



# Challenge 4

# Healthy Minds, Healthy Lives

WorkMind



# Team: WorkMind



- Team: WorkMind
- Name: Ran Cheng
- PhD student at Imperial College London



# Challenge Summary

Within the workplace, we would like to

1. Analyse the differing attitudes towards mental health and frequency of mental health disorders.
2. Insight in how each employee would like to work to optimise their productivity whilst ensuring a positive workplace.
3. Identify what factors need to be highlighted based on survey data and use data mining to create various proposals for implementing workplace improvements.



Jacobs



PROJECT DATA ANALYTICS

# Persona of HR



Sarah

Female 27 years

London

IT Company

Senior HR

Comapny Size: 100 - 1000

## Job Responsibilities

- Recruit candidates
- Process payroll
- Conduct disciplinary actions
- Update policies
- Maintain employee records
- Conduct benefit analysis

## Goals

- Understand the employee wellbeing of our company
- Identify the company factors that might impact employee mental health
- Provide the correct pastoral care for each employee with suitable resources

## Pain Points

- It is difficult to clean and analyze the survey data from our employees
- It is difficult to find out suitable resources to satisfy each employee's needs
- It is difficult to balance the factors of budget, risks, company's culture, and nature of the business to create a clear and actionable proposal and policy

# Persona of Business Owner



Jack

Male 39 years

London

IT Company

CEO and Founder

Comapny Size: 100 - 1000

## Job Responsibilities

- Oversee the strategic direction of an organization
- Implement changes and proposed plans
- Engage in media obligations and public relations
- Interact with other leadership executives
- Maintain accountability with the board
- Monitor company performance
- Setting precedence for the working culture and environment

## Goals

- Reduce the stigma surrounding mental health in the workplace
- Make the decision and implementation of proposed plan of creating mentally resilient environment

## Pain Points

- It is difficult to forecast the benefits and effects of implementing the proposed plan
- It is difficult to track and measure the improvements after implementing the plan



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# User Needs

**Data skills**

**Time**

**Consistency**

**Knowledge**

**Resources**

**Confidence**

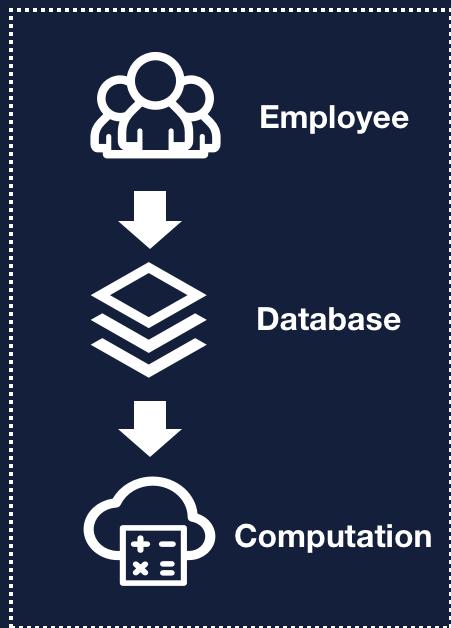


PROJECT DATA ANALYTICS

# The Solution: MindAble

1

Processing of Survey Data



2

Management Console for HR and Business Owners



3

Actionable Proposal for Better Workplace





PROJECT DATA ANALYTICS

## Workflow



## Key Actions

Employee complete an anonymous survey via mobile or PC

Identify mental health condition of employees based on well-designed questionnaire

Use historical survey data to train a prediction model

## Tech Stacks

Mobile App Development

Questionnaire Design

Data Cleaning

Data Pre-processing

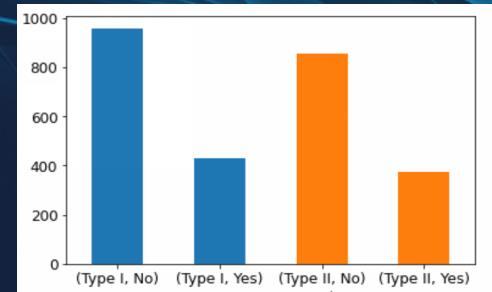
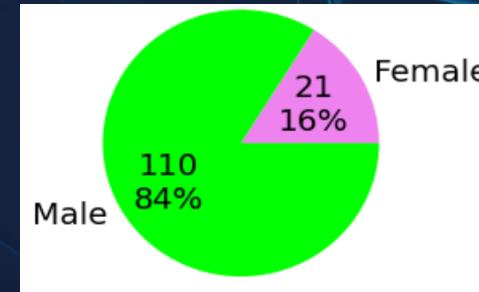
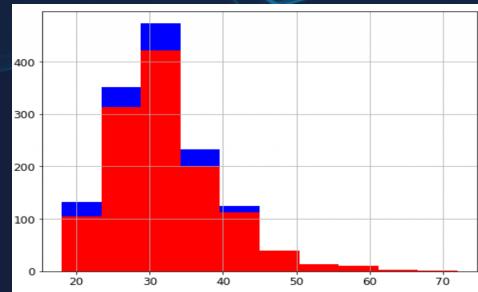
Model Training

Model Serving



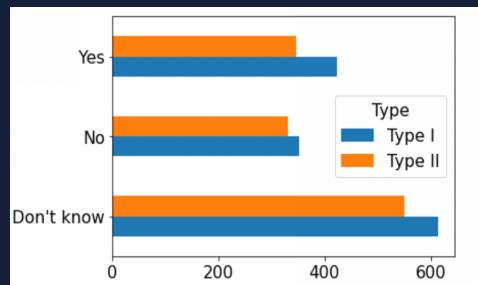
## Data Dashboard

**Key features** of employees with mental health problems

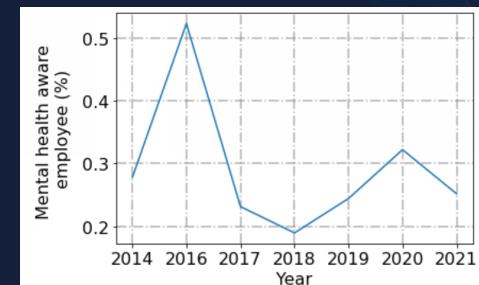


**Company factors** that impact employees mental health

Distribution of Age



Distribution of Gender



Distribution of Remote Work



**Changes** of survey data over time

Mental Health Awareness

Data Changes

Feature Importance

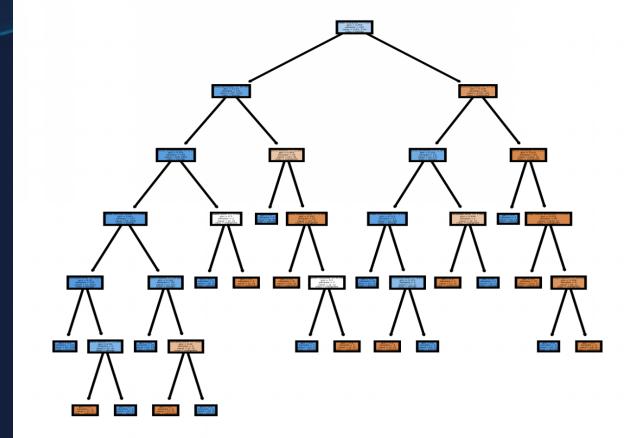


## Predictive Analytics

**Explainable prediction** of employees getting mental health problems

**Applicable** for survey data has a large number of missing values

**Risk quantification** for delivering personalised pastoral care



**Random Forest Model for Explainable Predictive Analytics**

```
array([[0.80046471, 0.19953529, 0.        ],
       [0.80046471, 0.19953529, 0.        ],
       [0.80046471, 0.19953529, 0.        ],
       ...,
       [0.02720948, 0.5838874 , 0.38890312],
       [0.47875669, 0.02001161, 0.5012317 ],
       [0.47875669, 0.02001161, 0.5012317 ]])
```

**Prediction Results**



Mental Healthy



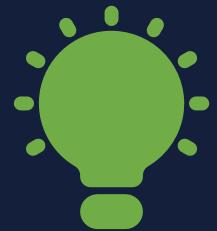
Potential Risk



Has Mental Health Problems



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## Data-Driven Suggestions

**Minimise the mental health problems** by considering all factors

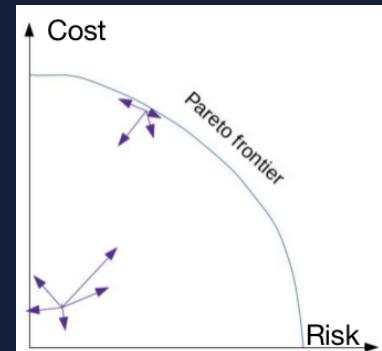
**Feasible** by considering the company's budget and revenue

**Flexible** by considering the nature of different business types

Percentage of risk

Acceptable budget

Other parameters



Optimization Analysis



## Digital Proposal with Support Tools

**Calculating tools** for estimating the cost of multiple proposals

**External API or link** to professional mental health service

**Automation tools** for email or social media



# Judge's Questions

Question 1: How will you ensure that employees data remains anonymous and complies with GDPR laws?

We expect the employees in the same company register with the same code, so they do not leave digital footprint. We also need to encrypt the database to avoid data leakage.



**Jacobs**



# Judge's Questions

Question 2: How will the solution help managers to step in and take action before the mental health of their employees worsens, rather than find out after the fact, at which point it may be harder to help the employee?

Our system predicts the probability of employees getting mental health problems, so we can take intervention when the number is around 0.5.



**Jacobs**



# Judge's Questions

Question 3: How will your visualizations of the data help managers to decide on the best actions to take in order to improve the mental health of employees?

Managers can visualize all the essential statistics of interested questions, so their decision is data driven supported. All the risks and returns are manageable.



**Jacobs**