**Data Analytics Project**

# Suicides in India
# Visualizations Using Tableau

**Name:K.SUNITHA**

## Abstract

Standard visualizations such as bar charts and scatterplots, especially those representing qualitative, emotionally sensitive issues, fail to build a connection between the data that the visualization represents and the viewer of the visualization.To address this challenge, the information visualization community has become increasingly interested in exploring creative visualization techniques that could potentially help viewers relate to the suffering and pain in emotionally sensitive data. We contribute to this open question by investigating whether visualizations that rely on metaphors (i.e., that involve existing mental images such as a tree or a personimage)withsomeemotionalconnectioncanfosterviewers'empathyandengagementwith the data. Specifically, we conducted an empirical study in which we compare the effect of visualizationtype(metaphoricandabstract)onpeople'sengagementandempathywhenexposed to emotionally sensitive data (data about sexual harassment in academia). We designed a metaphoric visualization that relies on the metaphor of a flower symbolizing life, beauty, and fragility which might help the viewers to relate to the victim, build some emotional connection, and an abstract visualization that relies on purely geometric forms with which people should not haveanyexistingemotionalconnection.Inourstudy,wefoundnoclear difference inengagement and empathy between metaphoric and abstract visualization. Our findings indicate that female participantswereslightlymoreengagedandempathicwithbothvisualizationscomparedtoother participants.Additionally,welearnedthatmeasuringempathyinadatavisualizationisacomplex task. Informed by these findings on how people engage and empathize with metaphoric and abstract visualization, newer and improved visualization and experiences can be developed for similar emotionally sensitive topics that are emotionally charged and fear-provoking.

# Chapter1

# Introduction

Inrecentyears,informationvisualizationhasbecomeapopularmethodforeffectivelyconveying messagesandspreadingawarenessaboutsubjectslikesexualharassment,childabuse,suicide,and othertopicsthatmayaffectpeople'sfeelings,ideas,attitudes,andvalues.Standardvisualizations like bar charts, pie charts, etc. represent quantitative information well but they fail to connect viewerswiththehumansufferingsthatthisdatadescribes[1].Additionally,asperpsychologists, thesestandardvisualizationssufferfroma"psychicnumbingeffect,"or"compassionfade,"which describes how our capacity for empathy decreases as the number of people suffering rises. Mark Twain originated the quote "As rise higher and higher to the sky, they become in the same proportion more and more inexplicable" [2]. These challenges with data involving sensitive sentiments call for the need of designing and evaluating visualization techniques that could form ahumanconnection.TheconceptofhumanizingdatawaspopularizedbyGiorgiLupiandStefanie Posavec in their book 'Dear Data' [39].We think it is important to foster data-driven empathy and engagement in the visualization to enable viewers to form a human connection with emotionallysensitivedataandexploretheinvisibleemotionsandfeelingsinvolvedinthedataset.

In fact, other data visualization researchers [10, 11] have studied how human-like visuals or "anthropographics" in visualizations can elicit empathy or humanize the data. Although these previous studies did not demonstrate the clear benefits of anthropographics, anthropographics is onlyoneapproachusedtoelicitingempathywithdata.Theideathatdatavisualizationsbuiltwith creative and engaging visual representations could evoke viewers' empathy and engagement has some supporters, while others have expressed their doubts and concerns [4].Another popular approachtohumanizingdataconsistsofrelyingonmetaphoricvisualstosymbolizeacertainentity or concept. Several visualization designers [12,13,14] have developed data visualizations using this metaphoric approach for emotionally sensitive data, such as using a flower petal to represent adayofachild'sillnessandusingmetaphorsoftrees,waves,stars,andfirefliestorepresent

different suicide ways of people suffering from depression and pain. However, little research has examined the effect of this metaphoric approach on viewers. Further research is required to understand how these creative visuals affect viewers' responses to a visualization. In this report, we contribute to addressing the complex topic of the role visualization design might play on empathy and engagement of people using the metaphoric-focused approach, by conducting an empirical study that compares metaphorical and abstract visualization representing emotionally sensitive data.

## Motivation

The motivation behind this project grew out of a desire to explore non-traditional visualizations foremotionallysensitivedatathatmayhelpinspreadingawarenessinanimpactfulmannerinthe future.Wewereinspiredbymetaphoricvisualization[12,13]usingreal-worldentitieswithsome emotional connection as a potentially effective technique for representing emotionally sensitive informationcomparedtothetraditionalandabstractvisualizations.ConceptualMetaphorTheory (CMT) indicates that metaphor is the fundamental mechanism to shape the way we think and act [8].Thatisonereasonwhyvisualmetaphorisacommonlyusedtechniqueintheadvertisingand editorial design world where the designer's goal is to convince the readers of something.

## Contribution

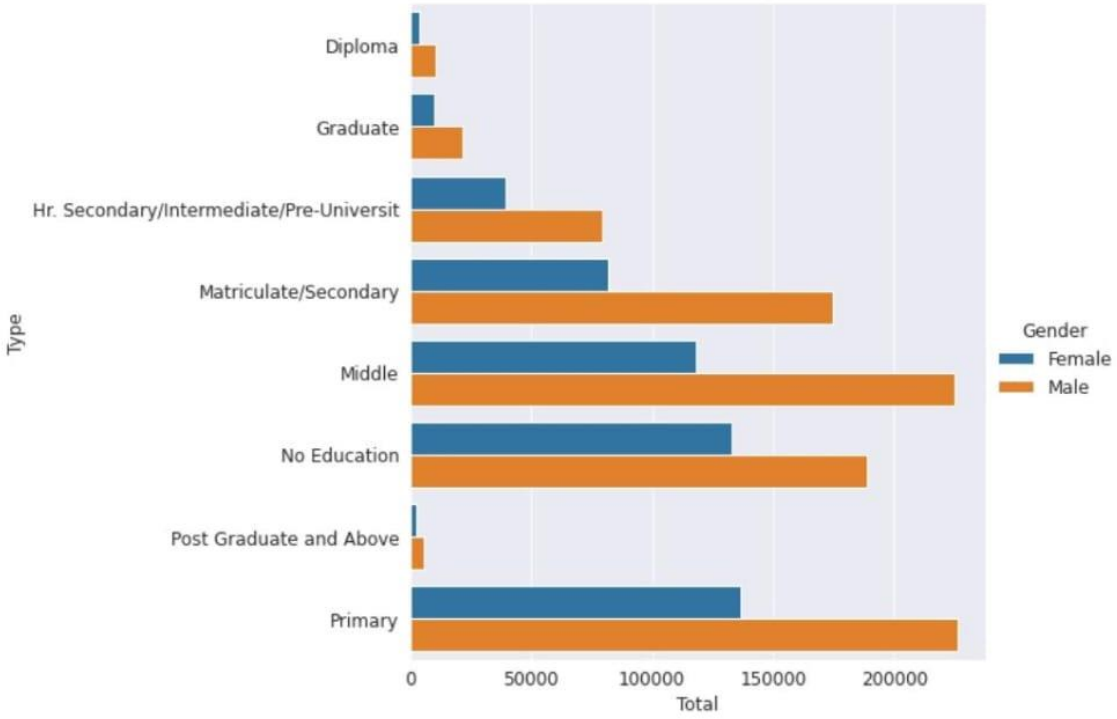
The primary goal of the project is to understand whether a metaphoric representation of an emotionally sensitive dataset can lead to more engagement and empathy from the viewers compared to the abstract representation. To achieve this, the contributions of the project are as below:

1. Thedesignandimplementationofonemetaphoricandoneabstractvisualizationusingthe "sexual harassment in academia" dataset [1], with similar visual channels to encode data dimensions.
2. Aweb-basedexperimenttolearnhowpeopleempathizeandengagewiththeimplemented metaphoric and abstract visualization.

## Suicides By The Eduatonal Background

In this section we will see individuals of which educational background have committed suicides more often.

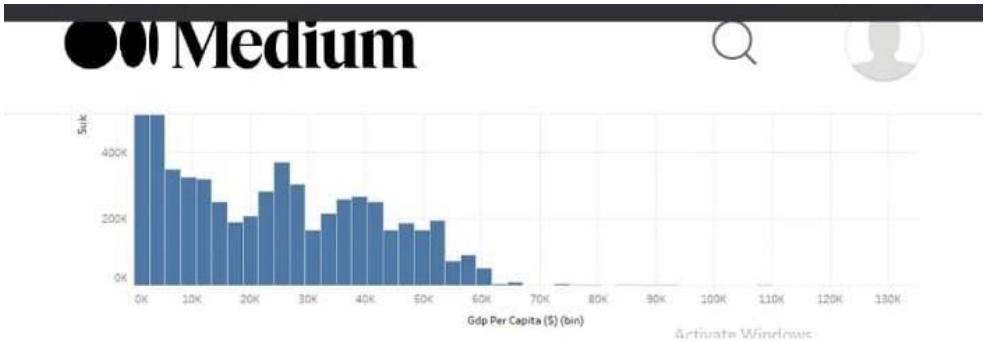
```
#filtering the data as per the educational ba
```

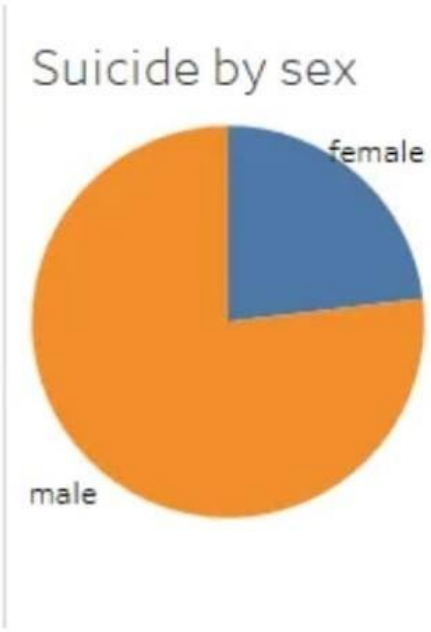



As per above graph it seems that people that has no formal or any professional education have committed more suicides especially the males. Females of these education background have also committed suicides more often.

## Suicides By Social Status

In this section we will visualize the suicides according to the social status of the individauls.




Now, let's look at the sex, we can see from the pie-chart that about 3 times more men commit suicide the women. What do you think is the reason for that?

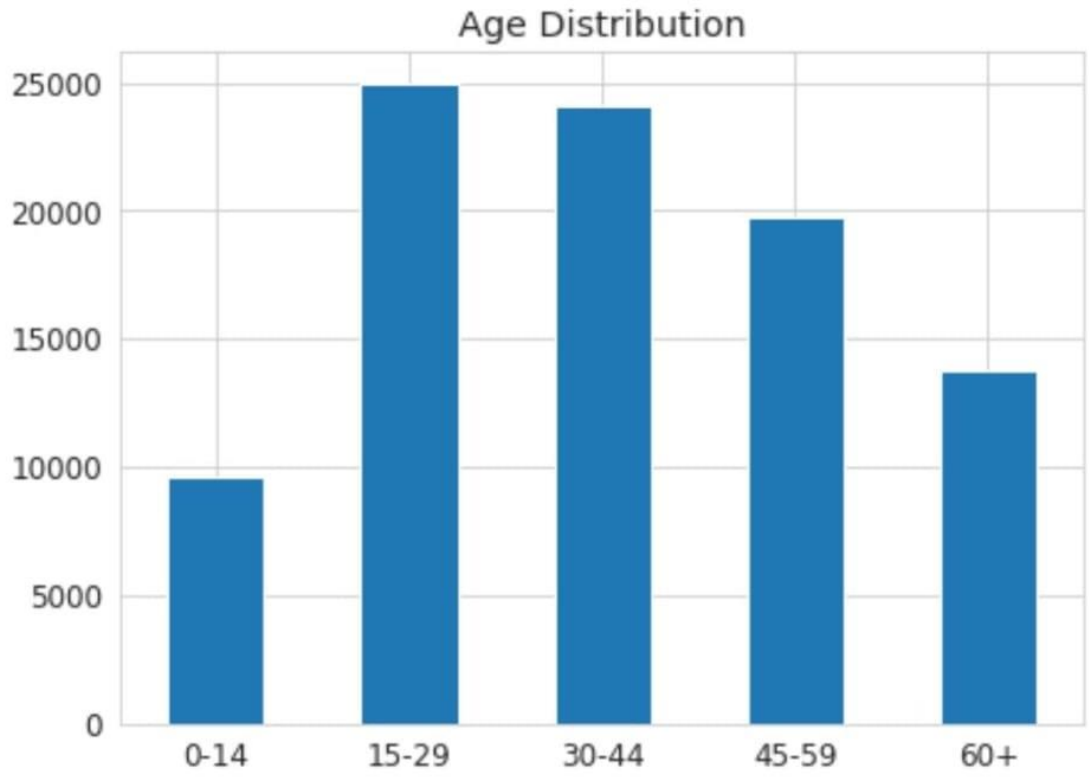
Examining the suicide numbers by age, it is observed that adults between the ages of 35 and 54 are more liable to commit suicide(maybe mid-life crisis... lol), followed by the senior citizens, then adults of 25–34 years.

## Suicides By Age Groups

As we have seen in above section that married people have commited more suicides. Now we will try to check this inference through age group column. If the above inference is right then the age group that has committed suicides will fall in between 25 to 50.

```
#Age Distributiionstatewise_Age_df = statewis

0-14 963915-29 2496030-44 2406445-59
1973060+ 13766Name: Age_group, dtype: int64
```




The graph above cleary indicates that the inference we have deduded in the previous section is absolutely correct. The age group that has committed suicides more often does fall in the range of 25 to 50.

## Suicides By The Eduatonal Background

In this section we will see individuals of which educational background have committed suicides more often.

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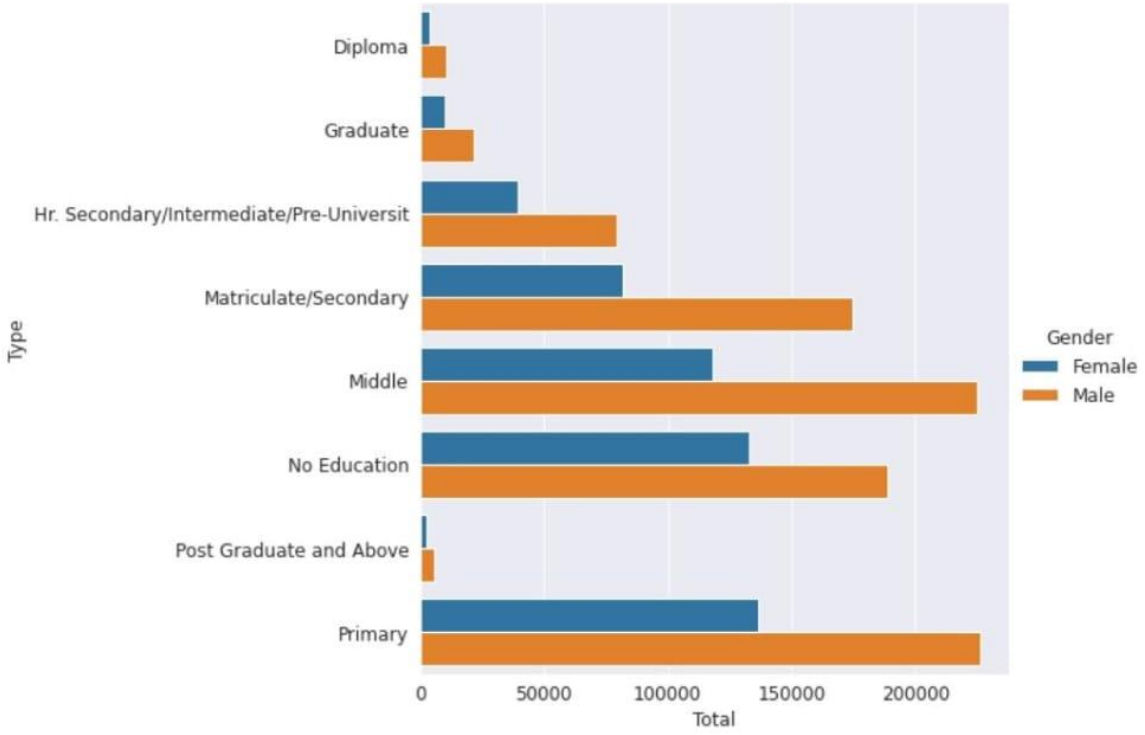


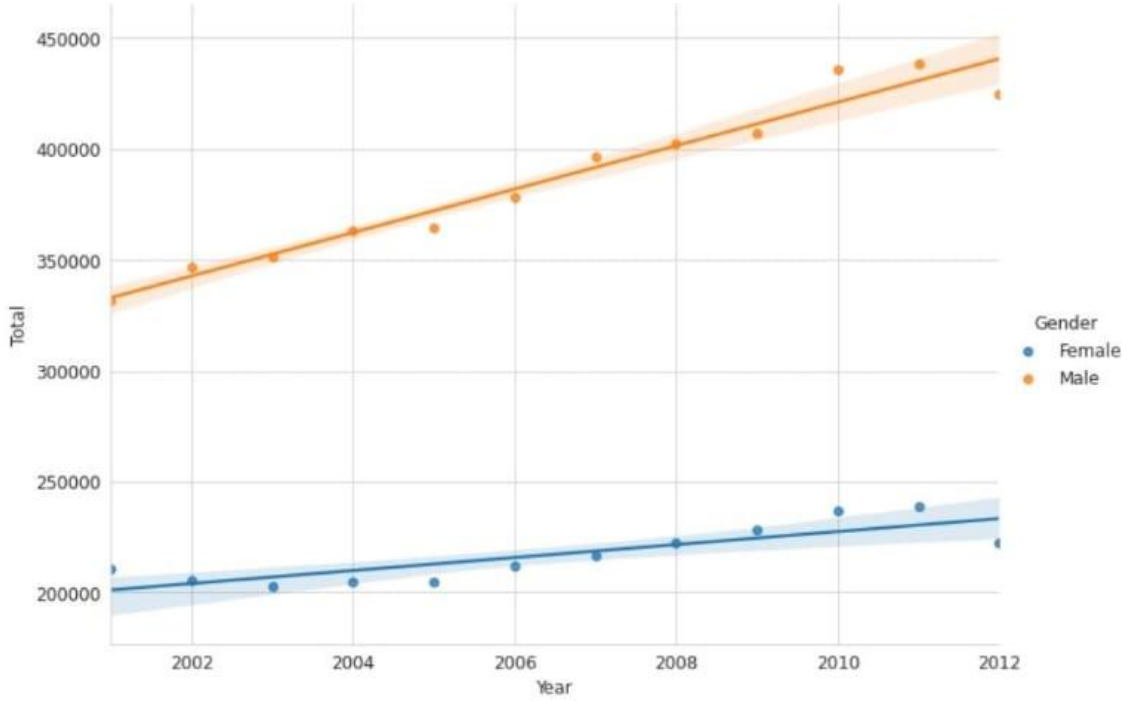

As per above graph it seems that people that has no formal or any professional education have committed more suicides especially the males. Females of these education background have also committed suicides more often.

## Suicides By Social Status

In this section we will visualize the suicides according to the social status of the individauls.

## Q5: How has the number of cases have been changed over the years?

```
grouped_year = statewise_df.groupby(["Year","Gender"])["
grouped_year = pd.DataFrame(grouped_year).reset_index
# grouped_year
sns.lmplot(x="Year", y="Total", hue="Gender", data=group
```




As we have already seen in previous section that males commit suicides more often then the females, but this graph shows a growth in upward direction in the number of suicides both for males and females. It is very alarming to notice that this trend will go on in future also.

Let us save and upload our work to Jovian before continuing.

# Inferences and Conclusion

According to the above analysis we can conclude the following things:

- Males tend to commit more suicides compared to Females in India
- Highest no. of suicide cases occur in Maharashtra, West Bengal, and Tamil Nadu.
- If the trend continues the number of suicides will increase in the future

People who commit suicide are mostly:

- Married
- Farmers and housewives
- Youngsters (15-29 age) and middle aged (30-44)
- Don't have proper or any professional education