Atal Bihari Vajpayee Indian Institute of Information Technology and Management Gwalior

INFORMATION TECHNOLOGY
Minor Project

ANALYSIS AND VISUALISATION OF SUICIDAL TRENDS IN INDIA

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1 ABSTRACT

According to the World Health Organization's report, India's suicide rate is 16.5 suicides per 100,000 people. It is one of the leading cause of death among young minds. aging around 15-29 years. Every year more than one lakh lives are lost due to suicide. In India, a student dies every hour and about 28 suicides per day, and the data is provided by National Crime Records Bureau (NCRB). A study is presented to analyze the significant factors that affect the number of suicides in different parts of India from 2001 to 2012. For the past 30 years, the suicide rate has been increased by 43%. The majority (71%) of suicide in India by people under 44 has led to a more significant social, emotional, and economic burden. Poisoning, hanging, and hiding (especially women) were suicides. Physical and mental illness, relationship problems, and financial hardship were significant causes of suicide. By analyzing the data on suicides, it can help the government know which part of the population is most affected by this problem to take the required steps to reduce them. A good analysis is crucial to prevent and suicidal behavior in India.

Key words : Suicide,India Risk Factors,Accidents,Data Analysis

2   INTRODUCTION

Suicide is considered a major public health problem. About 800000 people commit suicide worldwide every year, of these 17% are the residents of India. The WHO acknowledges that suicide is a global problem affecting all nations, especially low-income countries. On an average a total number suicides in India per day is 300. Suicide is the act of deliberately initiated and performed by the person concerned in the full knowledge, or expectation .

The WHO's Mental Health Gap Action Program (mhGAP) includes identifying the risk of suicide as a health priority.It has developed an intervention guide for the diagnosis and management of mental illness, substance abuse and suicidal ideation and programs, and history of intentional self-harm.

The WHO is also launching a variety of intervention studies, which seek to raise awareness of the problems. It leads to reduced discrimination and impact on national policies. It includes suicide monitoring, international technical support, regional and national workshops, production and distribution of resources, the promotion, and randomized clinical trial of suicide prevention interventions.

3   MOTIVATION

About 800,000 people die by suicide worldwide every year, of these 135,000 (17%) are residents of India, a nation with 17.5% of the world population. India is one of the most suffering nations in the world due to suicide. Many families suffer a great loss due to suicides. The average number of suicides per day in India is 381. There is a need to analyze what is causing many people to take their lives, in which area does more number of suicides taking place, what are the reasons that make them take their lives. In this project, we will analyze the suicides that happened during 2001 and 2012.

4   LITERATURE SURVEY

Satyavati [[7]] investigated attempted suicides in psychiatric in patients and reported that during a one year period out of 1881 admissions 126 had made suicidal attempts with drowning being the most commonly employed method.

Khan,[2] identified the presence of psychiatric illness and stressful life events as the two most important reasons for completing suicide.

Badrinarayana,[1] found a positive and significant correlation between depressive illness, suicidal ideation with early parental deprivation, recent bereavement and positive family history of suicide.

Suresh Kumar,[6] reported that those who completed suicide were significantly younger, they were more frequently unemployed and used more lethal methods (hanging) than those who attempted.

Palaniappan,[4] explored the possible association between suicidal ideation and biogenic amines.

Srivastava and Kumar[[5]] in their study on patients with major depressive disorder reported that the 17% in patients with suicidal ideation attempted suicide, The risk factors identified were being below 30 years of age.

Nandi,[3] investigated the relationship between availability of lethal insecticide and the incidence of suicide.

Author	Title	Year	Publisher	Work
Srivastava, Nishant. and Agarawal, Kanika.	Unilateral pure trigeminal motor nerve neuropathy: A rare case report	2005	Indian Journal of Psychiatry	in their study on patients with major depressive disorder reported that the 17% in patients with suicidal ideation attempted suicide, The risk factors identified were being below 30 years of age.
Vijayakumar, Lakshmi.	Indian research on suicide	2010	Indian Journal of Psychiatry	investigated attempted suicides in psychiatric in patients and reported that during a one year period out of 1881 admissions 126 had made suicidal attempts with drowning being the most commonly employed method.

Author	Title	Year	Publisher	Work
Khan, Farooq. and Anand, B. and Devi, M. and Murthy, K.	Psychological autopsy of suicide-a cross-sectional study	2005	Indian Journal of Psychiatry	identified the presence of psychiatric illness and stressful life events as the two most important reasons for completing suicide.
A.Badrinarayana	Study of suicidal risk factors in depressive illness	1980	Indian Journal of Psychiatry	found a positive and significant correlation between depressive illness, suicidal ideation with early parental deprivation, recent bereavement and positive family history of suicide
Suresh Kumar, Pattath Narayanan	An Analysis Of Suicide Attempters Versus Completers In Kerala	2004	Indian journal of psychiatry	reported that those who completed suicide were significantly younger, they were more frequently unemployed and used more lethal methods (hanging) than those who attempted
Palaniappan, V. and Ramachandran, V and Somasundaram, O	Suicidal Ideation And Biogenic Amines In Depression	1983	Indian Journal of Psychiatry	explored the possible association between suicidal ideation and biogenic amines.
Nandi, D.N. and Mukherjee, S.P. and Banerjee, G.and Boral, G.C. and Chowdhury, A. and Bose, J	A Rural Survey Of West Bengal	1979	Indian Journal of Psychiatry	investigated the relationship between availability of lethal insecticide and the incidence of suicide.

5   OBJECTIVE

The principle objective of the project is to perform statistical and geographical analysis. In this project, we will attempt to determine the suicidal trends in various states of India. We have been reading reports of suicides from all across India every-day.We have access to an extensive database containing suicidal data across various states of India dating from 2001 to 2012.
Using this, we can plot various statistics and analyse the given data like:

1. Year wise Overview
2. State wise Analysis:

   - Bar plot of State wise Suicide Cases

3. Pattern in Age group:

   - Age group role in Suicides

   - Year wise suicides based on age-groups

   - Young Age - State wise Analysis

   - Elder Age - State wise Analysis

4. Gender Wise:

   - Gender wise distinction

   - State wise suicides (Female)

   - State wise suicides(Male)

   - Age and Gender vs Suicide Count

5. Occupation:

   - Major attribute - Adoption,Causes and Profession

   - All Suicide causes

   - Top 15 suicide causes

6. Suicide distribution according to occupation and causes.

6 METHODOLOGY

1. Data is thoroughly studied and explored for a better understanding
2. The obtained data is raw and must be pre-processed. The missing values are replaced and a clean dataset is produced.
3. The Clean data is loaded into the kernel and then analyzed and checked again for no further miscalculations.
4. The data is then plotted and visualized through various dynamic and interactive graphs for a better understanding and analysis of the data.
5. The analysis is done and noted down.
6. The final report along with graphs, insights, and analysis is done.
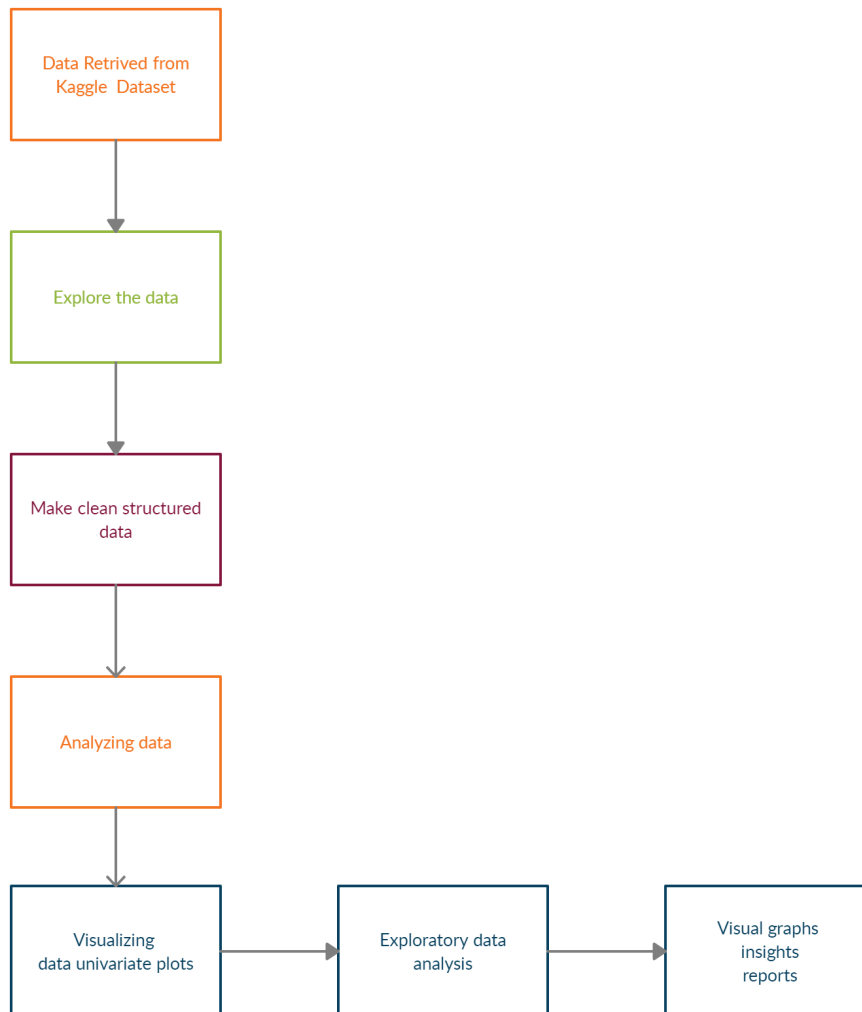
6.1 SETUP AND TOOLS

6.1.1 Software requirements

• Python 3.0
• Anaconda: It is a free and open-source distribution of the Python Languages •
Jupyter Notebook: An open-source web-based Python IDE.
• Creately : A website providing tools to build the System Architecture and other
related designs.
• Lucidchart: A website providing tools to build Gantt Chart
REQUIRED LIBRARIES:
• numpy - the fundamental package for scientific computing with Python
• pandas - provides easy-to-use data structures and data analysis tools for Python

6.1.2 Hardware Requirements

If your computer does not have GPU(GPU is recommended for faster Computation)
we can use GPUs that are provided by Google or Kaggle.
• Kaggle is recommended as the datasets are available on kaggle. Datasets can be
loaded with ease if you are using Kaggle kernel.
If you want to do it on Google Colab you need to upload the datasets to your Google
Drive first.
• In a kaggle kernel we can use the GPU that's provided for us by Select the Settings
tab.
Then select the checkbox for Enable GPU. Verify the GPU is attached to your ker-
nel in the console bar, where it should show GPU ON next to your resource usage
metrics.
And turn on the internet to download the relevant libraries.

6.1.3 Dataset

- itemThe shape files provides districts level boundary data of India. Data is
  downloaded from arcgis and extracted from OpenStreetMap.

- This data set contains yearly suicide detail of all the states/u.t of India by
  various parameters from 2001 to 2012.

- Time Period: 2001 - 2012 Granularity: Yearly Location: States and U.T's of India

  Parameters:

  a) Suicide causes b) Education status c) By means adopted d) Professional profile e) Social status

6.1.4 Tools and Hardware

- Seaborne Seaborne is a Python data visualization library based on matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics.

- Matlabplot.lib Matlabplot.lib is a plotting library for the Python programming language and its numerical mathematics extension Numpy.

- Plotly Plotly Python library is an interactive open-source library. ... plotly graph objects are a high-level interface to plotly which are easy to use. It can plot various types of graphs and charts like scatter plots, line charts, bar charts, box plots, histograms, pie charts.

1.Graphical Processing Unit(GPU)	NIVIDIA GeForce GTX 960 2 GB
2.RAM	12 GB
3.Processor	Intel Core i5 8th Generation i5-8265U
4.Hard Disk Space	200 GB of Solid-State Drive

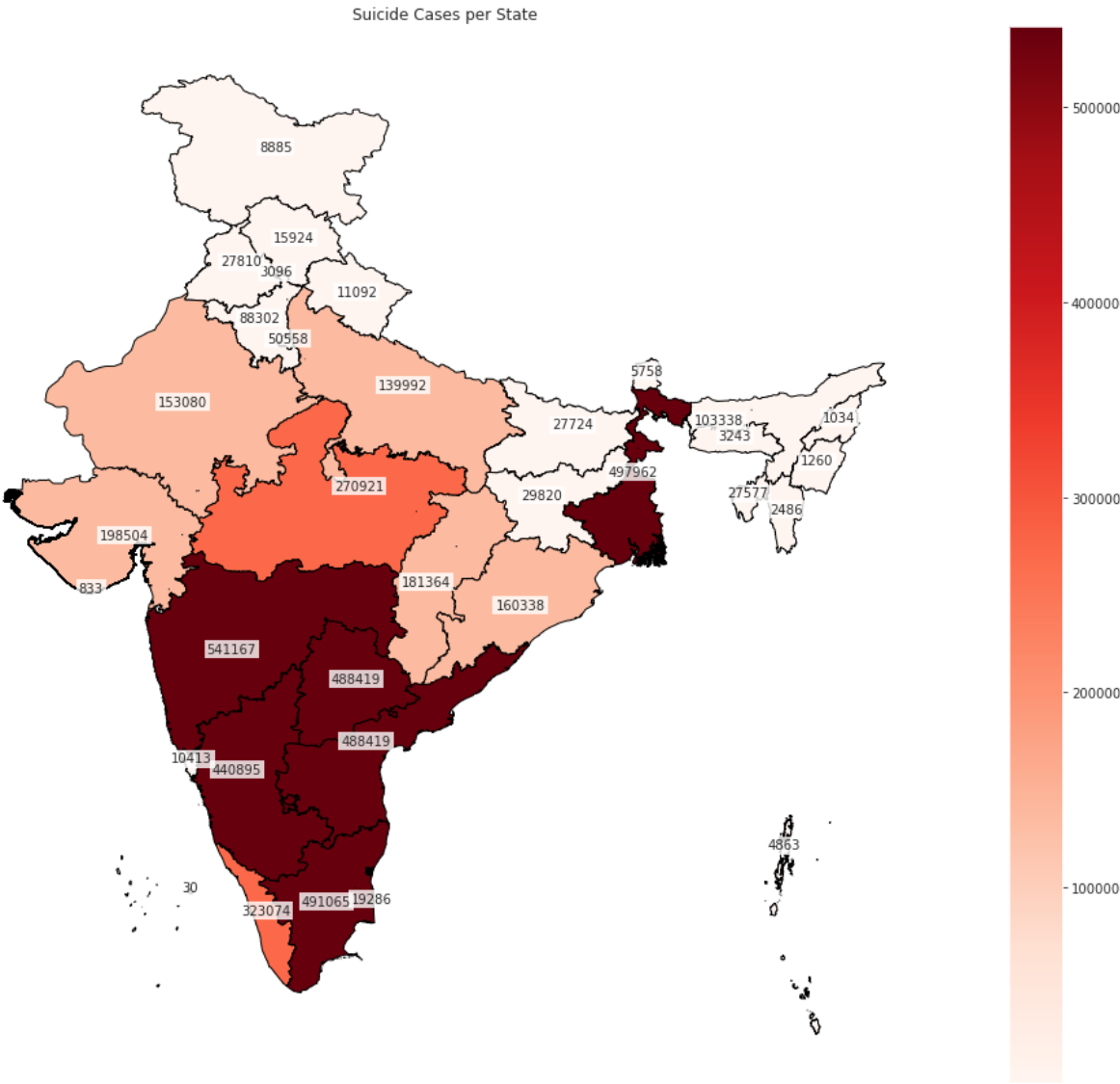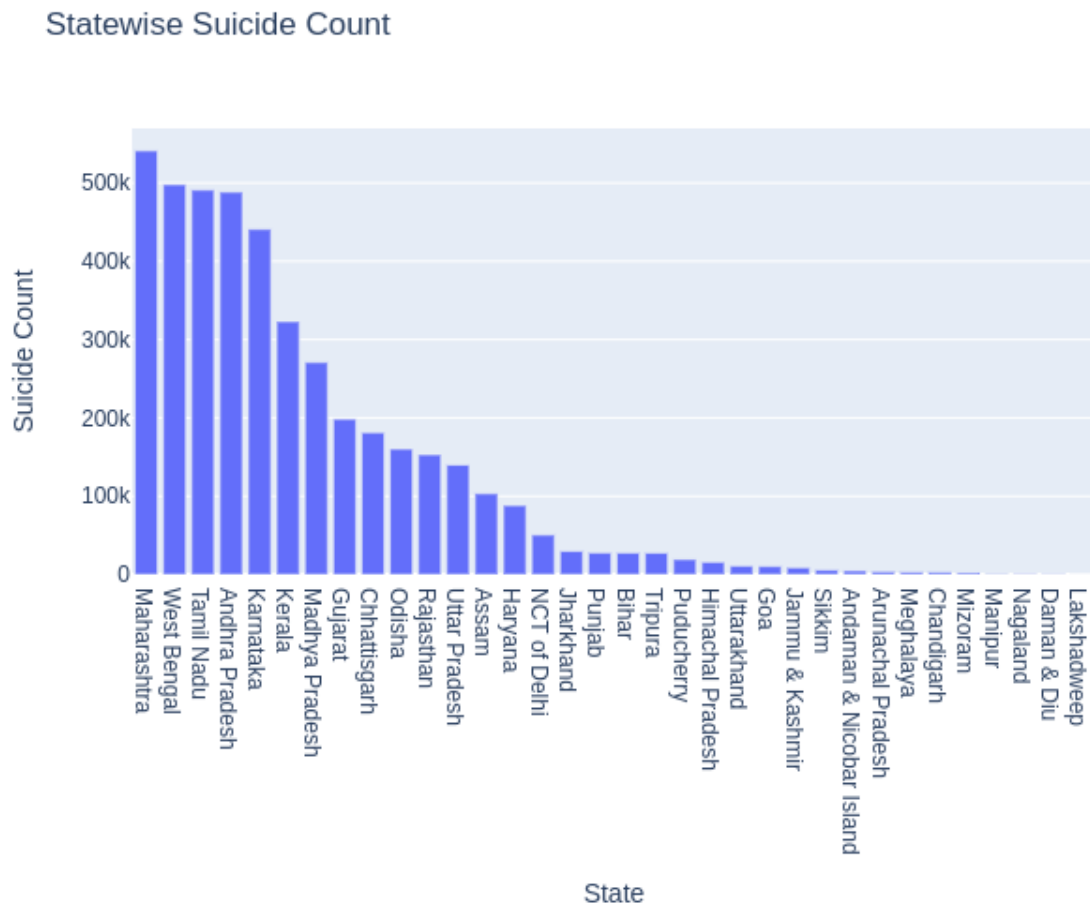# 7 RESULT

7.1 Year wise Overview
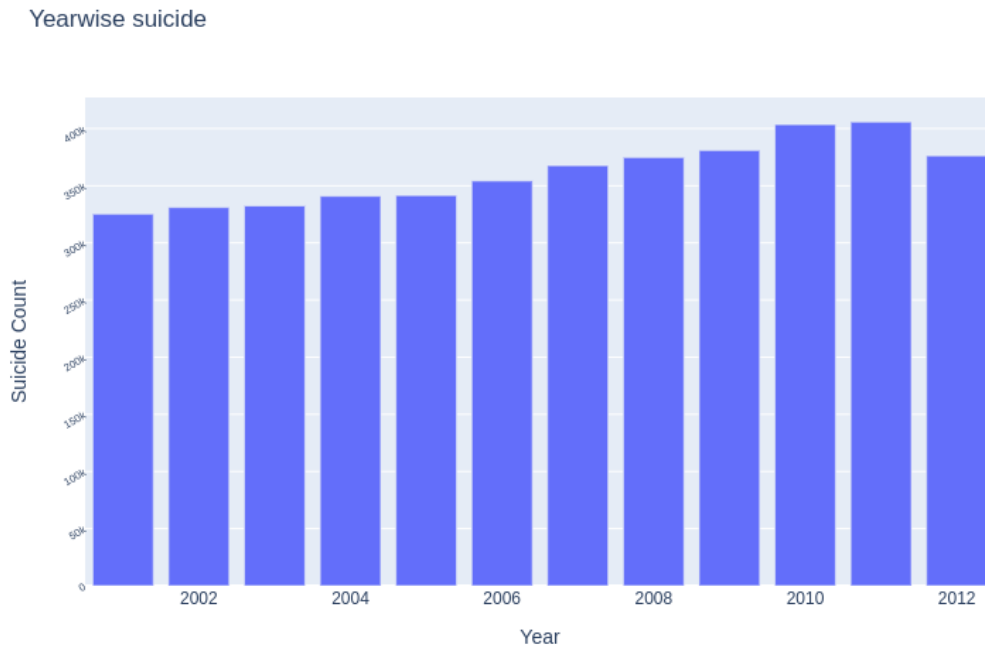
Yearwise suicide

Observation:
The bar graph of the yearwise plot doesn't show any significant trend, suicide count is increased as we move from one year to the next expect there is a decrease in the suicide count in year 2012.

7.2   State wise Analysis

7.2.1   Statewise Suicide Mappings

Suicide Cases per State

Statewise Suicide Count

Observation:

It's quite surprising to see the South End of India having the highest majority of suicide rates. In the East part, West Bengal seems to be an exception to low suicide rates.
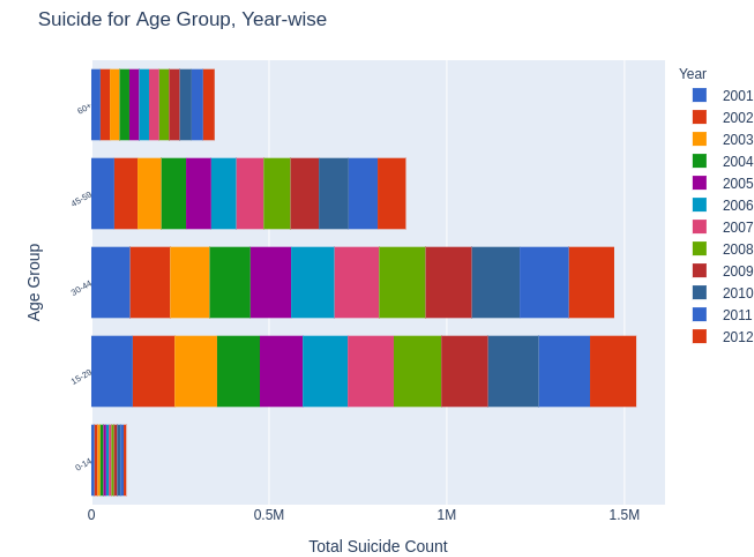
However, these are purely based on numbers, so it's not uncommon to see higher populated areas registering more suicide rates compared to other areas.

Population density is fairly low in North East states, and hence there is a decline in suicide rates towards the North East. The same argument can be applied for Lakshadweep, Andaman Nicobar and Maldive Islands.
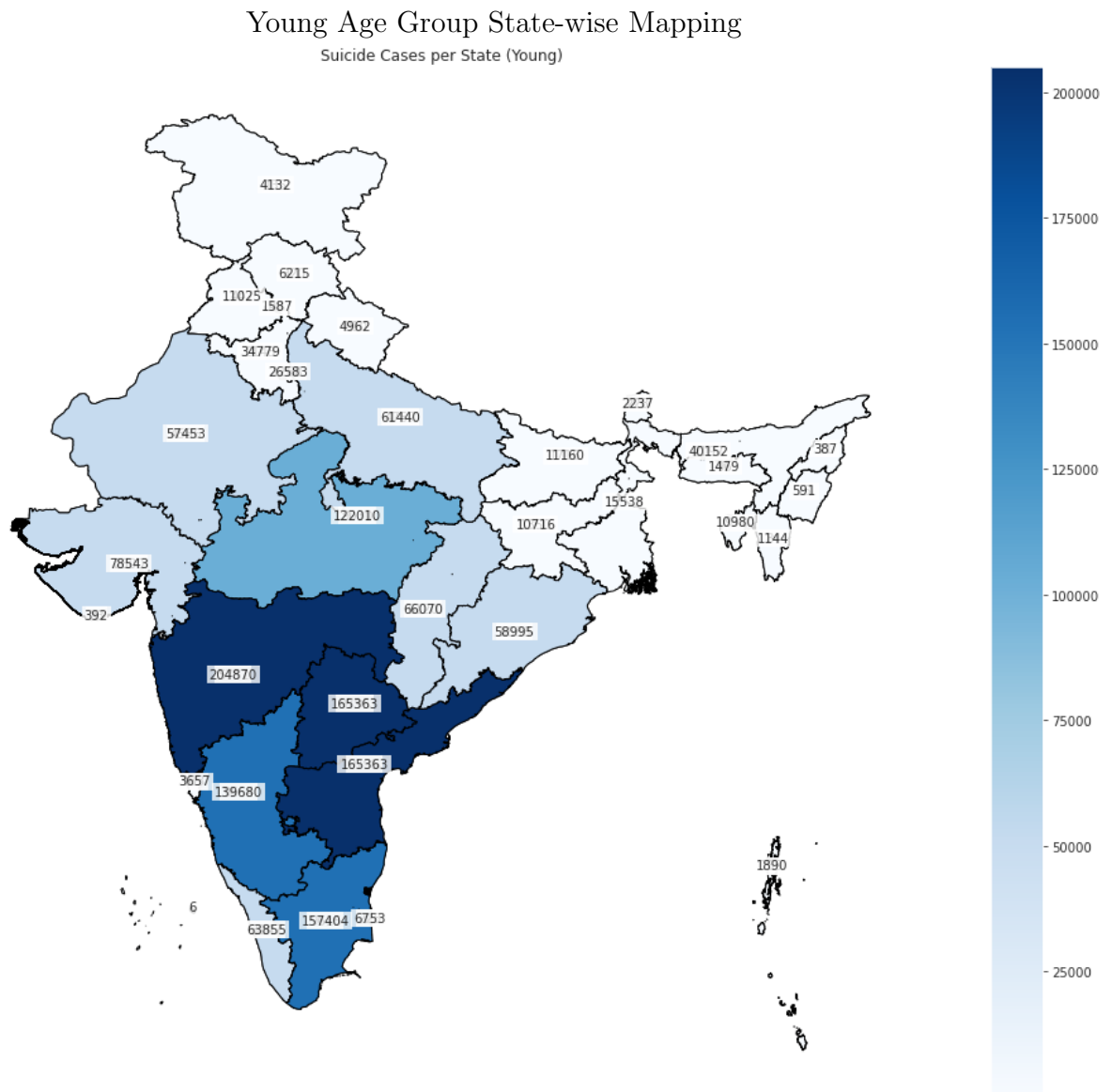
7.3 Age

Suicide Cause
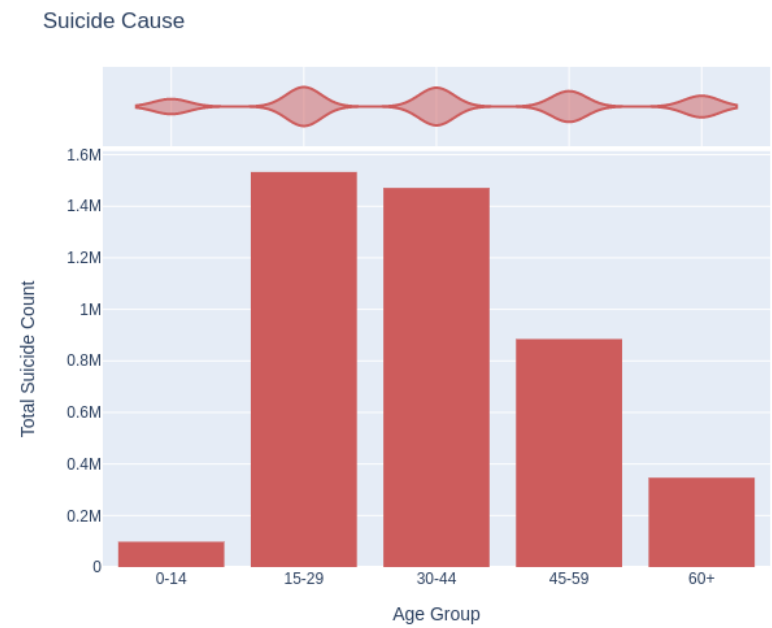
7.3.1 Year wise distribution of Age Groups

Suicide for Age Group, Year-wise

7.3.2 State wise Analysis (Young vs Elder)

Young Age Group State-wise Mapping

Suicide Cases per State (Young)

Elder Age Group State-wise Mapping

Suicide Cases per State (Elder)

Observation:
The bar plot of age group vs suicide count clearly depicts that the population of people with the age group of around 14-29 years have committed the most number of suicides followed by the 30-44 years age-group.

The age group 14-29 years mainly comprises students who are studying in schools, colleges and universities. The reason for these suicides by the students may be because of the immense pressure put by the educational institutes, society and parents on the students, stress to cope up with others and immature love affairs.

The age group 33-49 years mainly comprises employees, married men and women. The reason for these suicides may be unemployment, disputes in marriage, dowry reasons and physical or mental abuse.

8   CONCLUSION

8.1   Future Work

We can build a ML/DL model in the future to predict if a person has a suicide intent or not.
We can make a prediction model based on the data where the predicted variable is about predict the no. of suicides from the given data, for the given country for the given year.

8.2   Advantages

The results obtained gives us the clear vision about what type of population is highly affected by this problem. Government should take the preventive measures in bringing down number of suicides in our country by giving more attention on the population that is mostly affected in their respective states. It's not only the government but even it is job of us also to work

[7],[6],[2],[4],[5],[3],[1].

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[1] A Badrinarayana. Study of suicidal risk factors in depressive illness. *Indian journal of psychiatry*, 22:81–3, 01 1980.

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