



IŞIK UNIVERSITY  
COMPUTER  
SCIENCE AND  
ENGINEERING

# The Data Mining Model for Factors of Alzheimer's and Depression

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## Abstract

Alzheimer's Disease (AD) is neurodegeneration defined as a severe deterioration in the person's mental, physical, and behavioural functions due to disorders in the function of the brain. AD is one of the most common causes of dementia. According to research conducted by World Health Organization (WHO), in 2018, approximately 55 million people had dementia. People with Alzheimer's Disease account for 60-70% of dementia cases. According to WHO's research, it is estimated that dementia cases will double every 20 years, reaching 65.7 million in 2030 and 115.4 million in 2050.

Depression is a common severe mood disorder. Depression is characterised by moods such as sadness, feelings of guilt, low self-esteem, insomnia and loss of appetite, fatigue, and poor concentration that will affect our daily lives. It can also evolve into situations such as having physical pains and complaints without an apparent physical cause. In the most severe cases, it can lead to suicide. According to research conducted by the WHO in 2015, the total number of people with depression exceeds 300 million. Depression is also the most significant contributor to nearly 800.000 million suicide deaths per year.

My project is The Data Mining Model for Factors of Alzheimer's and Depression Project focuses on the relation between possible factors that are genre, age, alcohol consumption rate, smoking consumption rate, GDP, education rate, calorie food consumption rates with AD and Depression. The model defines this relationship with analyzes, hypothesis tests, and predictions by using datasets. And presents it to the user as an interactive user interface. Thus, the model paves the way for new analyzes.

## Introduction

The Data Mining Model for Factors of Alzheimer's and Depression is an interactive model that can analyze AD and Depression.

- The model is a model designed to find the factors by which AD and Depression can be defined on a large scale and can be used for different analyzes depending on the datasets.
- Although the model was built in the Google Colab environment, it can be run on other platforms that support the software language.
- The model is open to all users and can be downloaded from the link <https://github.com/elifakar98/Graduation-Design-Project>.

## Methodology

### DATASETS

The data sets used in the model; It consists of AND, Depression, genre, age, alcohol consumption rate, smoking consumption rate, GDP, education rate, calorie food consumption rates.

### ANALYSE

Models were made using Python's libraries Plotly, Altair, Seaborn, Matplotlib, Pandas in order to analyze the relationship between the datasets with AD and Depression in the model.

### PREDICTIONS

In the model, predictions of AD and Depression for the next years were made according to the mean AD and Depression rates of the countries in the given years.

### HYPOTHESES TESTS

The validity and invalidity of the hypotheses put forward at the beginning of the project were determined by tests.

### USER INTERFACE

All of the work done on the model was arranged to be presented to the user. In addition, an interactive user interface has been created so that the user can use the model interactively and analyze their own data sets on the model.

## Experiments

1 to 10 of 6780 entries				Filter		?
Entity	Code	Year	Prevalence - Alzheimers_disease_All_Ages_standardized_Rate	Alzheimers_disease_All_Ages_Rate		
Afghanistan	AFG	1990	747.0211315441709	311.3561929610406		
Afghanistan	AFG	1991	744.3732745722458	286.45427577871743		
Afghanistan	AFG	1992	741.7894382523232	251.98521978966465		
Afghanistan	AFG	1993	739.3470516206618	232.7238686048077		
Afghanistan	AFG	1994	737.1182539379803	225.3635839902468		
Afghanistan	AFG	1995	735.2096283490516	217.896274570822		
Afghanistan	AFG	1996	733.3861715177152	211.42009527095345		
Afghanistan	AFG	1997	731.487872924618	206.4862340678272		
Afghanistan	AFG	1998	729.5902395900657	205.28659740490427		
Afghanistan	AFG	1999	727.7519110381545	206.3833965500888		
Show 10 per page				1	2	10

Figure 1 An example of interactive table of datasets .

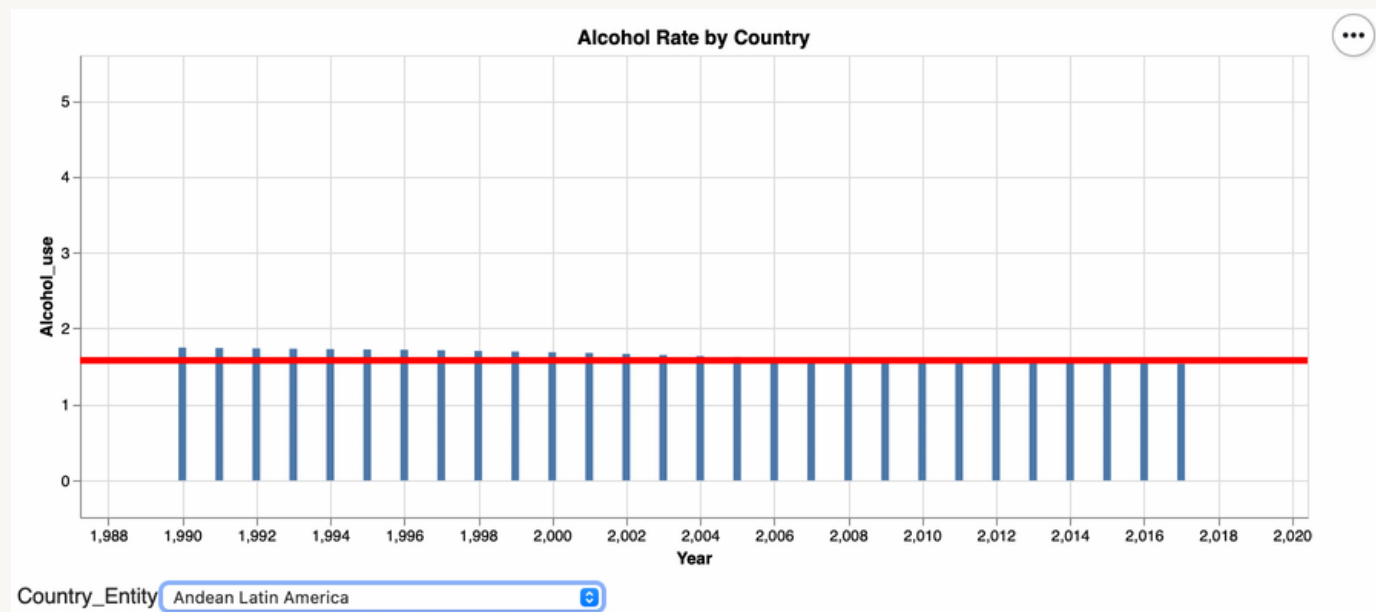


Figure 2 An example of analysis modeling with possible factors.

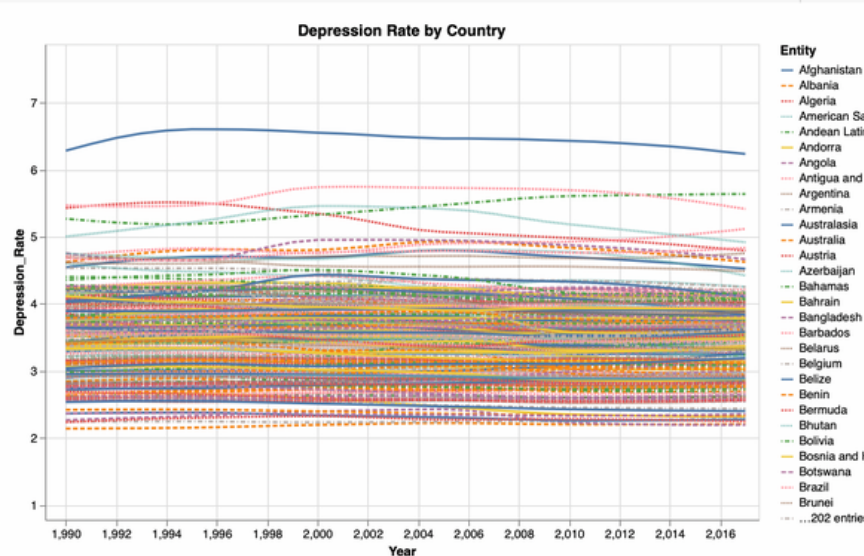


Figure 3 An example of analyses modeling of Depression.

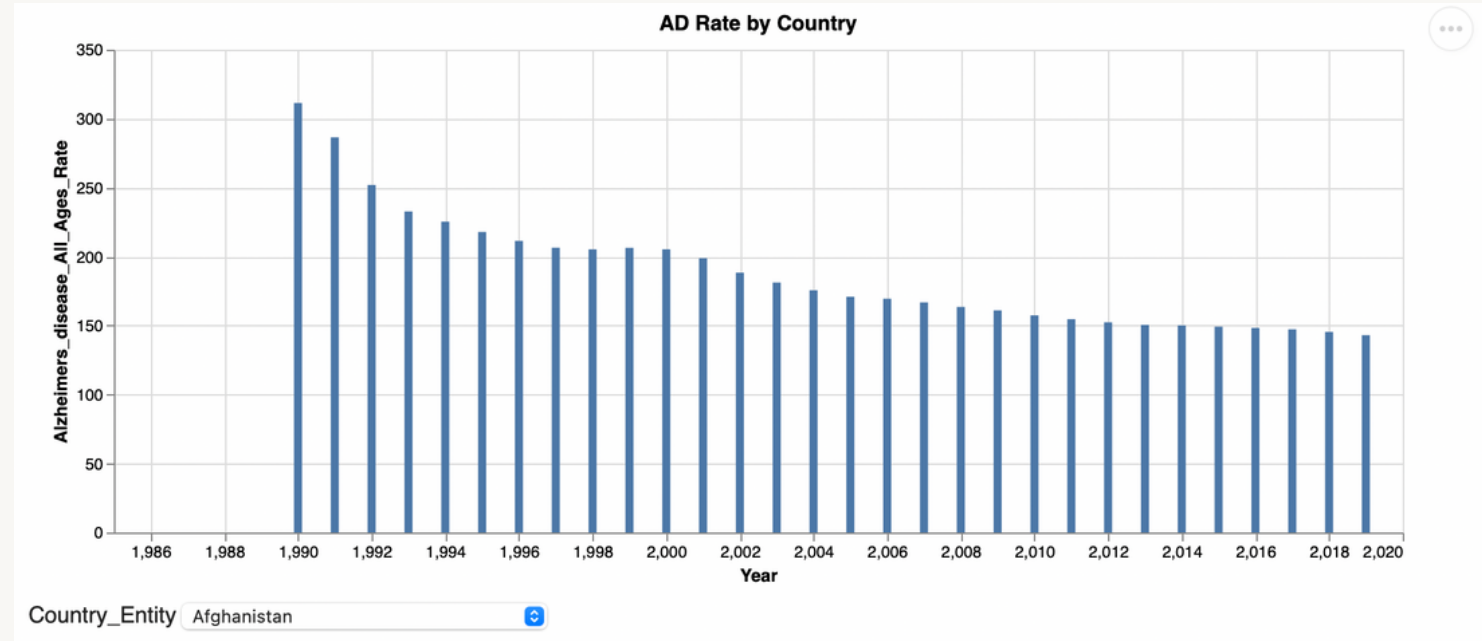


Figure 4 An example of analyses modeling of AD.

Figure 5 An example of analysis modeling of AD with possible factors.

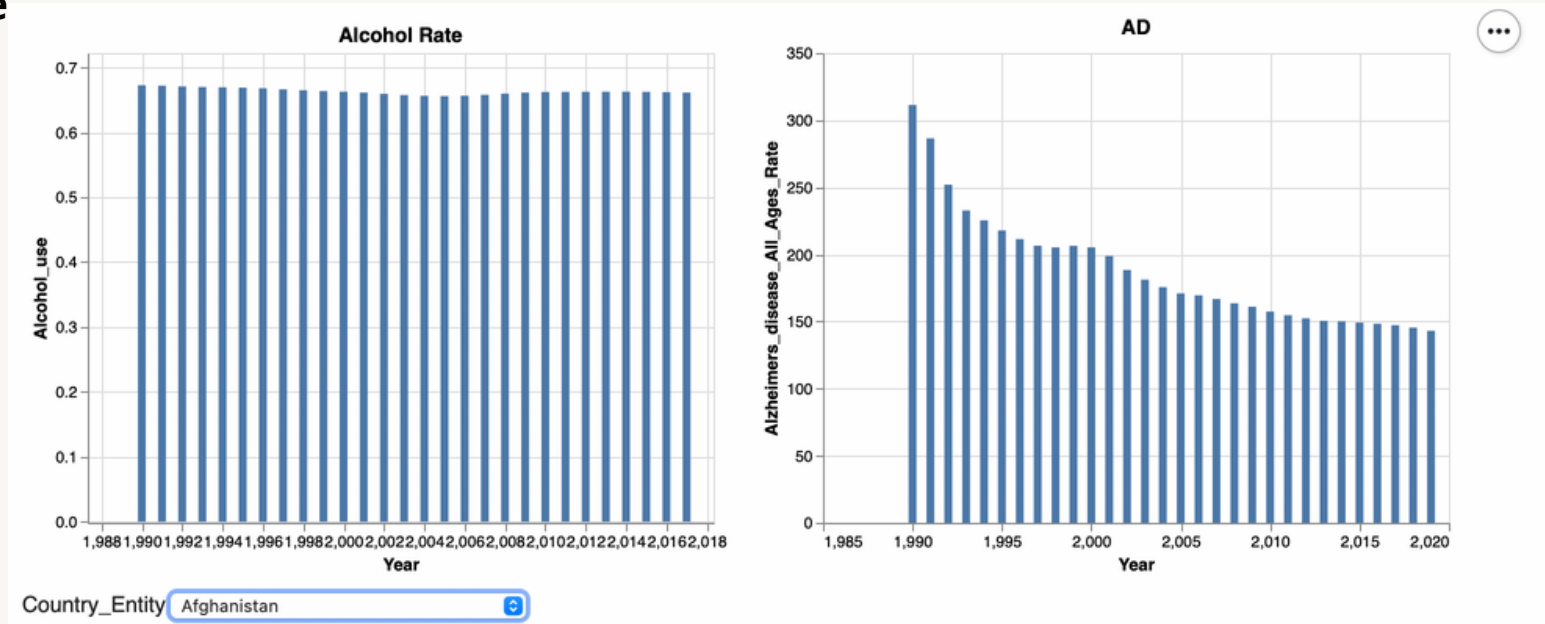


Figure 6 An example of analysis modeling of AD with possible factors.

Figure 7 An example of prediction of AD and Depression

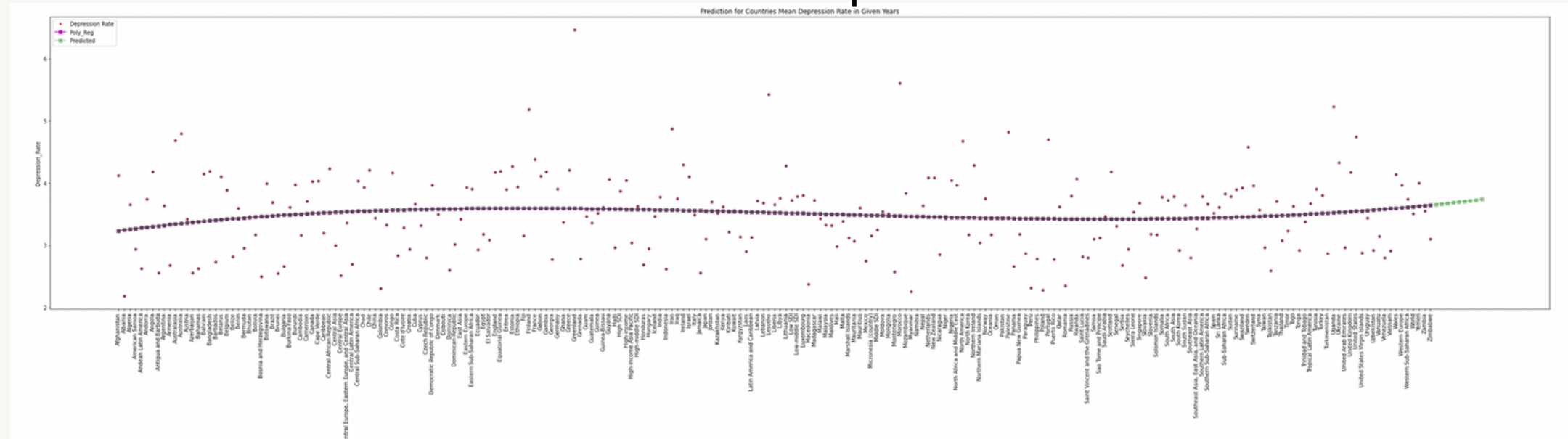


Figure 8 An example of heat map of AD and Depression with possible factors

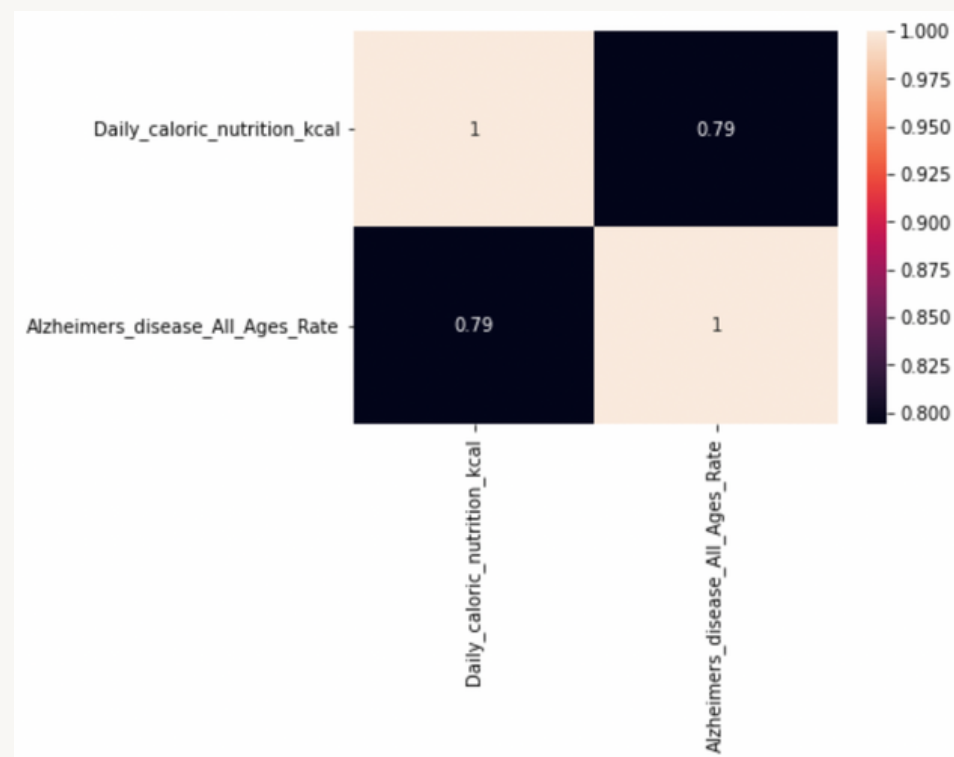
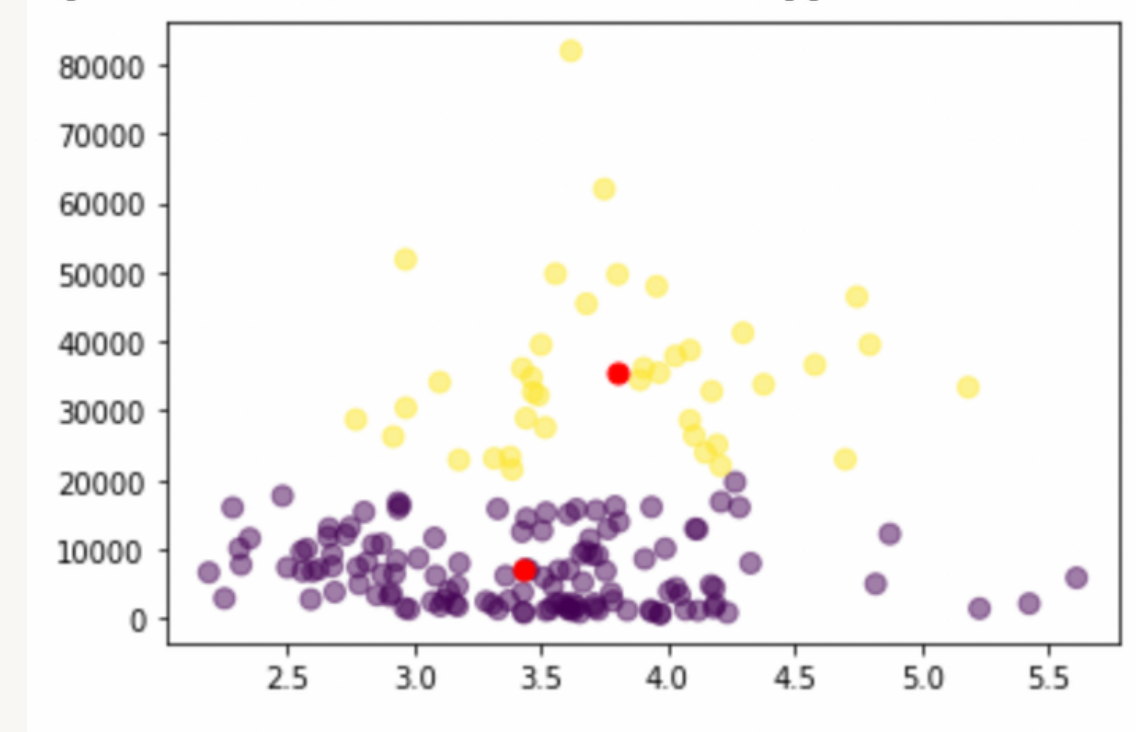


Figure 9 An example of kNNclassification for AD and Depression with possible factors.



## Results

The results we obtained as a result of the analyzes made in The Data Mining Model for Factors of Alzheimer's and Depression Project:

- There is no strong positive relationship between alcohol consumption and depression.
- There is no strong positive relationship between smoking and depression.
- Females' depression rates are higher than males.
- Depression cannot be defined by age
- There is no strong positive relationship between GDP and depression.
- There is no strong positive relationship between calorie nutrition and depression.
- There is no strong positive relationship between average education and depression.
- There is no strong positive relationship between alcohol consumption and AD.
- There is a nearly strong positive relationship between smoking and AD.
- There is a nearly strong positive relationship between GDP and AD.
- There is a highly positive relationship between calorie nutrition and AD
- There is a nearly positive relationship between average education and AD.

## Conclusion

The Data Mining Model for Factors of Alzheimer's and Depression is a data mining project created by creating a user interface developed with research-based analysis. In the project, an interactive user interface was presented to the user by combining data analysis studies with the user interface. Thus, users can make their own analysis on the model