
- ❑ Missing of relevant datasets, such as substance use rates, hospital admission rates as well as recovering rates, can limit the ability to perform prescriptive analysis.
- ❑ Hindering the ability to provide detailed recommendations to minimize the impacts of mental health and substance use disorders as well as develop effective strategies for prevention and treatment.



Future plan

Innovate in the future





Future plan

- ❑ Due to limited by the availability of relevant datasets, exploration of alternative data sources can be considered.
- ❑ Enhance the analysis capabilities by improving our dashboard using more different related features in various approaches.
- ❑ Improve comprehension of our report by re-selecting key factors as well as adding more components if possible, such as hospital admissions, recovering rates for further investigating the current state of healthcare services in order to identify areas where improvements can be made.
- ❑ Experiment with different models to achieve better performance on prediction.



THANK YOU !

