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Body Builder Chatbot

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BODY BUILDER CHATBOT

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ABSTRACT

This project aims to develop a chatbot for bodybuilding enthusiasts. There are bodybuilders that do not have access to bodybuilding information, face budget constraints and without proper guidance. All of these reasons will lead them to use incorrect methods during their bodybuilding process. With the development of this chatbot, these problem can be overcome. The chatbot will be able to provide information on exercises, training routines, and nutrition plans. The chatbot will be trained on a dataset of bodybuilding information and will utilize natural language processing techniques to understand and respond to user queries. The goal of this project is to provide an accessible and convenient tool for individuals to improve their bodybuilding knowledge and progress. The implementation and testing of the chatbot demonstrates its effectiveness in accurately understanding user queries and providing relevant and reliable information. With future works including expanded features, multilingual support, and integration with wearable devices, the chatbot holds great potential to further assist users in their bodybuilding journeys and contribute to their overall fitness goals.

ABSTRAK

Projek ini bertujuan untuk membangunkan chatbot untuk peminat bina badan. Terdapat ahli bina badan yang tidak mempunyai akses kepada maklumat bina badan, menghadapi kekangan bajet dan tanpa bimbingan yang betul. Semua sebab ini akan menyebabkan mereka menggunakan kaedah yang salah semasa proses bina badan mereka. Dengan perkembangan chatbot tis, masalah ini dapat diatasi. Chatbot akan dapat memberikan maklumat tentang senaman, rutin latihan dan rancangan pemakanan. Chatbot akan dilatih mengenai set data maklumat bina badan dan akan menggunakan teknik pemprosesan bahasa semula jadi untuk memahami dan menjawab pertanyaan pengguna. Matlamat projek ini adalah untuk menyediakan alat yang mudah diakses dan mudah untuk individu meningkatkan pengetahuan dan kemajuan bina badan mereka. Pelaksanaan dan ujian chatbot menunjukkan keberkesanannya dalam memahami pertanyaan pengguna dengan tepat dan menyediakan maklumat yang relevan dan boleh dipercayai. Dengan kerja masa hadapan termasuk ciri yang diperluas, sokongan berbilang bahasa dan penyepaduan dengan peranti boleh pakai, chatbot mempunyai potensi besar untuk membantu pengguna dalam perjalanan bina badan mereka dan menyumbang kepada matlamat kecergasan keseluruhan mereka.

CHAPTER 1

INTRODUCTION

1.1 Background

Bodybuilding is the use of progressive resistance exercise to control and develop one's muscles (muscle building) by muscle hypertrophy for aesthetic purposes (Emery, 2003). It is distinct from similar activities such as powerlifting because it focuses on physical appearance instead of strength. An individual who engages in this activity is referred to as a bodybuilder. There are several types of body builders which are natural body builders, recreational body builders, competitive body builders, physique competitors and strength athletes. They are conducting body building towards some common goals such as pursuing hobby, increasing muscle size, improving overall health and fitness, achieving a certain physique, and competing in body building or fitness competitions. There are several types of body building. This include classic bodybuilding which focuses on symmetry, powerlifting which focuses on strength, bodyweight training which emphasizes on using body weight as resistance to build strength and muscle, and bodybuilding for women which is a specialized form of bodybuilding that focuses on building strength and lean muscle mass while preserving femininity. In reality, body building is not restricted to male only and in fact there are female that are conducting body building as well. Figure 1.1 shows the demographic of body builder apprentice gender (BODY BUILDER APPRENTICE DEMOGRAPHICS AND STATISTICS IN THE US, 2023) from year 2010 to year 2019 in United States.

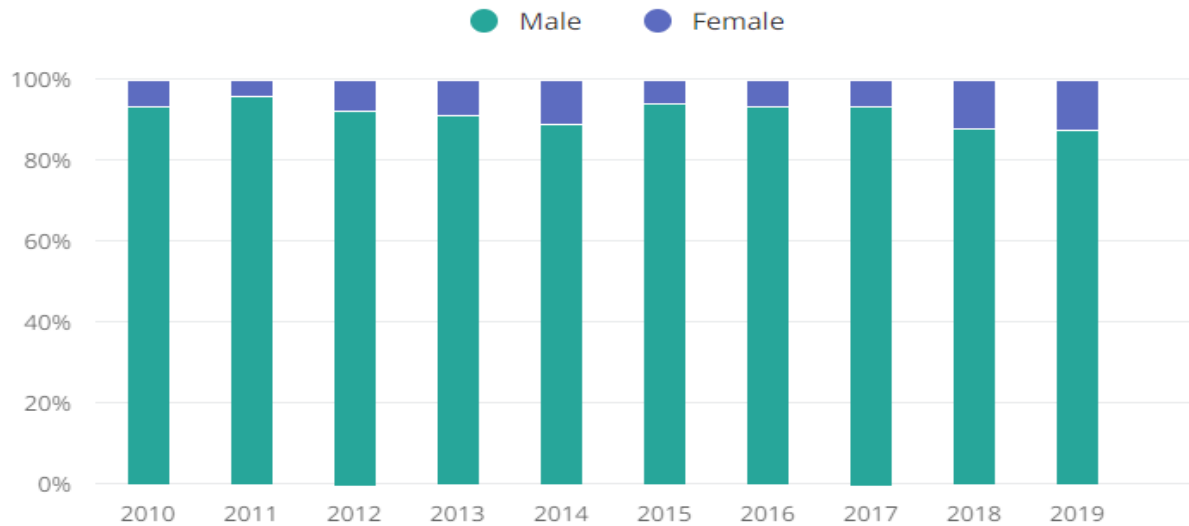


Figure 1.1: Demographic of Body Builder Apprentice Gender Over Time

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision (Burns, 2023). Natural language processing (NLP) is a branch of artificial intelligence that helps computers understand, interpret and manipulate human language. Machine learning (ML) is a field of inquiry devoted to understanding and building methods that 'learn', that is, methods that leverage data to improve performance on some set of tasks (Mitchell, 1997). Machine learning and NLP are crucial components in the development of a chatbot. Chatbot is a software application designed to simulate conversation with human users, especially over the internet. Machine learning algorithms are used to train the chatbot to understand and generate responses to user inputs, while NLP techniques are employed to process and analyze human language. The chatbot uses NLP to interpret the intent and meaning behind a user's message, and machine learning to generate an appropriate response. With the implementation machine learning to the chatbot, the chatbot can mimic real-life conversations through neural networks. To enhance the performance of the chatbot, NLP solution can be applied to it to add more features to the chatbot.

1.2 Problem Statement

There are bodybuilders who lack instant access to information and immediate advice, which can lead them to use incorrect methods during their bodybuilding process. This results in inadequate training and an increased risk of injury. Some bodybuilders also lack internet connection at home, making it challenging for them to obtain information about proper form and techniques for bodybuilding. Without knowledge of the most effective exercises, sets, and reps, they may struggle to optimize their workouts and achieve their desired results. For instance, some bodybuilders may have equipment at home but fail to use it properly, thereby increasing the risk of injury due to incorrect or dangerous techniques.

Furthermore, some bodybuilders face budget constraints that prevent them from seeking a personal trainer or lack transportation to a gym facility. Tight budgets make it difficult for them to access the necessary support and guidance needed to reach their goals. Additionally, working with a personal trainer requires allocating time for training sessions and regular meetings, which can be inconvenient for some bodybuilders.

Besides that, bodybuilders require a specific balance of macronutrients and caloric intake to support their training and achieve their goals. Without proper guidance, they struggle to meet these needs. They are not consuming the correct portion of the food and not following the diet accordingly. This led to slow progress and they end up not being able to build up their muscle efficiently.

1.3 Project Objectives

The main objective is to:

- i. To study and analyse the process of bodybuilding.
- ii. To design and develop a mobile chatbot application for providing advice to body builder.
- iii. To evaluate the chatbot module in terms of information delivery.

1.4 Scope of Project

The chatbot mobile application will be exclusive for android platform only. The proposed body builder chatbot mobile application target is to be used by the body builders to assist them during their body building process in terms of physical training guidelines and their food consumption. Besides, the chatbot is a retrieval-based chatbot which has repository of responses that is prepared. Retrieval-based chatbots use techniques like keywords matching, machine learning or deep learning to identify the most appropriate response. Regardless of the technique, these chatbots provide only predefined responses and do not generate new output (Fainchtein, 2020). It could not answer or recognise queries which do not exist in the database.

1.5 Brief Methodology

In this development of this project, a suitable methodology chosen for this project is Rapid Application Development (RAD). RAD basically follows a cyclical process that includes four steps. The steps are illustrated in Figure 1.2.

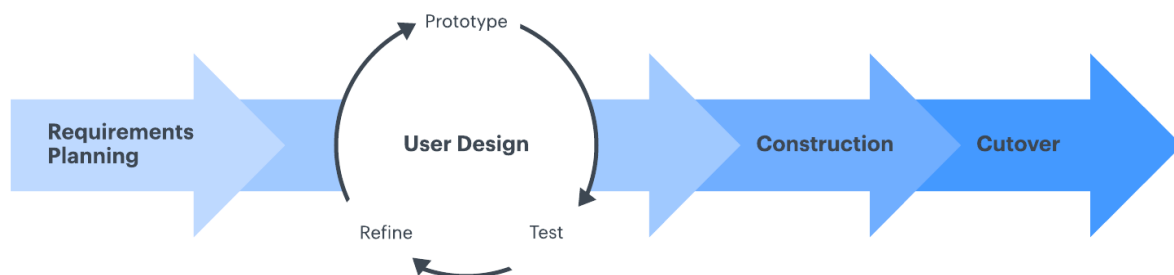


Figure 1.2: Rapid Application Development methodology

The first step is planning requirements. This is the initial stage of the development where a rough requirement planning takes place. The channel or platform for this chatbot should be on mobile platform. Then, the application requirements are identified from the paper research of making chatbot. The most important is to identify the chatbot development platform as the whole project will be built on the platform. The additional platform to cater to the requirement of NLP techniques also needs to be identified in this phase as it is fundamental for the chatbot development.

After the planning stage is designing the model and prototype of the chatbot. It will emphasize the chatbot system architecture. The testing will take place and the development continues with the refinement of the criteria in the chatbot. The process will be repeated as the project evolves.

Next is the rapid construction. Once the chatbot system design has begun, the construction of the chatbot will begin where the actual application coding, implementation, testing will take place. It will be repeated as often as necessary until the chatbot meet the needs of the project.

Lastly is the transition process or called as a final cutover stage. Until this step, the components of the chatbot system will be moved to a live production environment.

1.6 Significance of Project

The proposed mobile application aims to provide a consultation process for individuals who want to build their bodies. The chatbot module will offer proper guidance to bodybuilders based on their inquiries. The services provided to bodybuilders will be free of charge and will be used to promote general health to the public. The consultation process will be conducted through

the mobile application, requiring only an internet connection for access. Additionally, the chatbot services will be available 24/7 to users for the consultation process.

1.7 Project Schedule

Figure 1.3 shows the project schedule illustrated in a Gantt Chart Diagram for this project.

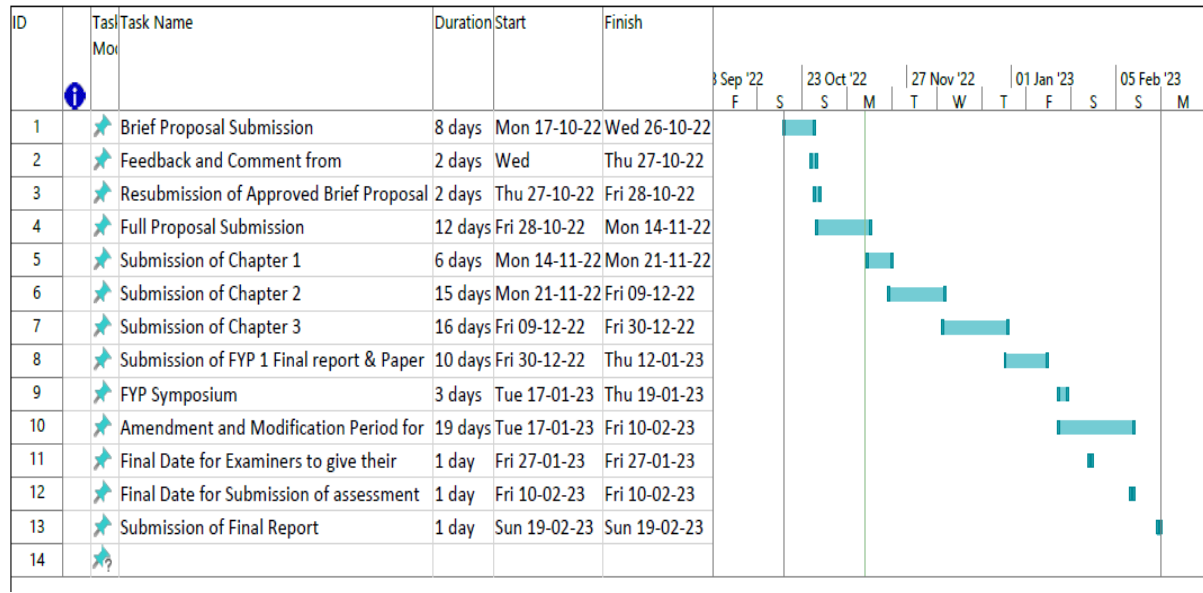


Figure 1.3: Gantt Chart Diagram for Prototype Development Phase

1.8 Expected Outcomes

At the end of the project, the expected outcome would be:

- A body builder chatbot mobile application is developed.
- A prototype of a chatbot model that manage to provide system chat response accurately.

1.9 Project Outline

Chapter 1: Introduction

This chapter provides general explanation about the project. It includes the background of the project, problem statement, objectives, project scope, methodology, expected outcome, significance of the project and project schedules.

Chapter 2: Literature Review

This chapter discusses the review and study done on similar existing systems. Comparisons between existing systems are made to evaluate the advantages and shortcomings of each system, thereby providing a clear view for the features and functionalities to be included in the proposed system.

Chapter 3: Requirement Analysis and Design

This chapter describes the methodology used in resolving the problem. This section also covers the analysis and design for the solution. The overall processes, functions, features and interface will act as guidelines for the whole project.

Chapter 4: Development and Implementation

This chapter discusses the development and implementation of the proposed system, providing details about the development of the chatbot.

Chapter 5: Testing and Evaluation

This chapter discusses the testing and evaluation of the proposed system, providing details about the interface design. The future review is required to improve and document the progress of the project.

Chapter 6: Conclusion and Future Works

This chapter consists of summary of project, the limitations, future works, and conclusion.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter, background study, review of existing system, the comparison between existing system and proposed system, details of the proposed system with justification will be briefly explained.

2.2 Background Study

The global chatbot market size was worth USD 525.7 million in 2021. It is expected to reach USD 3,619 million by 2030, growing at a compound annual growth rate (CAGR) of 25.7% during the forecast period from year 2022 to 2030 (BasuMallick, 2022) which will be a remark why chatbot will be a new trending application among society. Its significance shows that the generation nowadays prefers something more simple, fast, and useful for them to use instead of something that required them a lot of efforts and taking their time. A chatbot is an interactive application developed using either a set of rules or artificial intelligence technology. It is designed to interact with humans through the textual conversation process and is integrated with various messaging services, thereby assisting users in various sectors. Various innovations carried out in artificial intelligence and machine learning technologies are expected to enhance the features of chatbots. There are several common types of chatbot is shown in Figure 2.1.

TYPES OF CHATBOTS

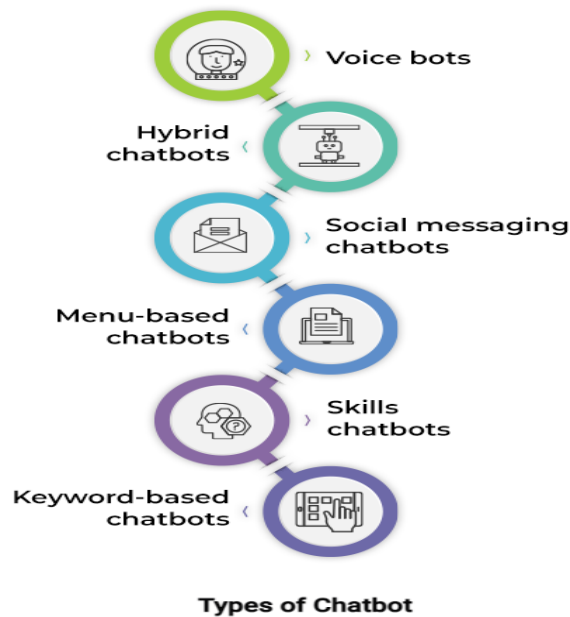


Figure 2.1: Types of Chatbot

A voice bot is a voice-to-text and text-to-speech communication channel powered by AI and natural language understanding (NLU). A hybrid chatbot is a type of chatbot that combines the strengths of two or more different types of chatbots to provide a more comprehensive and effective solution. For example, a hybrid chatbot might combine the decision-tree based approach of a rule-based chatbot with the sophisticated language understanding of an AI-powered chatbot.

Next, social messaging chatbot is a type of chatbot that is designed to interact with users via social media messaging platforms, such as Facebook Messenger, WhatsApp, and WeChat. This kind of chatbot designed to provide information, support, and services to users through natural language conversations, and can be used for a wide range of purposes, such as customer service, marketing, and entertainment.

Menu-based chatbot is designed to provide information and services to users through a series of menu options. It is often used in for simple, straightforward tasks, such as providing information about products or services, booking appointments, or answering frequently asked

questions. Meanwhile for skills chatbot, it is designed to perform specific tasks or provide specific services as it focuses on specific area of expertise. Basically it is implemented depend on the needs and requirements of the organization, as well as the capabilities of the chatbot platform.

Finally, keyword-based chatbot is designed to recognize and respond to specific keywords or phrases entered by the user. These chatbots use natural language processing (NLP) algorithms to understand the user's input, and they use a pre-defined set of keywords or phrases to determine the appropriate response.

Thus, in order to show the comparison between existing systems and the proposed system, this study will be specifically focused on the category of information delivery.

2.3 Review on Existing System

In this section, three existing systems will be reviewed: Hipmunk, Florence, and American Express Amex Bot. Each of these chatbot systems has its own characteristics, advantages, and disadvantages in terms of information delivery.

2.3.1 Hipmunk

Hipmunk (Jaya, 2019) is a travel assistant chatbot that provides information on location, flights schedule and places to stay. Hipmunk will ask the user current location by manually or by only click "Send Location" button to help Hipmunk personalized the information that needs to be sent to the user later. According to Zak Lee (2017), Hipmunk receives the request through a JavaScript Object Notation (JSON) request to the webhook endpoint. First, Hipmunk parsing engine extracts typed entities from the text.

Next, Hipmunk's intent engine works backwards from the entities to identify the intent, assembling an action that links the intent with the associated entities. Hipmunk then executes