COMSATS University Islamabad (CUI)

Project Report

for

DATABASE-DRIVEN ANALYSIS OF THE IMPACT OF REMOTE WORK ON MENTAL HEALTH

(Version 1.1)

By

Taha Bin Tazeem **CIIT/SP23-BDS-051/ISB**

Haidar Ali Thaheem **CIIT/SP23-BDS-015/ISB**

Supervisor

Mr. Muhammad Harris

Bachelor of Science in Computer Science (2023-2027)

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Project Category: (Select all the major domains of proposed project**)**

☐ **A-**Desktop Application/Information System	☐ **B-**Web Application/Web Application based Information System	
☐ **C-**Problem Solving and Artificial Intelligence	☐ **D-**Simulation and Modeling	☐ **E-**Smartphone Application
☐ **F-**Smartphone Game	☐ **G-**Networks	☐ **H-**Image Processing
☑ Other (specify category) _____		

- Database Management Systems
- Data Analysis and Visualization
- Mental Health and Well-being
- Remote Work and Productivity

Abstract

Remote work's growing prominence has sparked concerns about its effects on mental health. Existing studies explore this relationship but lack detailed analysis with modern database tools. This project bridges that gap by leveraging MongoDB to analyse employee data, uncovering how remote work influences mental health, stress, and work-life balance. By identifying trends, this project aims to inform organizations on improving employee well-being. Its significance lies in its ability to provide actionable insights, benefiting companies in adapting to remote and hybrid work models effectively.

Introduction

The project aims to explore the relationship between remote work and mental health, motivated by the rise in remote work practices and mental health challenges. By analysing a dataset sourced from Kaggle, the project uses MongoDB to store and query data efficiently. The system processes data related to employee demographics, work conditions, and mental health factors to derive insights. The proposed database system will allow organizations to make data-driven decisions to enhance employee well-being.

Problem Statement

The shift towards remote work has created challenges for organizations in understanding its impact on employees' mental health. Current systems are limited in providing holistic insights from large datasets, often leaving companies without adequate data to address employee stress and improve work-life balance. This project solves this problem by using advanced database queries to analyse the relationship between remote work and mental health.

Problem Solution/Objectives of the Proposed System

The project utilizes MongoDB to query and analyse data on remote work and mental health. Objectives include:

i. Analyse remote work's impact on mental health, stress, and work-life balance.
ii. Enable aggregation queries to identify trends and correlations in the data.
iii. Store query results for visualization and extended analysis.

Objectives:
BO-1: Analyse the relationship between remote work and mental health challenges.
BO-2: Provide actionable data insights for organizations.
BO-3: Develop a scalable MongoDB-based system for employee data analysis.

Related System Analysis/Literature Review

Application Name	Weakness	Proposed Project Solution
Survey Systems	Lack of advanced data processing	Utilizes MongoDB for efficient aggregation queries.
HR Tools	Limited focus on mental health	Focused analysis of mental health and work conditions.
BI Tools	High cost, low customization	Open-source, customizable MongoDB-based solution.

Vision Statement

For organizations analysing the impact of remote work on employee well-being, the Remote Work and Mental Health Database Project is a MongoDB-based system that efficiently processes and analyses employee data. Unlike traditional survey tools, this project provides in-depth aggregation and trend analysis, offering actionable insights to improve work environments.

Scope

The system processes data on demographics, work conditions, and mental health factors using MongoDB. Features include importing datasets, running aggregation queries, and exporting results. Future enhancements may include data visualization and a user-friendly frontend.

Modules

Module 1: Data Import

FE-1: Import CSV data into MongoDB.
FE-2: Verify data integrity.

Module 2: Schema and ERD Designing

FE-1: Understanding the schema.
FE-2: Crafting the ERD.

Module 3: Query Execution

FE-1: Execute pre-defined aggregation queries.
FE-2: Save results as JSON.

Module 4: Result Analysis

FE-1: Analyse JSON outputs for trends.
FE-2: Prepare insights for visualization.

Entities and their Attributes

1. **Employee**

— Employee_ID (Primary Key, varchar)
— Age (int)
— Gender (varchar)
— Job_Role (varchar)
— Industry (varchar)
— Years_of_Experience (int)
— Work_Location (varchar)
— Region (varchar)

2. **Work_Statistics**

— Record_ID (Primary Key, int, Auto-increment)
— Employee_ID (Foreign Key, varchar)
— Hours_Worked_Per_Week (int)
— Number_of_Virtual_Meetings (int)
— Work_Life_Balance_Rating (int, 1-5 scale)
— Company_Support_for_Remote_Work (int, 1-5 scale)

3. **Mental_Health**

— Record_ID (Primary Key, int, Auto-increment)
— Employee_ID (Foreign Key, varchar)
— Stress_Level (varchar, Low, Medium, High)
— Mental_Health_Condition (varchar)
— Access_to_Mental_Health_Resources (varchar, Yes/No)
— Productivity_Change (varchar, Increase, Decrease, No Change)
— Satisfaction_with_Remote_Work (varchar)
— Social_Isolation_Rating (int, 1-5 scale)

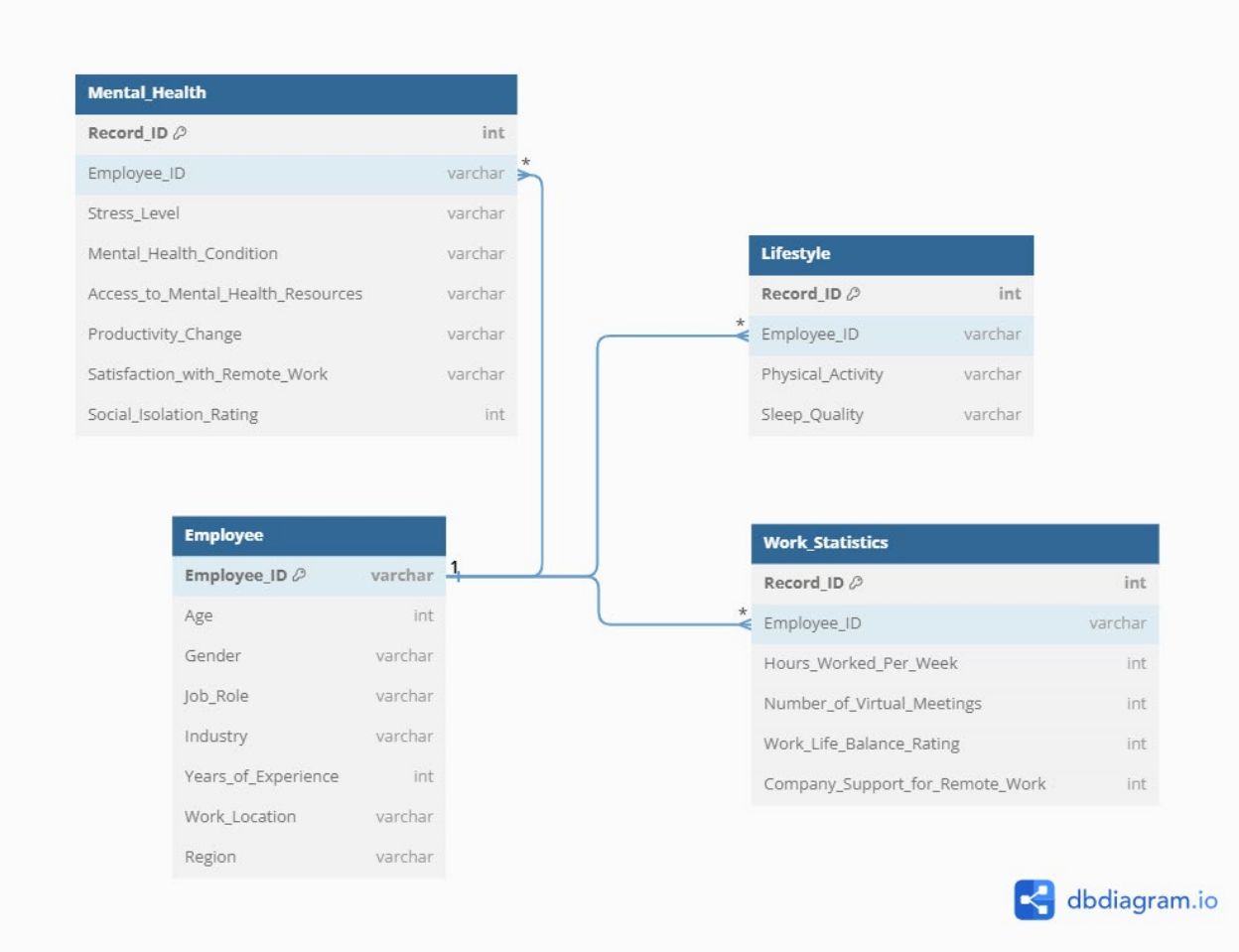
4. **Lifestyle**

— Record_ID (Primary Key, int, Auto-increment)
— Employee_ID (Foreign Key, varchar)
— Physical_Activity (varchar, Daily, Weekly, None)
— Sleep_Quality (varchar, Good, Average, Poor)

Entities and their Relations

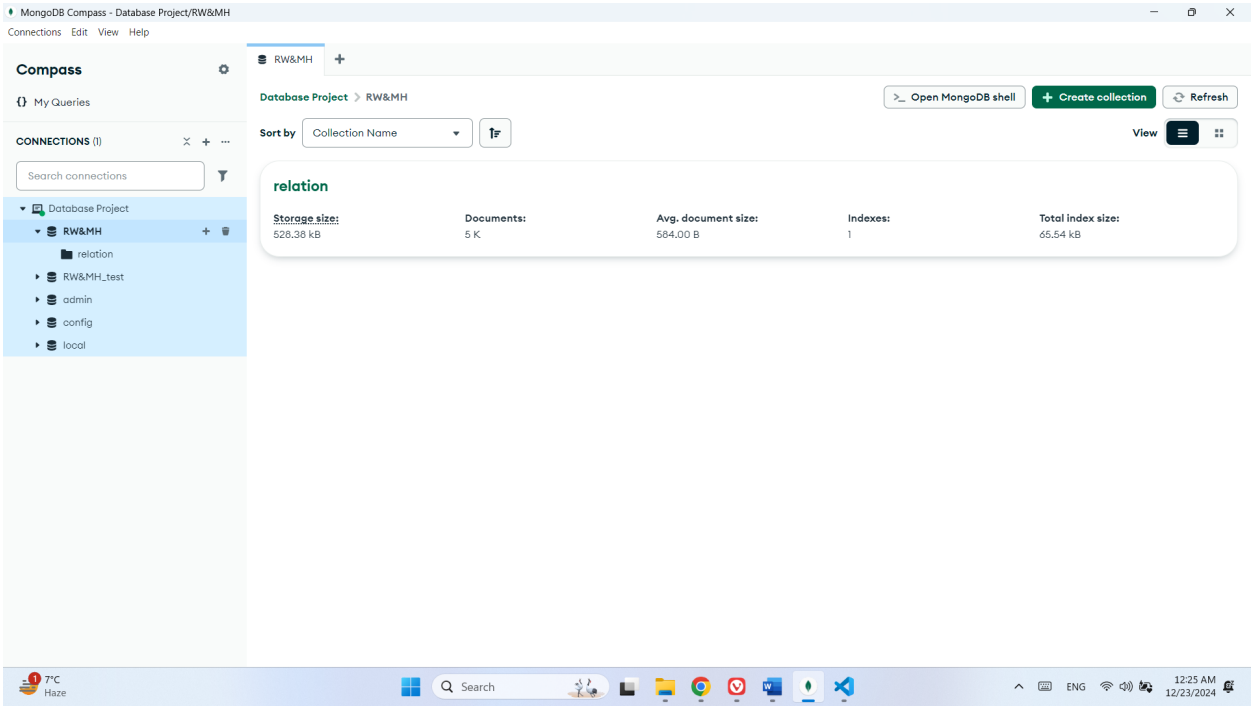
1. **Employee ↔ Work Statistics:** One-to-many relationship, an employee can have multiple work statistics records.
2. **Employee ↔ Mental Health:** One-to-many relationship, an employee can have multiple mental health records.
3. **Employee ↔ Lifestyle:** One-to-many relationship, an employee can have multiple lifestyle records.

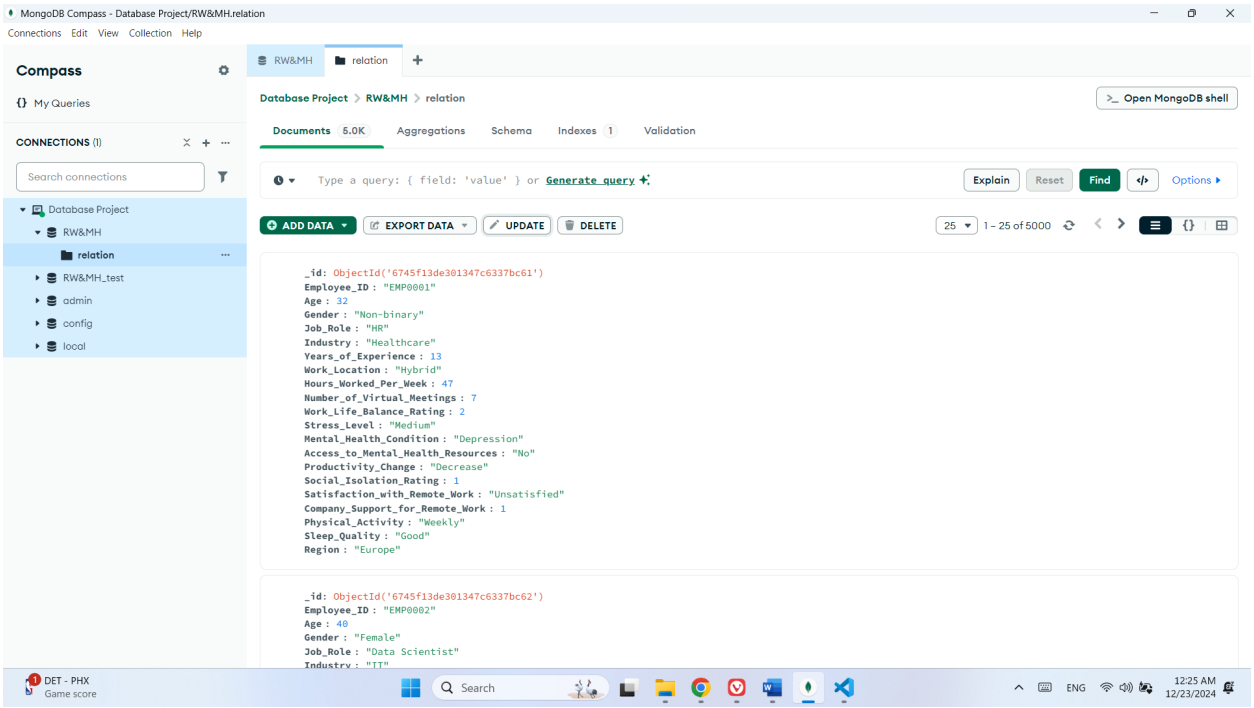
Entity Relation Diagram



Screenshots

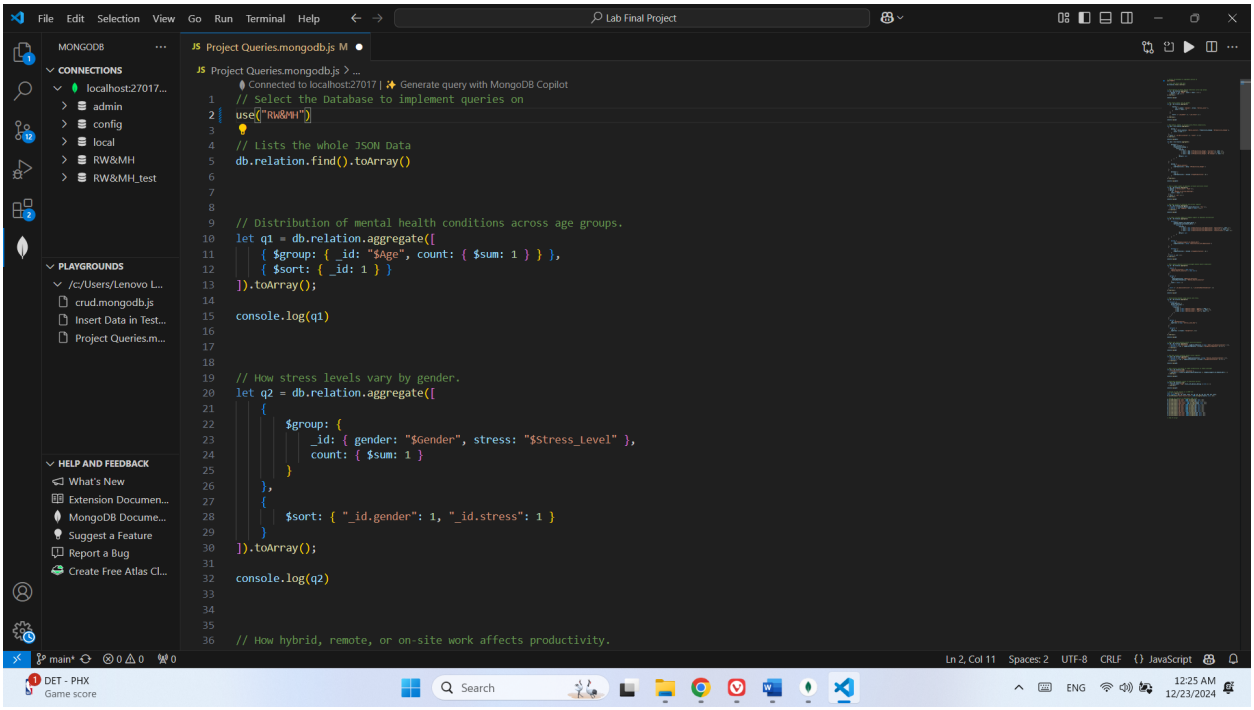
Database Setup





Description: Shows how the dataset appears in MongoDB Compass.

Query Execution

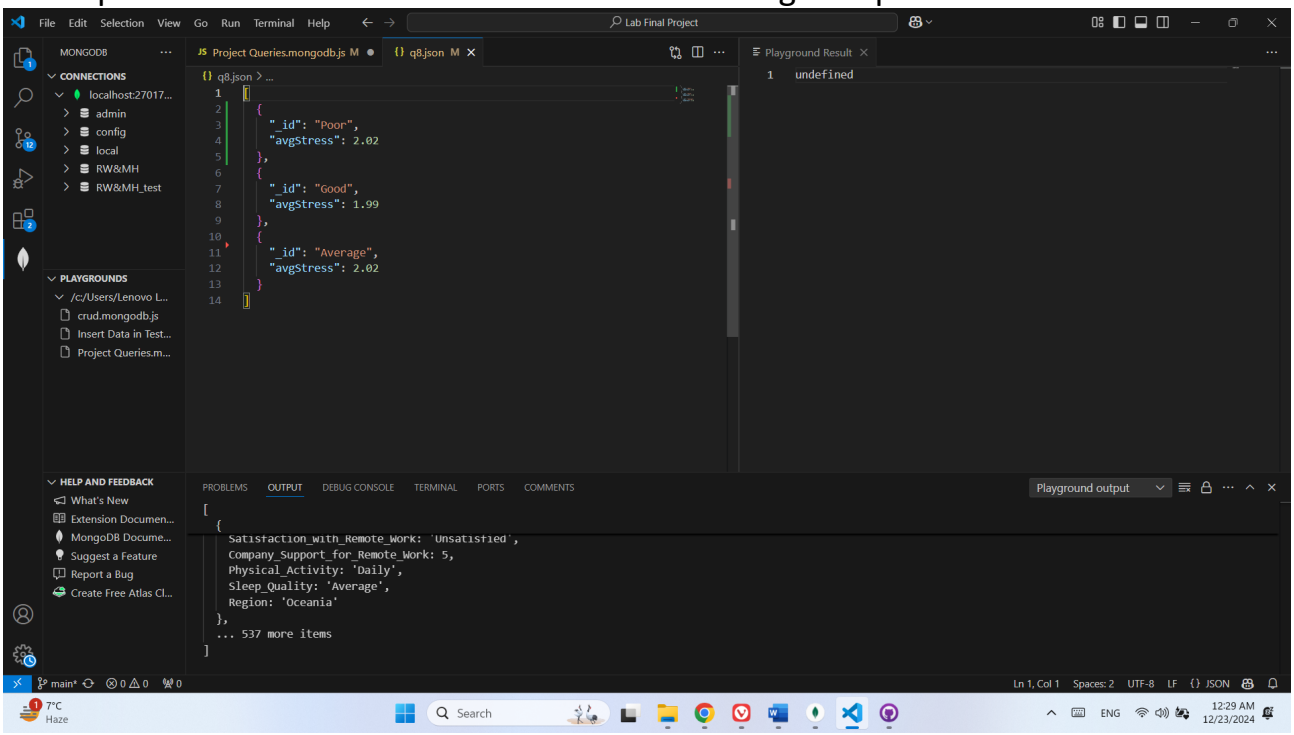


Description: VS Code with query files open

Query Outputs

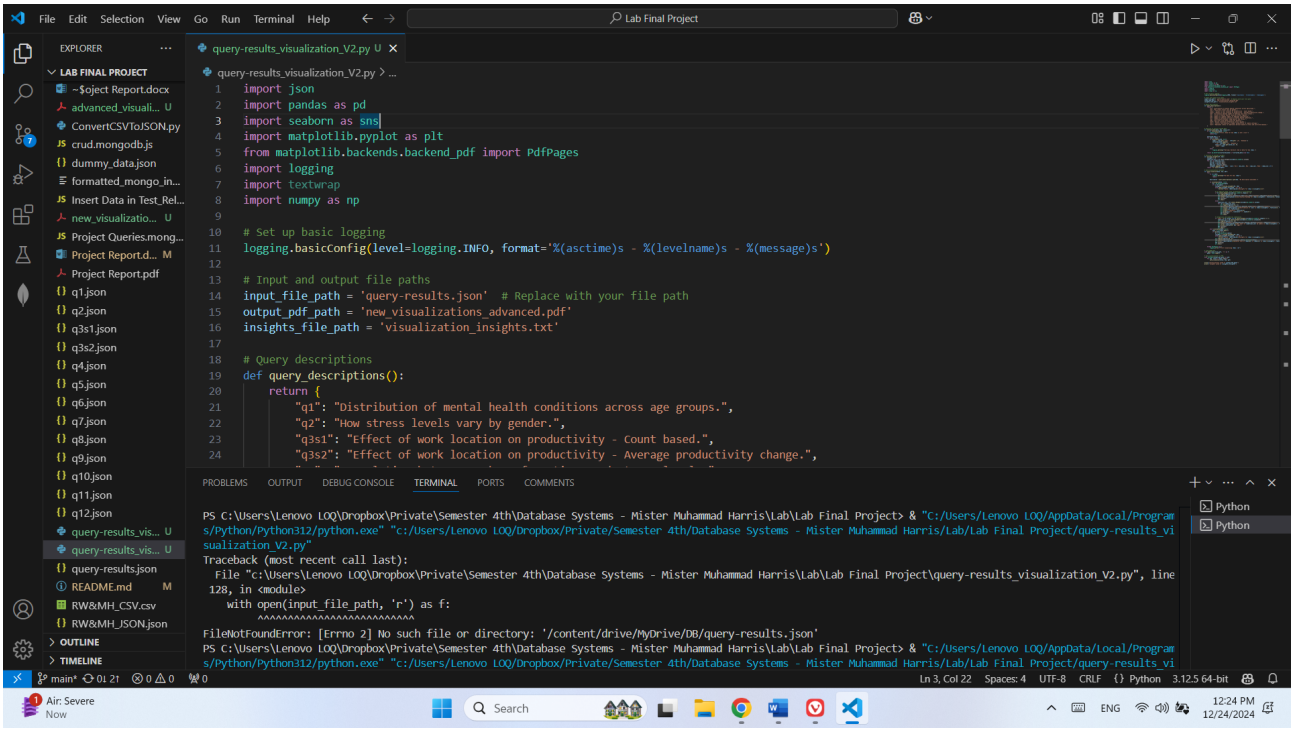
q1	✓	12/23/2024 12:26 AM	JSON Source File	2 KB
q2	✓	12/23/2024 12:26 AM	JSON Source File	2 KB
q3s1	✓	12/23/2024 12:26 AM	JSON Source File	2 KB
q3s2	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q4	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q5	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q6	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q7	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q8	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q9	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q10	✓	12/23/2024 12:26 AM	JSON Source File	1 KB
q11	✓	12/23/2024 12:26 AM	JSON Source File	258 KB
q12	✓	12/23/2024 12:26 AM	JSON Source File	446 KB
query-results	✓	12/23/2024 12:26 AM	JSON Source File	759 KB

Description: JSON files created because of executing the queries.



Description: A sample query result.

Visualizations

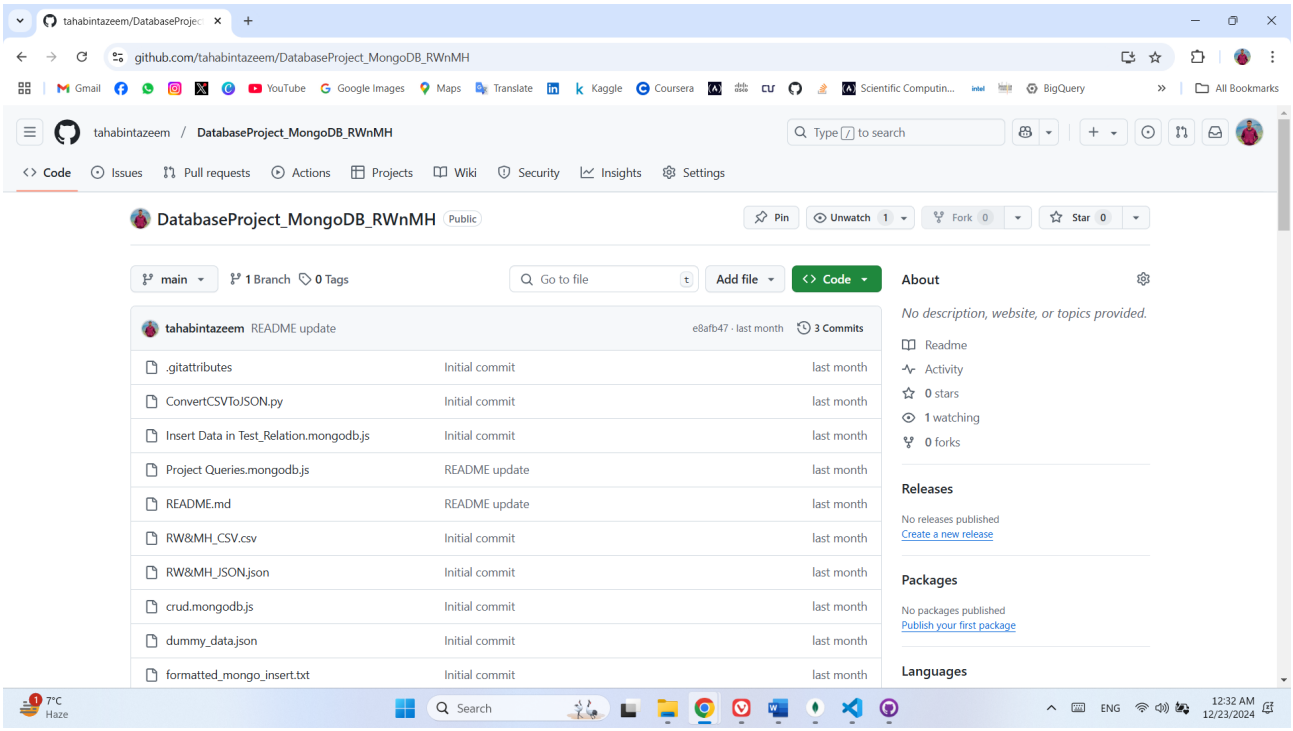


Description: The query results are the visualized for better insights understanding.

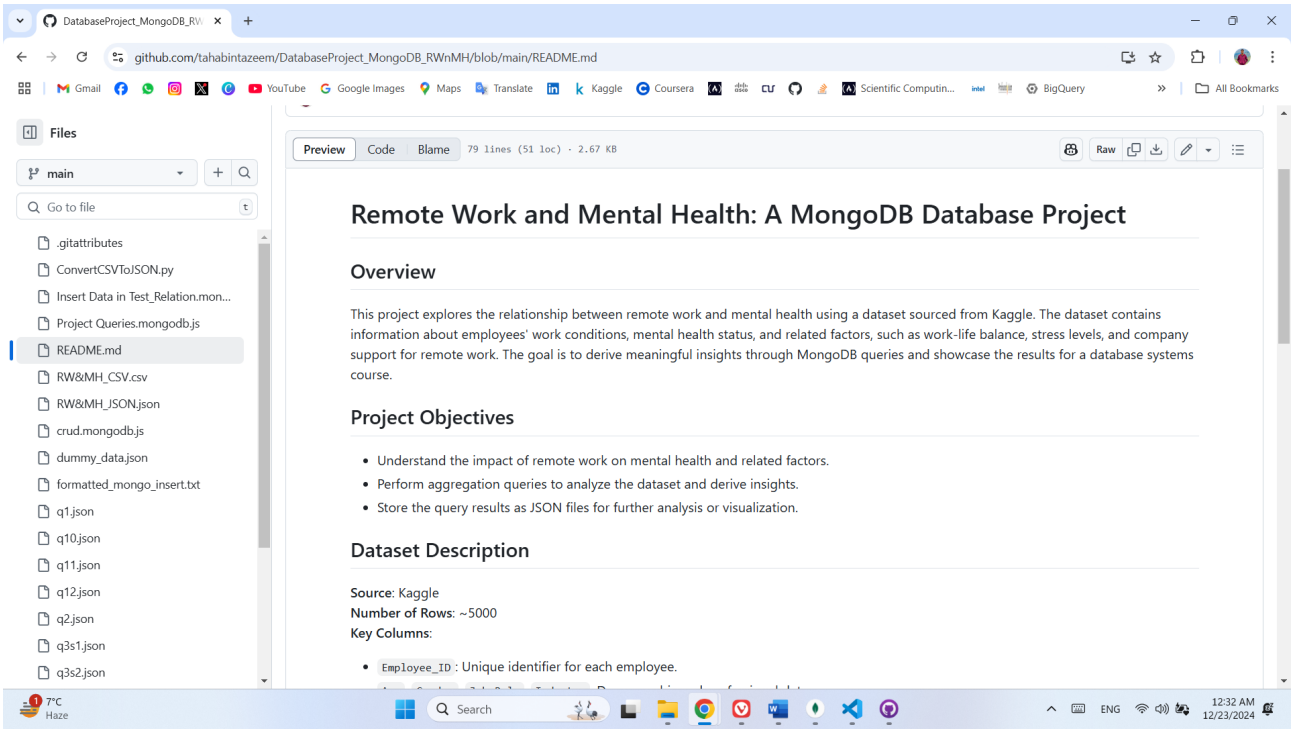
query-results_visualization_V2	✓	12/24/2024 12:26 PM	Python Source File	7 KB
README	✓	12/24/2024 11:49 AM	Markdown Source ...	4 KB
RW&MH_CSV	✓	9/22/2024 11:44 AM	Microsoft Excel Co...	585 KB
RW&MH_JSON	✓	11/26/2024 6:45 PM	JSON Source File	2,693 KB
visualization_insights	✓	12/24/2024 12:26 PM	Text Document	5 KB
visualizations_advanced	✓	12/24/2024 12:26 PM	Chrome HTML Do...	60 KB

Description: The visualizations and their insights are saved in individual files.

GitHub Repository



Description: [GitHub repository](#) structure with README, query files, and results folder.



Description: Open README on GitHub.

System Limitations/Constraints

LI-1: Limited to MongoDB for database operations.
LI-2: Requires high computational resources for large datasets.

Data Gathering Approach

The project utilizes secondary data sourced from Kaggle, processed using MongoDB. Additional insights could be gathered through organizational surveys or interviews for extended analysis.

Tools and Technologies

Tools	Version	Rationale
MongoDB	6.0	Database storage and aggregation queries
Node.js	16.0	Script execution and integration
Python	3.9	Visualization

Module-Based Work Division

Student Name	Registration Number	Responsibility
Taha Bin Tazeem	SP23-BDS-051	Module 1 and Module 3
Haidar Ali Thaheem	SP23-BDS-015	Module 2 and Module 4

References

- Waqi786. “Remote Work and Mental Health Dataset.” Kaggle, 2022. [Online]. Available: https://www.kaggle.com/datasets/waqi786/remote-work-and-mental-health/data
- GitHub Repo of the Project available at: https://github.com/tahabintazeem/DatabaseProject_MongoDB_RWnMH/blob