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Design and Development of Chatbot Request System

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ABSTRACT

The Web-based Chatbot Request System is Chatbot system that will handle the requests of the users to process the requested files and documents through an online website. This study will make the process less time consuming and requires minimal effort which will help and benefit the user and the university. The system is designed to handle the request of the end-users via online by making a query. The Web-based chatbot request system currently runs on a free hosting website with two sets of account:(1) the administrator which are intended to be handle by employee who will process the requests, (2) the users account for the students of NEUST. The system has different functions and level of access based on the respective accounts. The system was developed using the Agile Model as the standard development method of the system. The system uses HTML, CSS as its front-end and PHP, JavaScript, and MySQL as its programming language for the back end. Based on the review of IT Experts and end-users, the Web-based chatbot request system obtained a rating of 3.54 with a qualitative description of highly effective.

Key words: Chatbot, Agile Development Model, Request system

1. INTRODUCTION

Requesting of files and documents to your university manually sure takes a lot of time and effort to be completed, just by doing a lot of steps and processes and to mention the very long line of people that you have to line up with just for your requested documents to be released takes a huge amount of time and stamina just to be completed, imagine doing something productive instead standing and doing nothing during that time is more likely better. That is where the Chatbot comes in the purpose of this study.

Nowadays Chatbots word seems a buzzword and trendy word, as they say that Chatbot is the future of technology or Chatbot is the future of the world [1]. A Chatbot is a computer software that uses voice instructions, text dialogues, or both to replicate human communication. A chatbot, or chatterbot, is an artificial intelligence (AI) tool that may be incorporated and utilized in any major messaging service [2]. In this paper the researchers present the design and development of the Chatbot request system of student's record that will handle all the request of students that are available in their records. The requested student record will be process through online website, the website has a login system where students are required to register using their student ID. In requesting files, they must interact with the chatbot that will help them in their request and that will make the process much less time consuming and requires minimal effort that will surely help and benefit the user and university.

In this paper the researchers focused on the design and development of the Chatbot request system of student's record that will handle all the request of students that are available in their records. The requested student record will be process through online website, the website has a login system where students are required to register using their student ID. In requesting files, they must interact with the chatbot that will help them in their request and that will make the process much less time consuming and requires minimal effort that will surely help and benefit the user and university.

Several studies were conducted about the Chatbot development. Adam et al. [3] developed an AI-based Chatbots for customer service and identify their effects on user compliance that provide a novel perspective on the nascent area of AI-based CAS in customer service contexts while authors in [4] developed a college inquiry chatbot system that's conducts an online chat session via text or text-to-speech instead of giving direct contact with a real person agent. Folstad et al. [5] develop an AI and Web-Based Human-Like Interactive University Chatbot (UNIBOT) that deals user's request in form of question-based message and processes it to deliver a desired response form of messages and Garret[6] conducts learning and educational applications

of chatbot technologies which the key metric in determining the value or effectiveness of a chatbot while Sugisaki [7] developed an Artificial Neural Network Based University Chatbot System which plays the role of counselor and provides the most appropriate guidance to students who aspire to join the particular university, while authors in [8] conducts an exploratory interview study which chatbots are increasingly offered as an alternative source of customer service. Manzano et al. [12] develop ManyChat program for Facebook Messenger to support the study company's e-commerce which is important tool to carry out the tasks related to online marketing, which leads to substantial cost savings and improves the experience for potential clients. According to Folstad et al. [5] Website chatbots are becoming essential for businesses that want to provide responsive customer support, improve the lead collection process, and nurture leads more effectively. The main use of chatbots is to answer basic questions from website visitors using artificial intelligence (AI) and to transfer conversations to a live person from your team as needed. To put it simply, chatbot meaning is basically an AI with machine learning capabilities that has been programmed to talk to customers about your company. Regardless of the language you speak, this is the definition of a chatbot

This study focused on designed and development of "Online Web-Based Chatbot Request System for the Students of Nueva Ecija University of Science and Technology". Specifically, this study dealt with the following concerns:

1. How may the Online Web-Based Chatbot Request System for NEUST Students be developed using Agile Project Management (APM):
    1.1 Planning;
    1.2 Designing;
    1.3 Development;
    1.4 User acceptance testing;
    and 1.5 Releasing/Implementation?
2. How may the Online Web-Based Chatbot Request System for NEUST Students be evaluated by the IT experts based on the following ISO/IEC 25010 criteria as:
    2.1 Functional suitability;
    2.2 Performance efficiency;
    2.3 Compatibility;
    2.4 Usability;
    2.5 Reliability;
    2.6 Security;
    2.7 Maintainability; and
    2.8 Portability?
3. How may the Online Web-Based Chatbot Request System for NEUST Students be evaluated by the Students of NEUST as:
    3.1 Function suitability;
    3.2 Performance efficiency;
    3.3 Chatbot efficiency; and
    3.4 Usability?

2. METHODOLOGY

2.1 Research Design

The study used developmental research method. The developments of Web-based Chatbot Request System were based on the Agile Development Model. Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product.

In addition, the study used descriptive research method with the utilization of survey questionnaires as tools in gathering data necessary to evaluate the validity of the system functionality in terms of system characteristics. Descriptive research was defined as a research method that describes the characteristics of the population or phenomenon that is being studied. Survey is the most familiar method of descriptive research; surveys involve interviews or discussions with larger audiences and are often conducted on more specific topics.

3. RESULTS

1. Design and Development of Web-based Chatbot Request System

The project was successfully completed by implementing the phases of the Agile Model, each of which is outlined and discussed below.

1.1 Planning

In this phase, the researchers gathered the necessary data and identify the activities that need to prioritize. The researcher developed a Gannt chart and identify the activities and schedule of the development of the system

The Planning had been executed during the 1st week of January until the 22nd of February were gathering of data, defining system requirements, listing activities for system development and listing all features of the system had been done.

The Designing phase were started on the 25th day of February and lasted for 2 months ending at the 16th day of April. The phase involves the creation of Use Case Diagram, Data Flow Diagram, Database Normalization, the Data Dictionary and Entity Relationship Diagram.

The Coding/Development phase is the actual coding and creation of the system that had done during a span of 4 months, from the 20th day of march to the 16th day of September. It was at this phase were the researchers created the system using the Bootstrap, HTML, and CSS for designing, MySQL for stablishing connection to database and coding using the PHP and JavaScript.

The testing phase took place on the 14th of October that lasted until the 19th day of November. This phase includes the testing of performance of the system, system flow and error testing and the debugging of the system.

1.2 System Designing

During this phase, the design specifications for the interface, website and database designs were established. The system was designed using the designs as indicated in the Conceptual framework. This was then tested and integrated for the next stage. The Data Flow diagram maps out the flow of the system.

This phase involves the technical specification and representation graphical illustration of database design, use case diagram, database normalization, ERD, Database schema.

a. Technical Specification

The Web-based Chabot request system was composed of the following components: Website, Hardware, Administrator, and end-users.

The Website refers to the system which the end-users and Administrator uses to interact with the system. The system was built with the following web-based software components by developers.

- HTML5
- PHP
- MySQL
- JavaScript

b. Use Case Diagram

Use case diagram represent the dynamic behavior of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application.

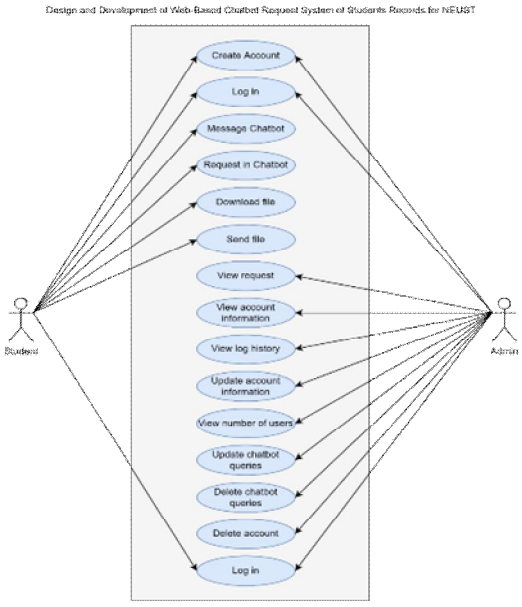

Figure 1: Data Flow Diagram of the Developed System

Figure 1 shows the listed function of the system. The user can create account, login, message chatbot, request in chatbot, view and edit account information, delete his/her own account and logout, the admin account can access all the processes of the system.

c. Interface Design

The visual appearance and style of a graphical user interface is referred to as interface design. The interface design guarantees that the interface is easy to access, understand, and utilize. Buttons, navigation keys, menus, and inputs are examples of interface components. The user can interact with the system via this interface. A user-friendly interface satisfies users because it is easy to learn and understand.

The system's graphical user interface was built using Bootstrap, HTML 5, and CSS in a web-based environment. The system was also intended to be responsive, meaning it adjusted to the size of the devices on which it was used. The user interfaces for the system built, together with its functionality, are shown in the diagrams below.

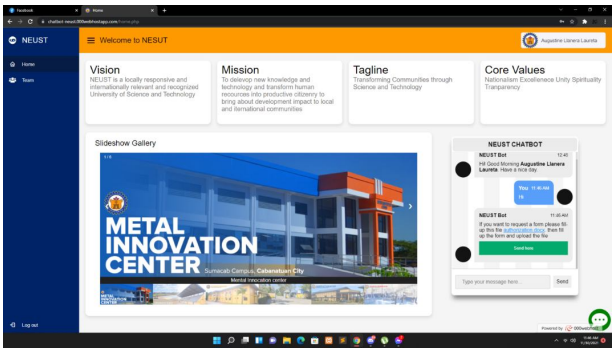

Figure 2: Chabot Conversation page

1.3. Development

The development phase is the actual coding stage of the system. The researchers used several software to create and develop the system based on the students' needs and universities data. PHP scripting language will be used in the actual coding of the system and MySQL as database connection, JavaScript for programming and HTML and CSS were utilized in designing the front- end user interface.

The system was designed and developed in a web- based environment to ensure its responsiveness to different devices, provided that a browser has been already installed.

1.4 User acceptance testing

In the phase, the user of the system and the IT experts evaluate the system, to check if it can handle task in a real-world scenario. Following the trial and evaluation, the

researchers present a summary of their findings for approval to proceed.

1.5 Releasing

After completing 4 phases of Agile development model the researchers went to the last phase. The last phase of the Agile Model of software development was the releasing. The researcher uploads the system in the web server using a free hosting website (000webhost), after uploading the system the research creates a database using phpMyAdmin (MySQL).

2. IT Experts Evaluation of Web-based Chatbot System

2.1 The IT Experts rated the Functional Suitability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Functional**)**.

2.2 The IT Experts rated the Performance Efficiency of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Efficient**)**.

2.3 The IT Experts rated the Compatibility of Web-based Chatbot Request System for NUEST with a weighted mean of 3.3 (Highly Compatible**)**.

2.4 The IT Experts rated the Usability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.6 (Highly Usable**)**.

2.5 The IT Experts rated the Reliability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Reliable**)**.

2.6 The IT Experts rated the Security of Web-based Chatbot Request System for NUEST with a weighted mean of 3.1 (Secured**)**.

2.7 The IT Experts rated the Maintainability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Maintainable**)**.

2.8 The IT Experts rated the Portability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Portable**)**.

3. Users Evaluation of Web-based Chatbot System

3.1 The end-users rated the Functional Suitability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.6 (Highly Functional).

3.2 The end-users rated the Performance Efficiency of Web-based Chatbot Request System for NUEST with a weighted mean of 3.5 (Highly Efficient).

3.3 The end-users rated the Usability of Web-based Chatbot Request System for NUEST with a weighted mean of 3.6 (Highly usable).

5. CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. The Web-based Chatbot Request System was successfully constructed using the Agile Model of Software Development, and it may be used and implemented by NEUST students in the future.
2. The ISO 25010 Software Product Quality Standards are met by the Web-based Chatbot Request System in terms of Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability.
3. The Web-based Chatbot request system complies with the end-user requirements specified in ISO 25010 Software Product Quality Standards in terms of Functional Suitability, Performance Efficiency and Usability.
4. The Web-based Chatbot request system was evidently highly effective based on the respondents' response and therefore can improve the service of the university
5. The Web-based Chatbot request system will be effective because of its high results according to the response of NEUST students and IT experts which are the chosen respondents of the research.

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