

# **Minding our madness:**

*An analysis on the status of mental health in the tech industry*

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## **Abstract**

As mental health and wellness are gaining more and more attention in the recent decade, businesses are putting more emphasis on creating workplace environments that foster mental wellness as well as inclusion for those who are living with mental health illness. The purpose of this project is to examine the state of mental wellness in the tech industry, as well as determining factors that may help improve support for mental health in the future.

## **Introduction**

According to the Canadian Mental Health Association, 1 in 5 people in Canada will personally experience a mental health problem or illness. By age 40, about half of the population will have or have had a mental illness.<sup>[1]</sup> Not only does mental health affect on an individual level, but it also has a significant economic cost as well. In 1998, \$6.3 billion was spent on uninsured mental health services and time off work for depression and distress that was not treated by the health care system.<sup>[1]</sup> The tech industry is no different. According to a survey done by Blind, which is an anonymous messaging app for the workplace, 57% of 11,000 tech employees surveyed said they were feeling burnt out by their jobs.<sup>[2]</sup>

Stigma or discrimination attached to mental illnesses presents a serious barrier, not only to diagnosis and treatment but also to acceptance in the community.<sup>[1]</sup> One may wonder – How might we improve support for mental wellness in the tech industry?

## **Data Source**

2017 and 2018 Open Source Mental Illness (OSMI) Mental Health in Tech Survey

- Available on Kaggle: [2017](#), [2018](#)

## **Research Questions**

*Overarching research question:*

How might we improve support for mental wellness in the tech industry?

*Specific research questions:*

1. What are the factors that affect the comfort level in discussing MH at workplace?
2. How can we improve MH support for employees in the tech industry?
3. What are the factors contributing to the ability to minimize work interference due to MH symptoms?

## **Planned Methodology**

1. Data preprocessing and feature engineering
  - *Data cleaning:*
    - Creating dummy variables for text responses (i.e Yes/No/I don't know)

- Cleaning and combining responses that are the same but have different spellings (i.e Male vs. male vs mail)
- Handling NaN values; replacing values with the median for numeric and “Did not answer” for text data
- Data Visualization to get a sense of the distribution of the dataset
- *Feature Engineering*
  - Using unsupervised clustering models to create different classes of comfort levels in discussing MH at the workplace from a cluster of related survey questions in order to carry out the remaining analysis using supervised models
  - Proposed models: KMeans Clustering, Gaussian Mixture model

## 2. Data Analysis

- Using supervised models to carry out prescriptive analysis of the research questions
- Proposed models:
  - Sentiment analysis for text analysis
  - Logistic Regression, XGBoost, Decision Tree Classifier, Tobit, Sentiment analysis, or an ensemble method (eg. Voting) combining multiple models together for other analyses

## **Anticipated Challenges**

1. Handling NaN values from self-employed participants
  - These participants have NaN values to most of the responses regarding current employers, including the overall ratings.
  - Ratings are currently replaced using predictions from Decision Tree Classifier with some demographic data as independent variables. In the future, other options including replacing the NaN values with median ratings will be considered depending on the model performance during analysis.
2. Choosing the best model for the prescriptive analyses
  - Since there are many possible options for modelling, a systematic way of model evaluation and modification need to be implemented to improve efficiency and minimize potential errors

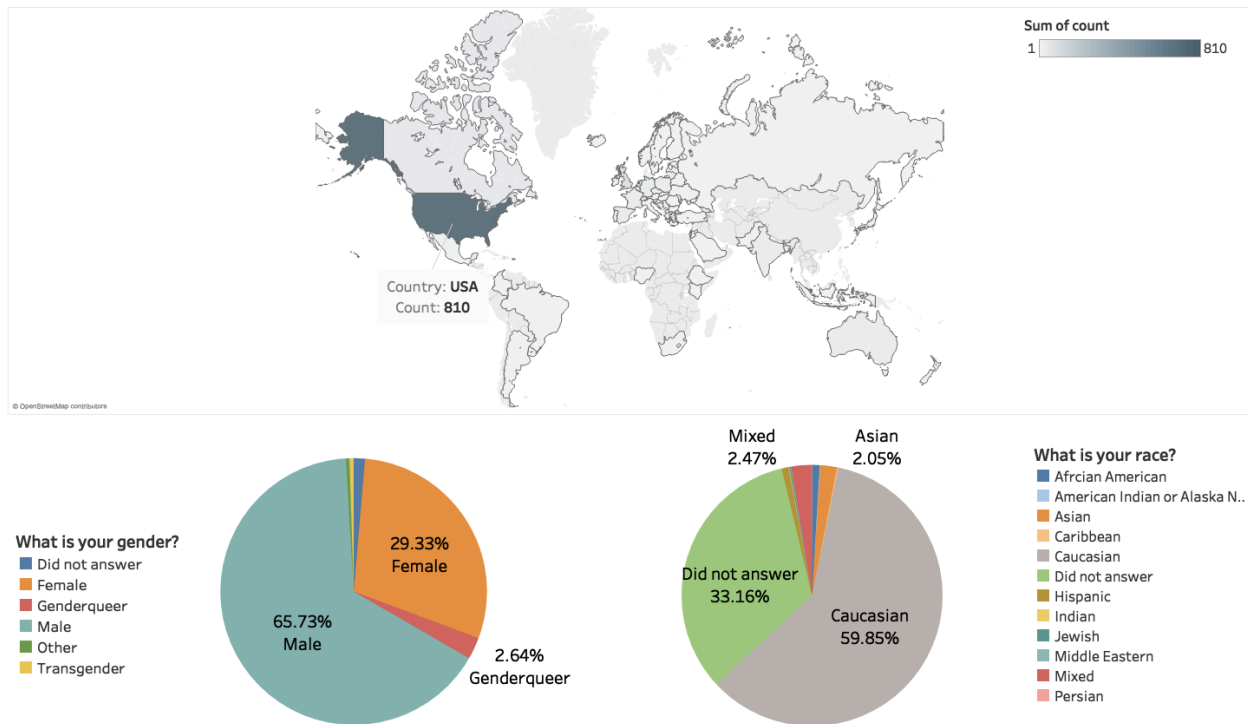
## **Hypothesized outcomes**

The tech industry may improve support for mental wellness by:

- Increasing MH benefits offered
- Allow easier access to time off due to MH-related stressors
- Foster an open, non-judgmental space for MH discussion at the workplace

## Preliminary analysis

### Demographic overview of survey participants



### Participants' overall ratings of the employers and the industry

