CHAT APPLICATION DATA ANALYTICS DASHBOARD USING POWER BI

POWER BI PROJECT REPORT

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ABSTRACT

The rapid advancement of communication technology has transformed how people connect, making real-time communication vital. This project focuses on developing a chat application that enables seamless messaging, group chats, media sharing, and video calls. The app includes features like message status tracking and typing indicators to enhance user experience. Security is ensured through phone number authentication and end-to-end encryption, safeguarding user data and privacy.

Using Power BI, the project provides insights into user engagement patterns, media usage, and chat activity across regions. The analysis helps identify trends in messaging types, file sizes, and regional interactions, enabling performance optimization. The ultimate goal is to create a reliable and efficient chat application that meets user needs while maintaining strong data protection

Problem Statement:

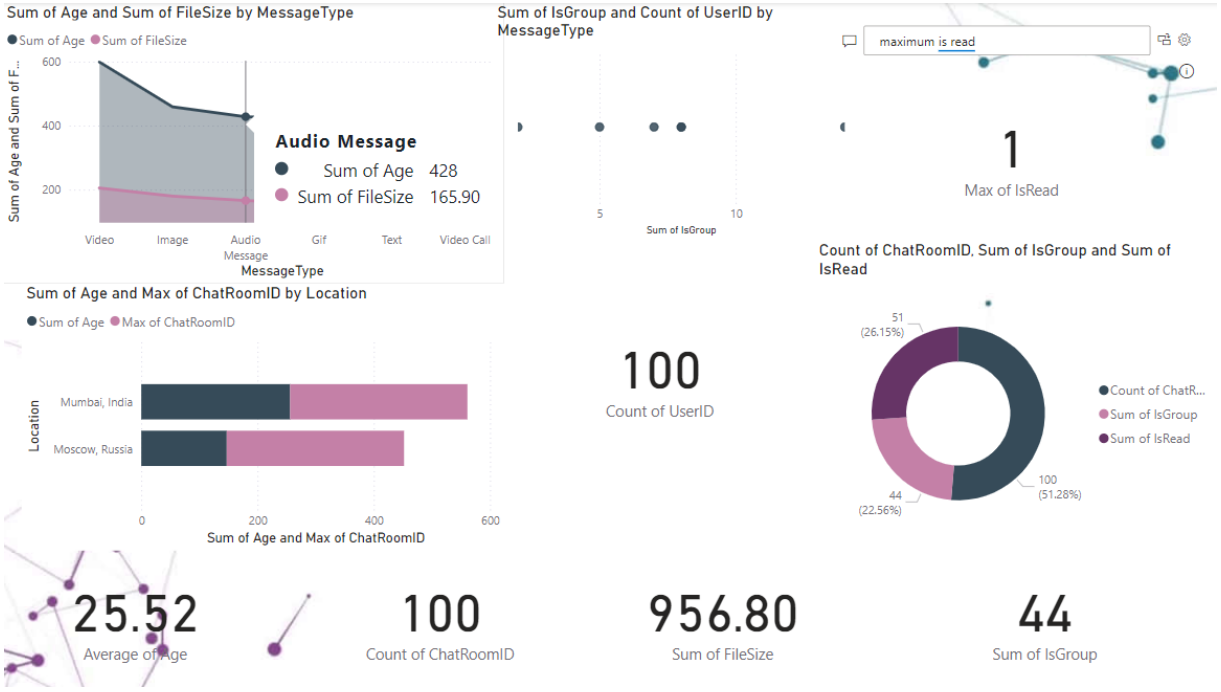
In today's digital world, real-time communication is a crucial aspect of both personal and professional interactions. With the growing demand for seamless, secure, and efficient communication tools, there is a need to develop a versatile chat application that offers more than just basic messaging. Existing solutions often lack features that cater to diverse user needs, such as group chatting, media sharing, and secure message encryption. Moreover, many chat applications struggle with performance issues, especially when handling large media files or high traffic in different geographical regions.

This project aims to address these challenges by developing a comprehensive chat application that includes one-to-one messaging, group chats, media sharing, status updates, and video calls. Additionally, the app will ensure user privacy with secure authentication and end-to-end encryption. By integrating data analytics through Power BI, the application will also provide insights into user behavior, regional activity, and performance, helping developers optimize the app for better scalability, efficiency, and user satisfaction.

1. User Interaction & Media Sharing Dashboard

- **Purpose:** This dashboard analyzes media sharing and message-read behavior, providing insights into user engagement by location, media type, and file size.
- **Key Visuals:**
    - **KPI Tiles:**
        - 9.57 (Average of FileSize), 2552 (Sum of Age), 100 (Count of ChatRoomID), 51 (Sum of IsRead), 100 (Count of UserID): Key metrics summarizing file sizes, user age, chat rooms, and user engagement**.**
    - **Pie Chart for Max of Age and Count of IsRead:** Highlights user engagement based on maximum age, with 23% of messages read by the oldest users.

- **Line & Bar Chart (Sum of Age and UserID by Location):** Displays age and user count across various locations, showing engagement by region.
- **Donut Chart for Median of IsRead by MessageType:** Breaks down engagement by media type (Text, GIF, Audio, etc.).
- **KPI Tiles (Bottom Row):**
  - **956.80 (Sum of FileSize), 30 (Max of Age), 303 (Median of ChatRoomID), 0.51 (Average of IsRead), 11 (Count of UserID):** Additional metrics summarizing file sizes and user behavior.



2. Message Type Dashboard

- **Purpose:**

This dashboard provides an in-depth analysis of user engagement by examining key metrics such as file sizes, message-read patterns, age distribution, and media sharing across various locations and message types. It serves as a tool for developers to assess user behavior and improve system performance based on media interaction trends.

- **Key Visuals:**
  - **KPI Tiles (Top Row):**
    - **9.57 (Average of FileSize):** Shows the average size of media files shared, which helps assess system storage needs.
    - **2552 (Sum of Age):** Total age sum of users, providing insights into user demographics.
    - **100 (Count of ChatRoomID):** Total number of chat rooms being analyzed.
    - **51 (Sum of IsRead):** Total count of messages read across the platform, indicating user engagement.
    - **100 (Count of UserID):** Total number of unique users engaging with the application.
  - **Pie Chart for Max of Age and Count of IsRead:** Highlights the proportion of messages read based on the maximum user age, showing that 23% of messages are read by users of maximum age, while 76.92% are not.
  - **Line & Bar Chart for Sum of Age and Count of UserID by Location:** Compares the sum of user ages and the number of users across different locations such as Berlin, Sydney, Tokyo, etc. This visual allows for geographic analysis of user engagement.
  - **Donut Chart for Median of IsRead by MessageType:** Breaks down the median message-read rates by message type (Audio, Text, Video, GIF, Image), helping understand which media types see the most user interaction.
  - **KPI Tiles (Bottom Row):**
    - **956.80 (Sum of FileSize):** Cumulative size of media files shared across the platform.
    - **30 (Max of Age):** Maximum age of the users engaged.
    - **303 (Median of ChatRoomID):** Median number of chat rooms involved in the analysis.
    - **0.51 (Average of IsRead):** The average rate at which messages are being read across all chat rooms.
    - **11 (Count of UserID):** Another summary of unique user activity within the data scope.

3. Regional Engagement Dashboard

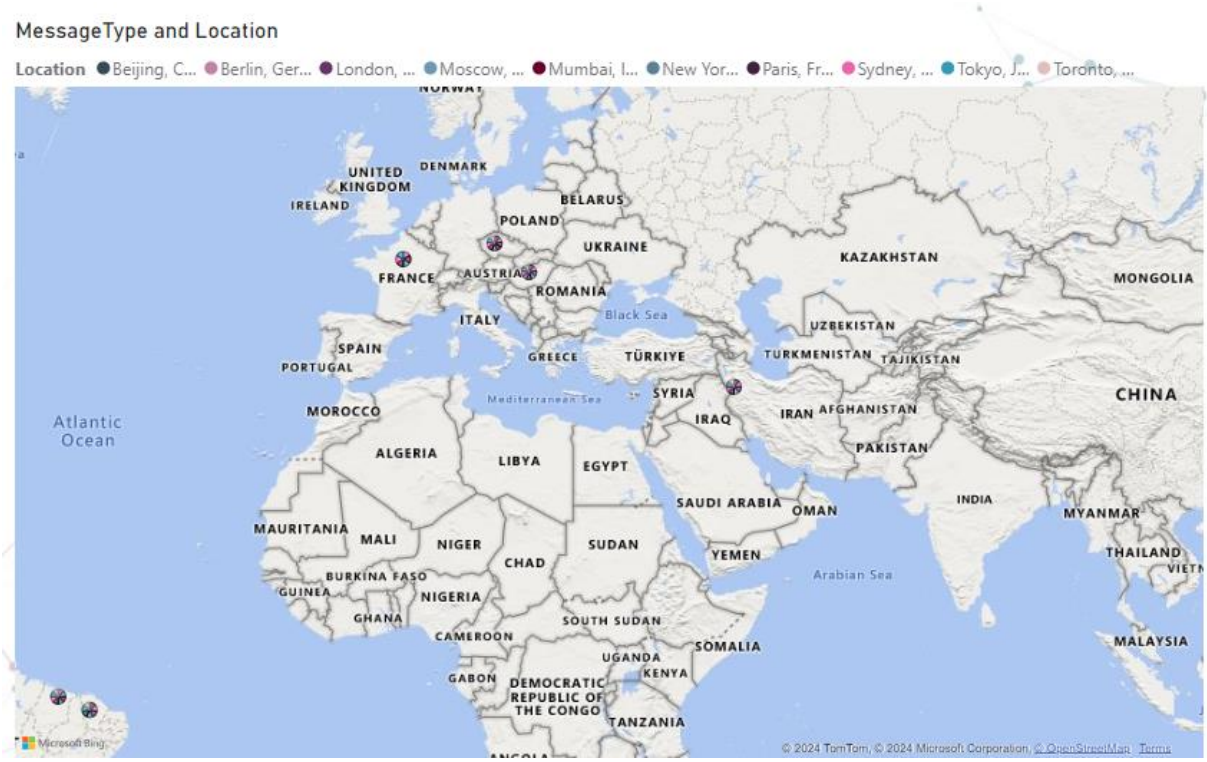
- **Purpose:**

  This dashboard provides insights into user activity across different geographical locations, showing which regions have the highest levels of interaction. It helps in regional server optimization and tailoring features for specific user bases.

- **Key Visuals:**

  - **Pie Chart for User Engagement by Country:**

  Displays the proportion of user activity from selected countries, highlighting which regions have the most interaction. Only key countries are shown, making it easier to focus on regions with significant engagement.



4. Media Interaction & Message Type Analysis Dashboard

- **Purpose:**

  This dashboard focuses on analyzing the interaction between users and different message types across various locations. It aims to provide insights into user engagement based on media type, message-read patterns, and file sizes, which can help developers optimize media handling and improve app performance.

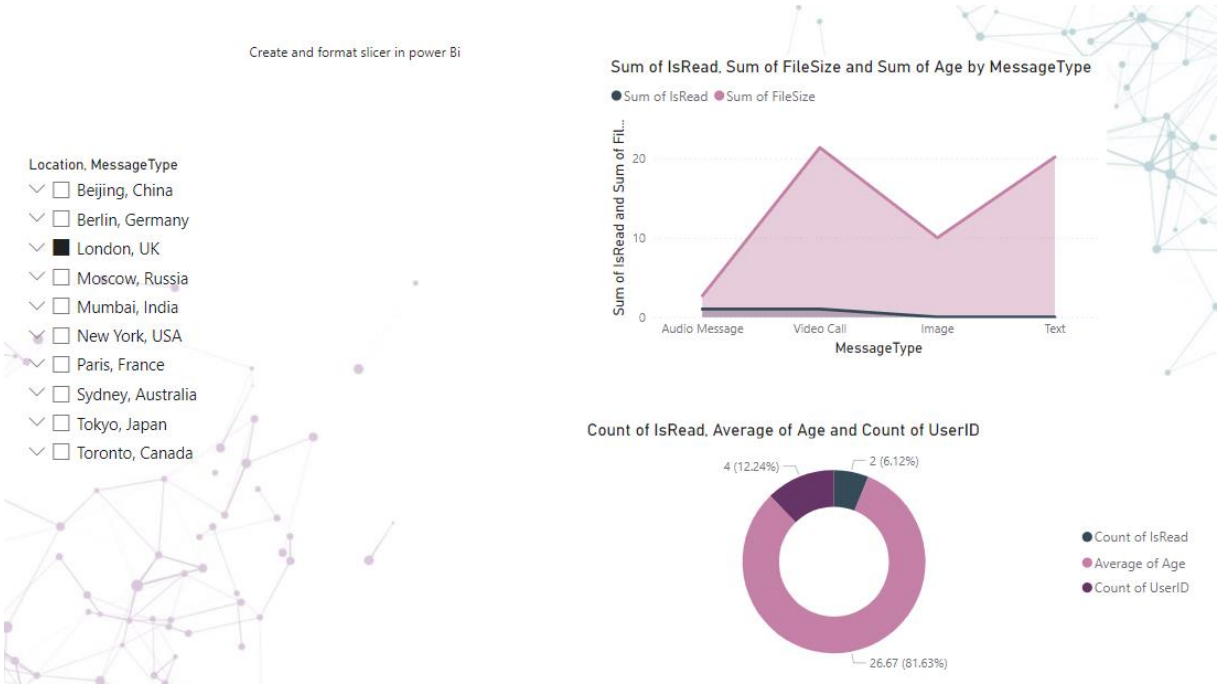
- **Key Visuals:**

  - **Slicer for Location and MessageType:** Allows filtering of the data based on specific locations (e.g., London, Berlin, Beijing) and message types (e.g., Text, Image, Audio Message). This enables users to drill down into the dataset for detailed insights.

  - **Area Chart for Sum of IsRead, FileSize, and Age by MessageType:** Displays the sum of messages read, the total file size, and the user age for various message

types (Audio Messages, Video Calls, Images, and Text). This visual helps identify the relationship between media usage and user engagement.

- **Donut Chart for Count of IsRead, Average of Age, and Count of UserID:** Shows the distribution of messages read, the average user age, and the count of unique users engaging with different message types. This visualization provides a summary of user activity based on these parameters.



5.Media Sharing Dashboard

- **Purpose:**

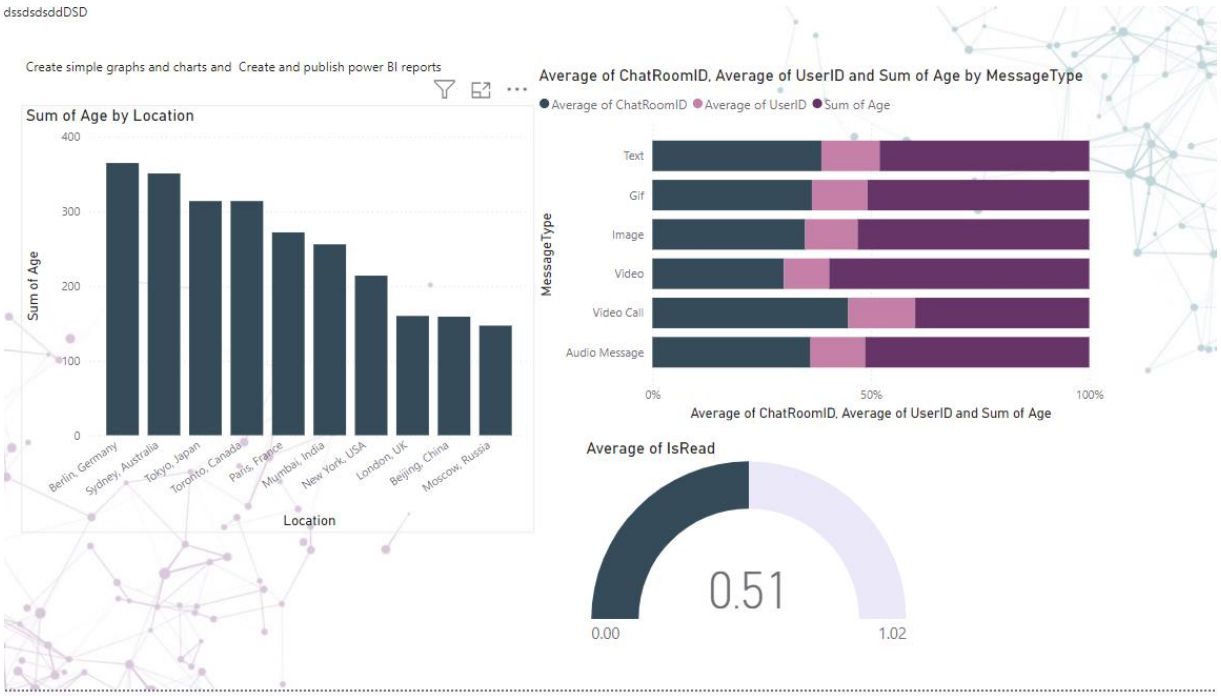
This dashboard tracks user behavior in media sharing activities across different locations and message types. It aims to provide insights into user engagement by examining the types of media shared and overall message reading patterns.

- **Key Visuals:**

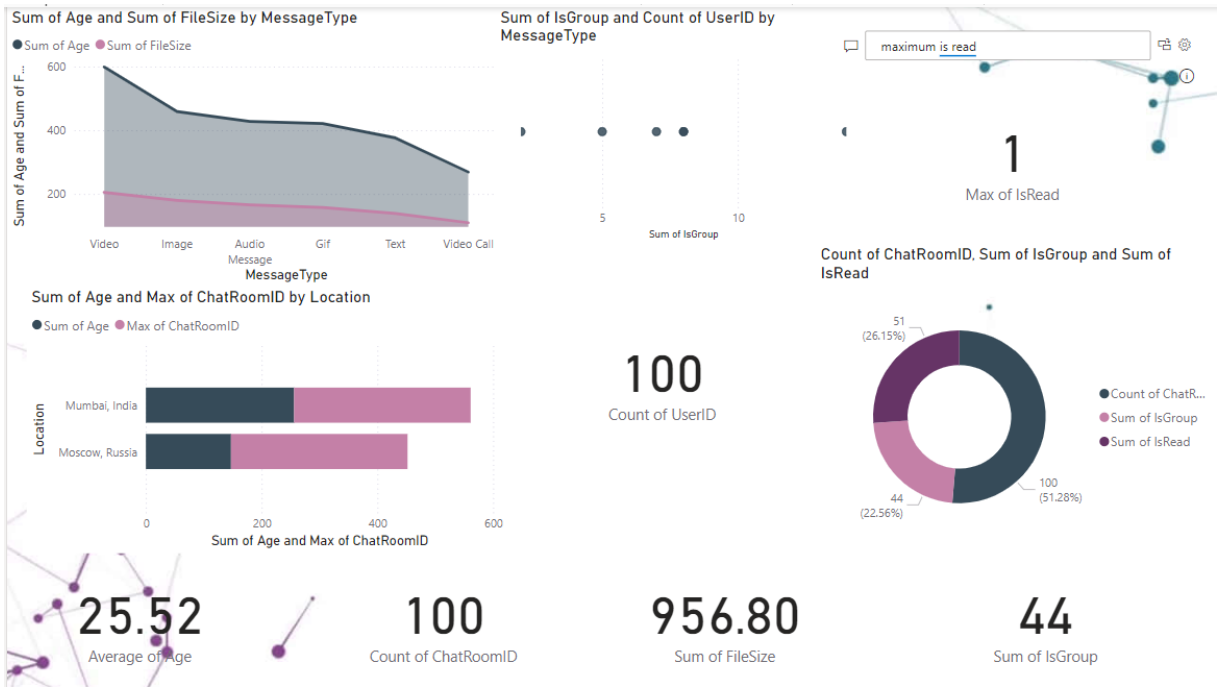
  - **Bar Chart for Sum of Age by Location:** Shows the distribution of users' ages across various locations such as Berlin, Sydney, Tokyo, and more. This helps in analyzing age demographics in media sharing by region.

- **Bar Chart for Message Types:** Displays the average ChatRoomID, UserID, and sum of age for different message types (Text, GIFs, Images, Videos, Video Calls, and Audio Messages), which helps understand what types of media are most shared based on user attributes.

- **Gauge for Average of IsRead**: Highlights the proportion of messages read by users, which stands at 0.51 in this instance. This helps in tracking user engagement and responsiveness.



Overall Dashboard Creations



Conclusion

The *Chat Application* project provides a secure and feature-rich communication platform, offering key functionalities like one-on-one messaging, group chats, media sharing, and video calls, while ensuring user privacy through authentication and end-to-end encryption. The app delivers a seamless user experience, enabling real-time communication with efficient data protection mechanisms. By focusing on intuitive design and smooth performance, the application meets the growing need for versatile communication tools in today's digital environment.

The integration of Power BI has played a crucial role in analyzing user engagement, message types, and chatroom activity across different regions. With dashboards like User Activity, Message Type, and Regional Engagement, the project utilizes Power BI's powerful data visualization and analytics features to extract meaningful insights. These operations allow for real-time monitoring of user behaviour, identifying areas for optimization such as server load management and media handling improvements. By leveraging Power BI, the application is equipped to make informed, data-driven decisions that enhance performance, scalability, and overall user satisfaction.