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**DRAFT PROJECT PROPOSAL FORM**

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**Program Name :** Bachelor’s in Software Engineer (SE)

**Title of project :** A Comprehensive Health Advisory Website: Tracking and Preventing Infectious Diseases in Malaysia

**Please record which module(s) your topic is related to:**

Programming for Data Analysis (CT127-3-2-PFDA)

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# 1.0 Introduction

Our country, Malaysia faces significant public health challenges due to infectious diseases such as dengue, COVID-19, and influenza. These illnesses can lead to serious health problems and place a considerable strain on the healthcare system. Therefore, it’s essential to monitor and manage these diseases effectively to reduce their impact and ensure public safety. The Malaysian healthcare sector is continuously adapting to meet these challenges, using technology to improve disease monitoring and raise public awareness. Despite these efforts, there remains a critical need for accessible, real-time information to help the public understand disease trends, preventive measures, and available healthcare resources. This underscores the necessity for innovative solutions that provide timely and accurate health information to the public.

This project seeks to develop an interactive web application using R and Shiny, which will analyze and visualize the healthcare situation in Malaysia. The application will offer users current information on infectious diseases, including their prevalence in specific areas, guidelines for prevention, and the locations of nearby healthcare facilities. By converting complex data into actionable insights, this platform aims to empower individuals to make informed health decisions. To accomplish this, extensive research will be conducted to gather and analyze data on infectious diseases, understand user needs, and determine the most effective ways to present this information. This will involve exploring various data sources, such as government health records, epidemiological studies, and real-time disease reporting systems. Additionally, the platform will be designed with user-friendly principles to ensure it is intuitive and accessible to a broad audience.

Through this comprehensive approach, the project aims to bridge the gap between data and public health action, ultimately contributing to improved disease prevention and management in Malaysia.

# 2.0 Problem Statement

1. **Underreporting and Data Gaps:** Inaccurate or incomplete reporting of infectious disease cases is a significant issue. This problem stems from insufficient infrastructure for real-time data collection and reporting, leading to gaps in surveillance data. Without accurate data, it is challenging to track disease trends and predict outbreaks, which hampers effective response strategies.

2. **Limited Public Awareness:** Public knowledge about infectious diseases and their prevention remains inadequate. Despite information campaigns, many individuals lack access to real-time, accurate information about disease trends and prevention measures. This gap can lead to poor compliance with preventive practices and increased disease transmission.

3. **Resource Allocation:** The efficient allocation of healthcare resources is critical in managing infectious diseases. However, without real-time data, it is difficult to identify areas most in need of medical supplies, vaccines, and healthcare personnel. This inefficiency can lead to overburdened healthcare facilities in high-incidence areas, negatively impacting patient care.

4. **Technological Barriers:** While there are advancements in technology, many existing platforms do not integrate real-time data effectively. For example, applications like MySejahtera focus primarily on contact tracing and vaccination status but may not provide comprehensive data on disease prevalence and healthcare resource availability. Additionally, not all platforms are user-friendly, which can limit their effectiveness in disseminating information to a broad audience.

# 3.0 Project Aim and Objectives

This project aims to develop an interactive web application using R and Shiny to analyze and visualize infectious disease trends in Malaysia, enhancing public awareness and decision-making by providing real-time, accessible health information and leveraging data analysis and visualization techniques.

The objectives of this project are:

1. **Develop a User-Friendly Web Application:**
   * Create a robust, user-friendly platform using R and Shiny that integrates multiple data sources to provide real-time information on infectious diseases in Malaysia.
2. **Implement Data Aggregation and Visualization:**
   * Design and implement algorithms for data aggregation and real-time processing.
   * Develop interactive visualizations that display disease trends, prevalence, and healthcare facility locations.
3. **Enhance User Experience:**
   * Conduct user research and usability testing to ensure the platform meets the needs of its users.
   * Incorporate feedback to refine the interface and improve accessibility and usability.
4. **Provide Comprehensive Health Information:**
   * Curate and present up-to-date information on preventive measures and healthcare resources.
   * Develop educational content to enhance public understanding of infectious diseases and their management.
5. **Ensure Platform Scalability and Sustainability:**
   * Implement scalable data processing and storage solutions to handle increasing data volumes.
   * Plan for long-term maintenance and updates to keep the platform relevant and effective.

By achieving these objectives, the project aims to contribute to improved disease prevention and management, empowering individuals to make informed health decisions and enhancing public health outcomes in Malaysia.

# 4.0 Literature Review

Effective disease surveillance systems are crucial for monitoring and controlling the spread of infectious diseases. The Health Ministry of Malaysia has implemented various initiatives to enhance disease tracking and reporting, such as the e-Dengue system, which provides real-time data on dengue cases (Ministry of Health Malaysia, 2020). Research highlights the importance of integrating real-time data to enable timely responses to disease outbreaks (Ministry of Health Malaysia, 2020). However, these systems often face challenges related to data integration and accessibility for the public, which can hinder their effectiveness.

The application of technology in public health has shown promising results in improving health outcomes. Mobile and web-based applications, such as the Dengue Patrol initiative, have been effectively utilized to disseminate information about dengue prevention and control measures (WHO, 2020). Similarly, during the COVID-19 pandemic, the MySejahtera app was developed to assist in monitoring the spread of the virus and managing vaccination efforts (MySejahtera, 2021). While these apps have been effective in specific contexts, there remains a need for a more comprehensive platform that addresses a broader range of infectious diseases and integrates multiple data sources (Johns Hopkins University, 2020).

Interactive platforms for health advisory services have gained popularity for their ability to engage users and provide personalized health information. Research indicates that web-based platforms can effectively deliver health education and support behavioral changes (Lee et al., 2013). For instance, the SISFORNUTRIMIL app designed for maternal nutrition has demonstrated significant positive impacts on dietary diversity and maternal health outcomes (Koeryaman et al., 2023). However, these platforms often lack real-time data integration and comprehensive disease tracking features, which are crucial for managing infectious diseases (Chaudhari et al., 2023).

Integrating real-time data and presenting it in a user-friendly format is essential for effective disease surveillance and public health management. Studies on data visualization techniques emphasize the importance of clear and interactive visualizations in enhancing user understanding and engagement (TechTarget, 2022). Tools like the Johns Hopkins COVID-19 Dashboard have set a benchmark for real-time data visualization, providing critical insights into the pandemic’s progression (Johns Hopkins University, 2020). Such tools highlight the potential of data visualization in public health and underscore the need for similar applications tailored to the Malaysian context (Brown, 2020).

The success of health applications largely depends on their usability and accessibility. User-centered design principles, which focus on understanding and meeting user needs, are crucial for developing effective health platforms (UX Design Institute, 2023). Research suggests that involving users in the design process and conducting usability testing can significantly improve the usability and effectiveness of health applications (Nielsen Norman Group, 2021). This approach ensures that the platform is intuitive, engaging, and capable of delivering the intended health benefits to a diverse user base.

In conclusion, existing literature underscores the importance of integrating real-time data, leveraging technology for public health interventions, and employing user-centered design principles. While there are several successful examples of disease surveillance systems and health advisory platforms, there is a clear need for a comprehensive solution that combines these elements to address the dynamic nature of infectious diseases in Malaysia. This project aims to fill this gap by developing an interactive web application using R with Shiny, providing real-time information, actionable insights, and educational content to empower individuals and enhance public health outcomes.

# 5.0 Deliverables

1. **User Registration and Authentication System:**

Implement a secure user registration and login system to manage user access to the application, ensuring data privacy and security.

1. **Real-Time Data Integration and Visualization:**

Develop algorithms to aggregate and process real-time data from multiple sources, including government health records, epidemiological studies, and real-time reporting systems.

Create dynamic visualizations to display disease trends, prevalence in specific areas, and locations of nearby healthcare facilities.

1. **Informational Dashboard:**

Design a comprehensive dashboard that provides users with up-to-date information on infectious diseases, including preventive guidelines and relevant statistics. This dashboard will serve as the central interface for users to access all the features of the application.

1. **Educational Content:**

Curate and integrate educational resources, such as articles, videos, and infographics, to inform users about preventive measures and healthcare resources. This content will help raise public awareness and educate users on how to protect themselves from infectious diseases.

1. **Feedback Mechanism and User Support:**

Implement a system for users to provide feedback on the platform, report issues, and suggest improvements. This mechanism will ensure continuous improvement of the platform based on user input and enhance user satisfaction.

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