ANALYSIS OF FACTORS AFFECTING METAL HEALTH AT WORLPLACES

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***Abstract*— There is growing evidence of the global impact of mental illness. Mental health problems are among the most important contributors to the burden of disease and disability worldwide. The issue with Tech companies and Startups is that deadlines, under-resourcing, and high expectations trigger psychological stress which in turn makes it harder for people to relax, sleep and digest. Furthermore, all predictions indicate that the future will see a dramatic increase in mental health problems. The burden of mental health disorders on health and productivity has long been underestimated. The impact of mental health problems in the workplace has serious consequences not only for the individual but also for the productivity of the enterprise. Employee performance, rates of illness, absenteeism, accidents, and staff turnover are all affected by employees' mental health status. In this paper we will describe workplaces and employee relation and effects of stress on personal as well as company level and good practices emerging from the literature and outline principles and recommendations for action in this area.**

I. INTRODUCTION

Mental health describes a level of psychological well-being or the absence of mental ill health. Probably the most well-known definition of mental health is that of the World Health Organization (WHO) that defines mental health as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to her or his community. According to WHO (1948), health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. The definition of mental health as the absence of mental ill health is a more conservative one.

This approach underlines the need to address mental health in its totality by recognising interrelationships among risks to mental health, sub-threshold conditions of poor psychological health and well-being (such as stress) that may not have yet resulted in diagnosed mental ill health problems but may severely affect their expression and diagnosed mental ill health problems. According to this perspective, efforts to tackle mental ill health should seek to put in place policies and practices that will tackle wider cultural differences, various types of assessment and competing professional theories all affect how 'mental health' is defined. So, to adopt a more inclusive definition of mental health and as such will not focus solely on (the absence of) mental health problems but a positive state of psychological well-being. Well-being at work is defined as individuals' ability to work productively and creatively, to engage in strong and positive relationships, fulfilment of personal and social goals, contribution to community, and a sense of purpose. These should prioritize prevention and tackling problems at source while also developing awareness and facilitating treatment and rehabilitation. This paper will discuss how this comprehensive approach should be applied with reference to mental health in the workplace. 16% of cases that present with colic are euthanised or die, highlighting that colic is a major health and welfare concern in the horse.

For 2017 this study estimates that 792 million people lived with a mental health disorder. This is slightly more than one in ten people globally (10.7%). Mental health disorders are complex and can take many forms. Mental health disorders remain widely under-reported. This is true across all countries, but particularly at lower incomes where data is scarcer, and there is less attention and treatment for mental health disorders like India.

It is also important to keep in mind that the uncertainty of the data on mental health is generally high, so we have been cautious about interpreting changes over time and differences between countries. Mental health disorders are common everywhere. Improving awareness, recognition, support, and treatment for this range of disorders should therefore be an essential focus for global health.

Poor mental health can negatively affect an employee's job performance, communication with co-workers, physical ability and daily functioning. This all adds up to loss of productivity. For that reason, it is very important that employees get the support and treatment they need for their mental health disorder. Employers must take mental health as seriously as physical health by openly discussing mental health disorders and providing resources and benefits for mental health in the workplace. The analysis of the Mental

Health in Tech Survey data set reveals that more work needs to be done to raise awareness.

II. OBJECTIVES

- To find out factors affecting the Mental Health at Workplaces.
- To use machine learning models, to find out the accuracy of the discovered factors.

III. RELATED WORK

Mental disorders are usually one of the three leading causes of disability, together with cardiovascular disease and musculo-skeletal disorders.The United Nations estimates that 25% of the world's population is adversely affected in one way or another as a result of disabilities.

It is clear that mental illness imposes a heavy burden in terms of human suffering, social exclusion, stigmatization of the mentally ill and their families and economic costs. Unfortunately, the burden is likely to grow over time as a result of aging of the global population and stresses resulting from social problems and unrest, including violence, conflict and natural disasters.

It is also seen that many large companies now realize that their employees' productivity is connected to their health and well-being. However, more emphasis has traditionally been placed on physical health than on mental health and well-being.

1) Job Stress

Job stress can be defined as the harmful physical and emotional response that occurs when the requirements of the job do not match the capabilities, resources or needs of the worker. Job stress can cause poor health and can increase rates of work-related injuries and accidents. Some potential causes of work-related stress are overwork, lack of clear instructions, unrealistic deadlines, lack of decision-making, job insecurity, isolated working conditions, surveillance, and inadequate child-care arrangements.

2) The role of the occupational health service

The occupational health service works closely with personnel and line management regarding all aspects of mental and physical health of employees. The occupational health team is available to look at the effects of health on work or of work on health, to discuss with staff any health problems they may have and to promote good health through health education, screening, and action programmes. The company believes that an occupational health service can play a major role in helping:

• to identify work problems caused by mental ill-health.
• to take action to improve the health of employees.
• to assist employers in modifying the work and work environment.
• to enable employees to remain at work rather than withdraw.

3) Consequences of mental health problems in the workplace Absenteeism

• increase in overall sickness absence, particularly frequent short periods of absence.
• poor health (depression, stress, burnout).
• physical conditions (high blood pressure, heart disease, ulcers, sleeping disorders, skin rashes, headache, neck- and backache, low resistance to infections).

4) Work performance

• reduction in productivity and output
• increase in error rates.
• increased number of accidents.
• poor decision-making.
• deterioration in planning and control of work.

5) Staff attitude and behavior

• Loss of motivation and commitment
• burnout
• staff working increasingly long hours but for diminishing returns
• poor timekeeping
• labour turnover (particularly expensive for companies at top levels of management).

6) Relationships at work

• Tension and conflicts between colleagues.
• Poor relationships with clients.
• Increase in disciplinary problems.

7) Female Mental Health and Hot Climates

Towards the early twentieth century, the factor of climate also came to be linked to female mental health. High temperatures were held responsible for female depression, hysteria, and neurasthenia. medical texts which underlined European women's vulnerability in tropical climates. Warm climates were said to harm them far more than men, leading to reproductive problems (including miscarriage), as well as psychological disorders, like depression, hysteria and 'tropical neurasthenia'.

IV. DATASET:

Source: Kaggle
Link: **https://www.kaggle.com/osmi/mental-health-in-tech-survey**

Features:
Attribute Information:

- Timestamp
- Age
- Gender
- Country
- state: If you live in the United States, which state or territory do you live in?
- self_employed: Are you self-employed?
- family_history: Do you have a family history of mental illness?
- treatment: Have you sought treatment for a mental health condition?
- work_interfere: If you have a mental health condition, do you feel that it interferes with your work?
- no_employees: How many employees does your company or organization have?
- remote_work: Do you work remotely (outside of an office) at least 50% of the time?
- tech_company: Is your employer primarily a tech company/organization?
- benefits: Does your employer provide mental health benefits?
- care_options: Do you know the options for mental health care your employer provides?
- wellness_program: Has your employer ever discussed mental health as part of an employee wellness program?
- seek_help: Does your employer provide resources to learn more about mental health issues and how to seek help?
- anonymity: Is your anonymity protected if you choose to take advantage of mental health or substance abuse treatment resources?
- leave: How easy is it for you to take medical leave for a mental health condition?
- mentalhealthconsequence: Do you think that discussing a mental health issue with your employer would have negative consequences?
- physhealthconsequence: Do you think that discussing a physical health issue with your employer would have negative consequences?
- coworkers: Would you be willing to discuss a mental health issue with your coworkers?
- supervisor: Would you be willing to discuss a mental health issue with your direct supervisor(s)?
- mentalhealthinterview: Would you bring up a mental health issue with a potential employer in an interview?
- physhealthinterview: Would you bring up a physical health issue with a potential employer in an interview?
- mentalvsphysical: Do you feel that your employer takes mental health as seriously as physical health?
- obs_consequence: Have you heard of or observed negative consequences for coworkers with mental health conditions in your workplace?
- comments: Any additional notes or comments

V. DATA VISUALIZATION:

1. Using **matplotlib** library in python:

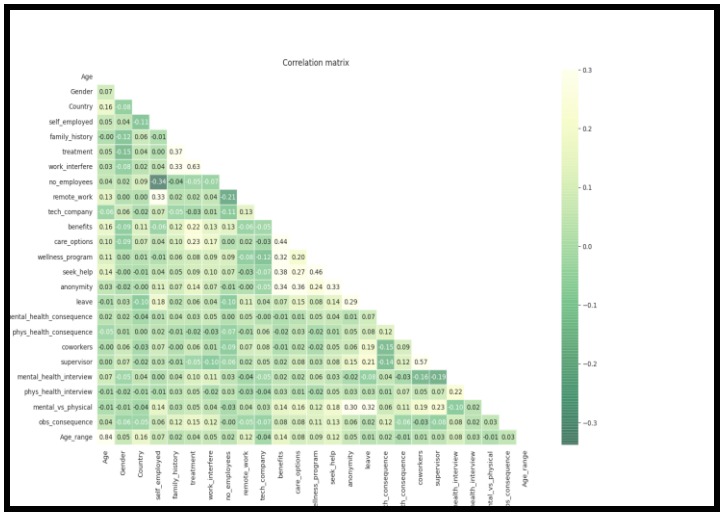


Fig. 1: Correlation Matrix

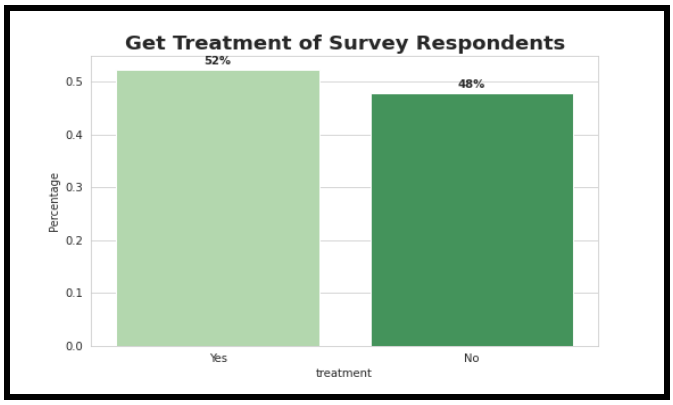


Fig. 2: What percentage of people are getting Treatment

Since our target is Treatment, we are seeing how people in different features are getting treatment.

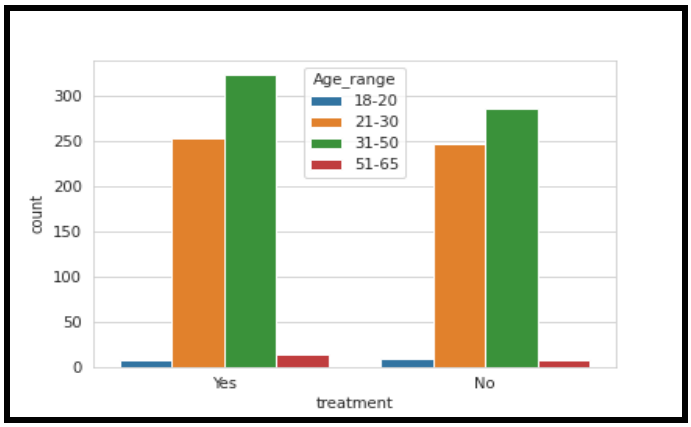


Fig. 3: Age wise treatment

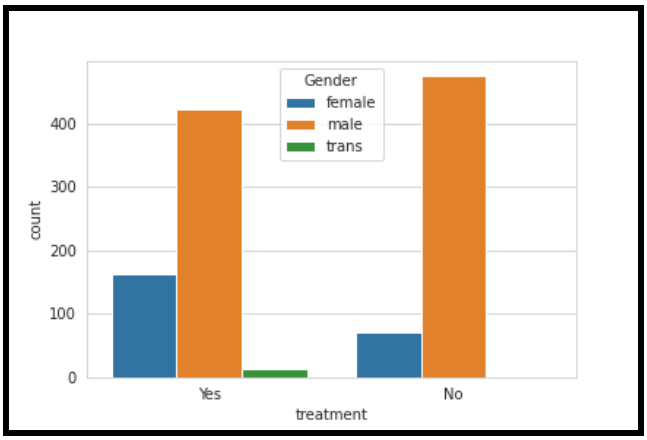


Fig. 4: Gender wise treatment

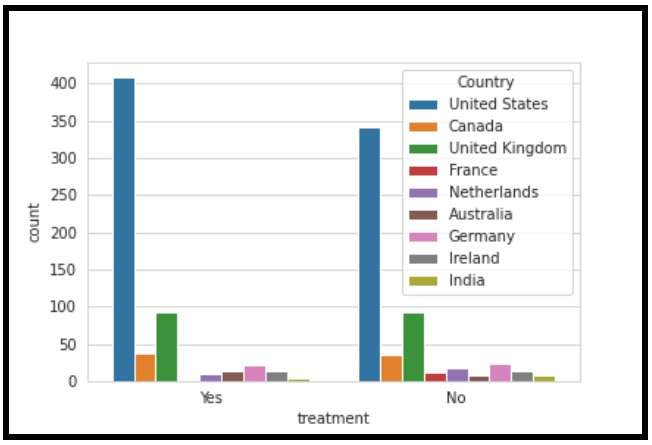


Fig. 5: Country wise treatment

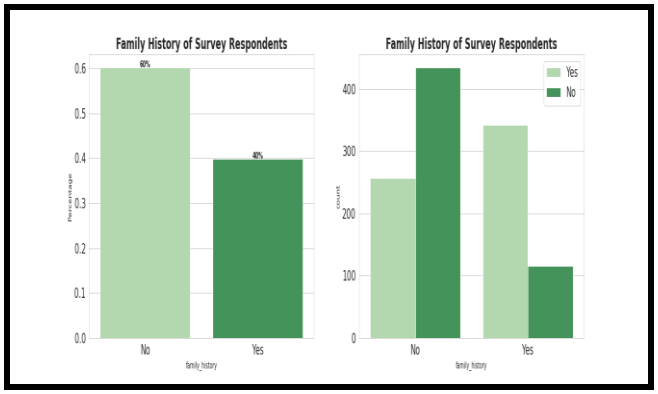


Fig. 6: Percentage of people with family history of mental issues

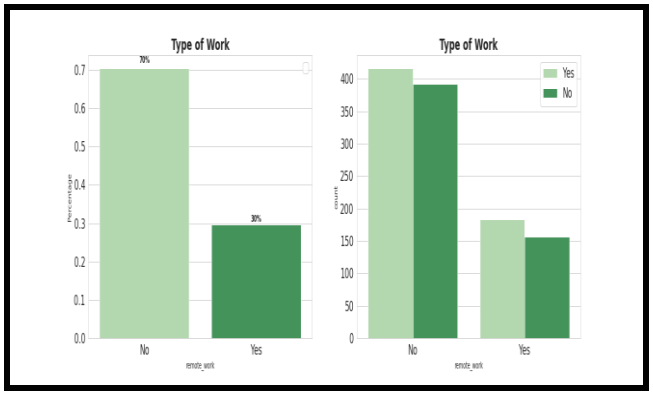


Fig. 7: Responds for remote work

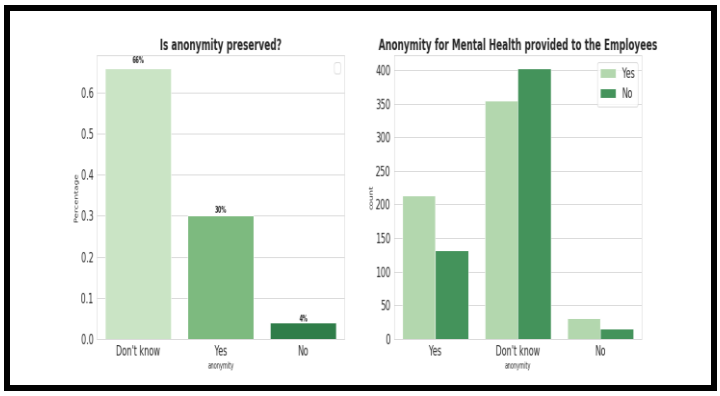


Fig. 8: Responds for, is anonymity preserved?

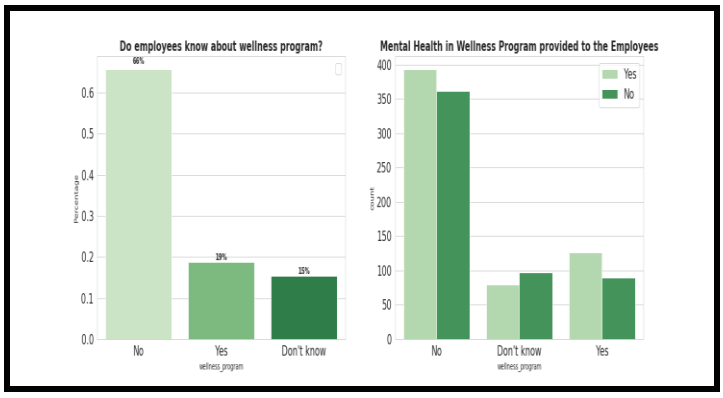


Fig. 9: Wellness Program

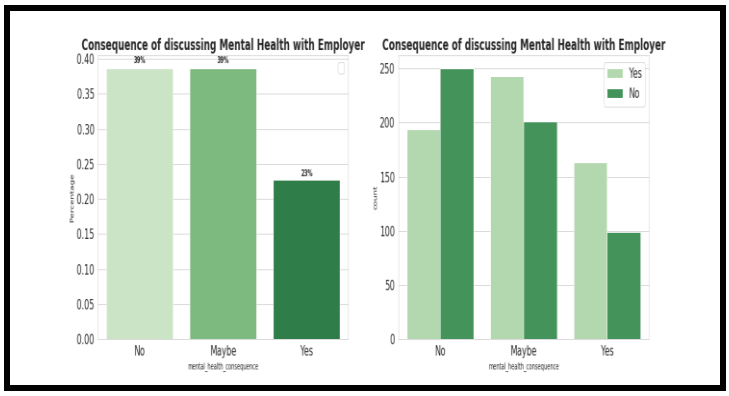


Fig. 10: Consequence of discussing mental health with employer

2. Orange Data visualization:

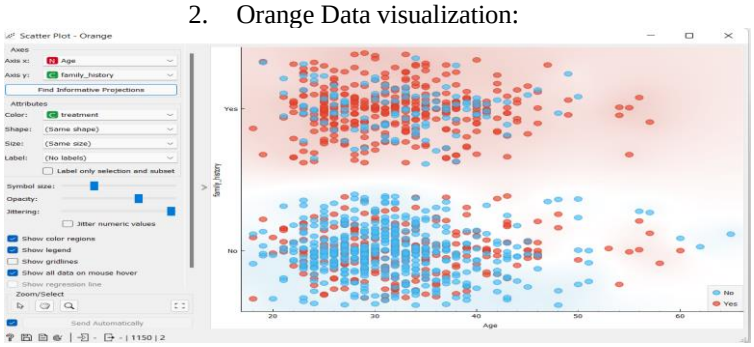


Fig. 11

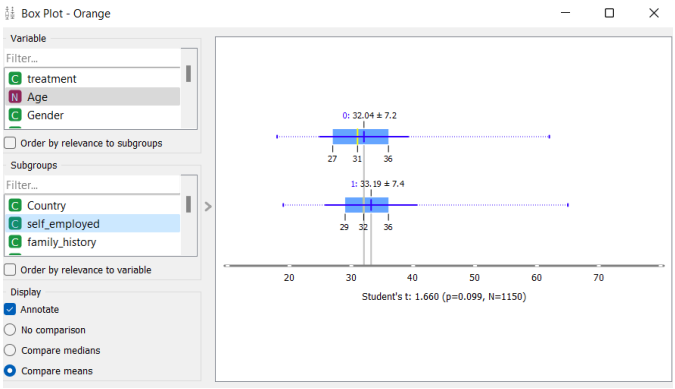


Fig. 12

3. Google Data Studio:

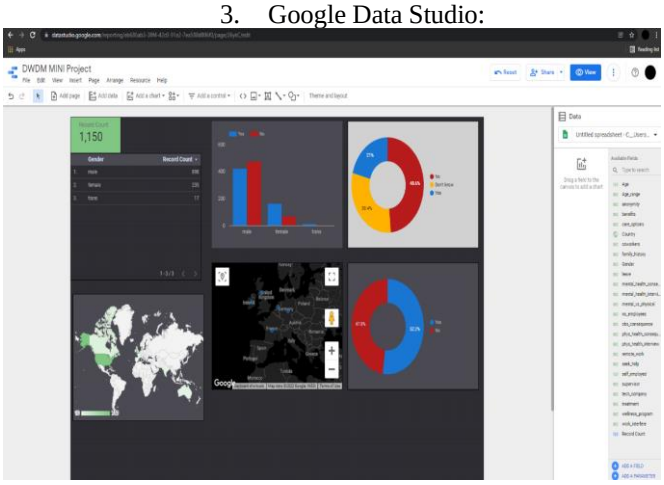


Fig. 13

4. Visualize Free:

Fig. 14

5. Microsoft Power BI:

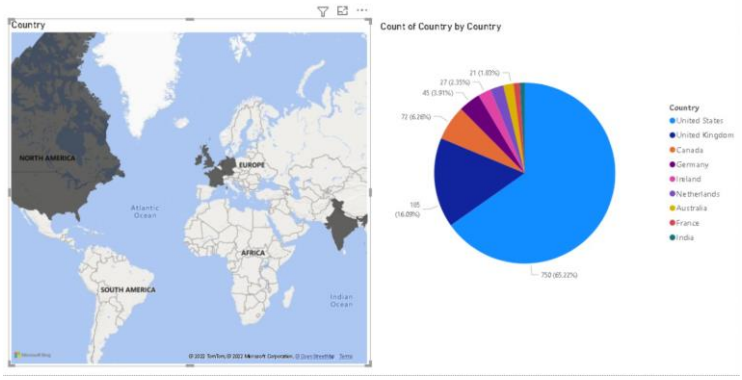


Fig. 15

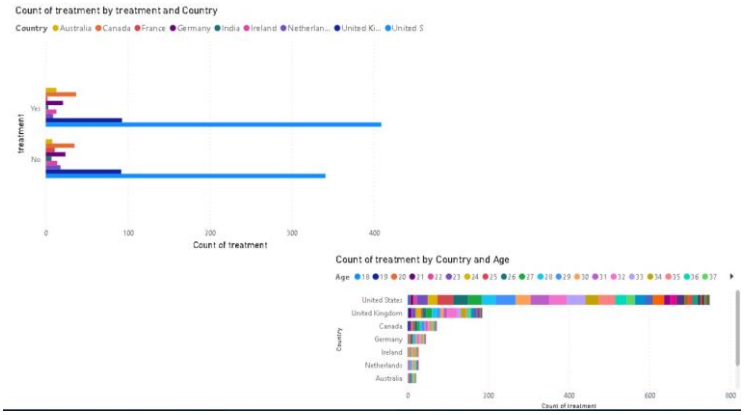


Fig. 16

VI. LEARNING ALGORITHMS:

- Logistic Regression
- Decision Tree
- Random Forrest

A. Logistic Regression:

Logistic regression is a process of modelling the probability of a discrete outcome given an input variable. The most common logistic regression models a binary outcome; something that can take two values such as true/false, yes/no, and so on. Multinomial logistic regression can model scenarios where there are more than two possible discrete outcomes.

Why logistic regression?
Logistic regression is a useful analysis method for classification problems, where you are trying to determine if a new sample fits best into a category.

B. Decision Tree:

A decision tree a tree like structure whereby an internal node represents an attribute, a branch represents a decision rule, and the leaf nodes represent an outcome. This works by splitting the data into separate partitions according to an attribute selection measure, which in this case is the Gini index. This essentially means that we each split aims to

reduce Gini impurity which measures how impure a node is according to incorrectly classified results.

Why Decision Tree?
They provide a highly effective structure within which you can lay out options and investigate the possible outcomes of choosing those options. They also help you to form a balanced picture of the risks and rewards associated with each possible course of action.

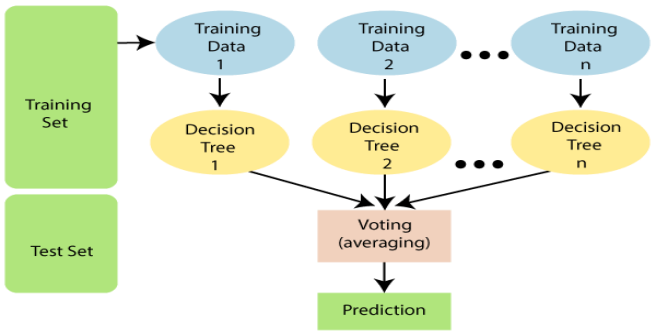
C. Random Forest:

Random forest is a popular machine learning algorithm that belongs to the supervised learning technique. It is used for both classification and regression problems in ML. It is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the model.

Why Random Forest?
It is always important to understand why we use this tool mover the other on? What are the benefits here? No overfitting: Overfitting means we have fit the data sx o close in the data sample and then we pick up on all the weird parts and instead of predicting the overall data we are predicting the weird stuff. Use of multiple trees reduce the risk of over fitting. Here training time is less.

High accuracy:
Runs efficiently on large database. For large data, it predicts highly accurate predictions. In today's world of big data this is very important and this is probably where it really shines. Therefore, Random Forest comes in.

Architecture of Random Forest:



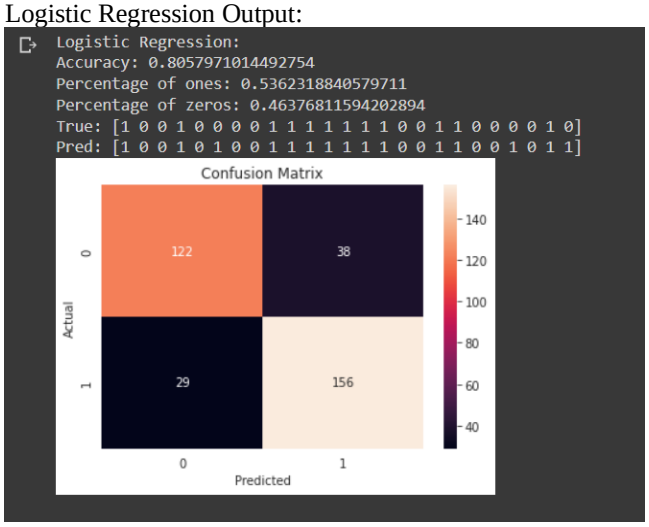
VII. RESULTS:

- Major contributing features deciding the factors which are responsible for Mental Health Illness as per our analysis on our dataset: 'Country', 'Age', 'Gender', 'family_history', 'benefits', 'work_interfere','mental_health_consequence', 'anonymity', 'wellness_program', 'phys_health_consequence'.

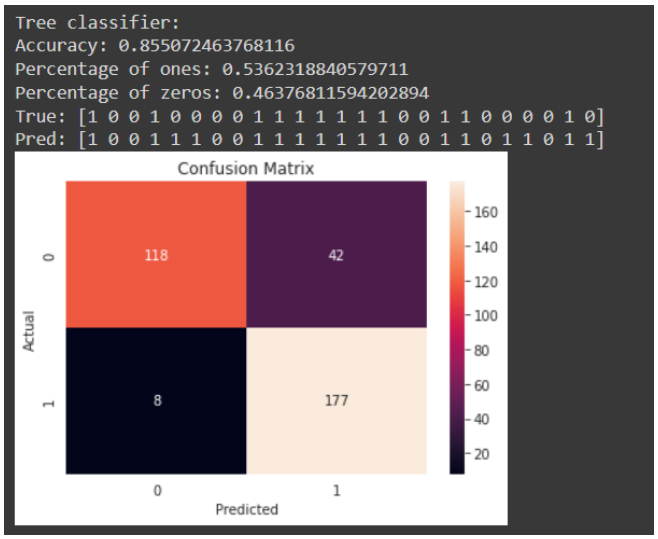
- Every algorithm implemented yielded a different accuracy score ranging from 80% to 85% with Decision Tree algorithm giving the maximum accuracy of 85.50%.

- Google Collab Data Analysis Link: https://colab.research.google.com/drive/1Y7HYB2LWO3sucxLb-L4u-8y3UT890QgH#scrollTo=ngVTs4-zZb5H

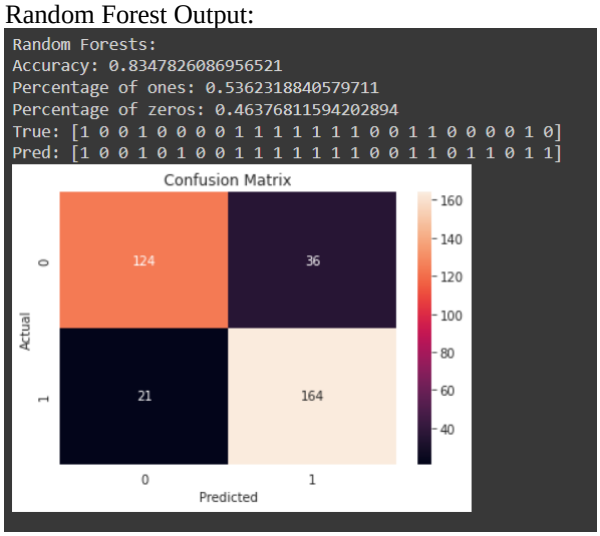
- Logistic Regression Output:



- Decision Tree Output:



- Random Forest Output:



VIII. Conclusion & Future Work:

Mental wellness is a pressing issue, especially in a high-pressure setting of the IT industries. Using the OSMI surveys, the trends and practices of the tech industry for the past 3 years were revealed. These results form a solid base for analysing the entire system and adopting them while finding solutions for inducing a healthy and welcoming workplace environment.

Now coming to the future work, we can compare our results from this project with various tech industries and by building their data and find what specific factors make that specific industry better or worse and can help them using our results.

Following are some suggestions based on the results of studying the visualization that could be adopted:

- Tech companies should encourage employees to open their issues and problems and provide help if needed.
- The Mental Health department should be established in tech industries so that employees can directly visit the department instead of telling this to their employers or colleagues.
- The larger companies still not working towards the cause of mental wellbeing should incorporate policies to support their employees.
- Counselling sessions and team building activities must be arranged frequently.

With more time, we would like to combine and explore Mental Health in Tech Survey data sets available from other years. This data set was from 2014, and it would be interesting to assess if things have improved since. We would also like to explore data from other industries, such as the healthcare industry, to see if attitudes toward mental health disorders are different among industries. And we would also like to find India's condition by comparing with our results.

IX. References

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