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Suggestive Artificial Intelligence-assisted Multifaceted Services Management System: Implementing Artificial Intelligence at City Building Administration Office of Parañaque City

In Partial Fulfillment
Of the Requirements for the Degree
Bachelor of Science in Information and Technology

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Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

The administration office is present in various organizations and institutions. The administration office's purpose is to make sure that everything in the organization or institution is operating smoothly and it also serves as its backbone. Every administration office has an idle time; waiting in a line can be stressful and draining for requestors which may lower their level of happiness as per Garcia A. (2020) stated.

A lot of administration office has a system for management but it does not include artificial intelligence's help to sort out the service type and levels of importance and urgency of the workloads. According to Yigit T. & Coskun H. (2020), the service type and levels of importance and urgency are important to be identified as it will be crucial for the important and urgent requests to be delayed.

Artificial Intelligence's popularity increased drastically in the year 2020 especially when the pandemic spread globally. It was stated by William P. (2022) that the artificial intelligence machines and systems will eventually take over and replace human capabilities in many areas. Embang S. et al. (2023) mentioned that while some business owners joyfully welcome AI as a crucial instrument for boosting output and efficiency, others are worried about the possible harm it may do to employee's morale.

Theoretical Framework

This study is anchored on the Artificial Intelligence Theory and Applications by Sakarya University (2021) where it states that artificial intelligence supports commercial decision-making at several levels. The evaluation of analytical architecture falls under the general heading of business intelligence when it supports all decision levels. Each of the three categories in which these supports are evaluated is descriptive, predictive, and prescriptive.

The Artificial Intelligence Theory and Applications explains how artificial intelligence manages and evaluates while providing a decision that will be suggested to the business owners. The researchers will create a management system of the administration office with artificial intelligence's assist to evaluate the level of importance and urgency of the request.

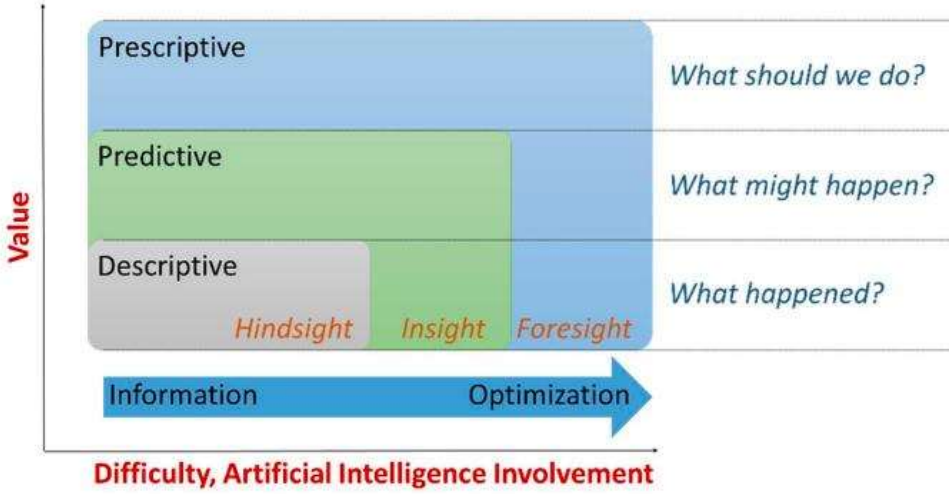

Figure 1. Artificial Intelligence Theory and Applications

Conceptual Framework

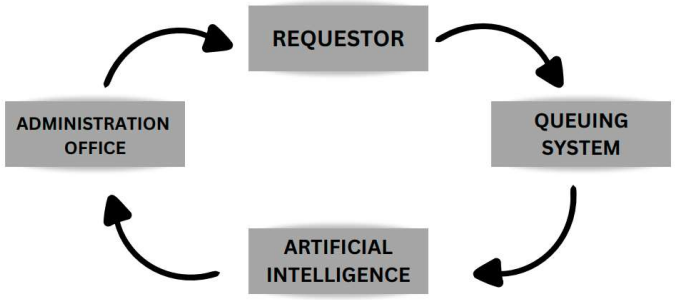

Figure 2. Agile Methodology

1.) **Requestor** - The requestor will request what service/s do they need in their system and it will be placed in queue on the system.

2.) **Queuing System** - The queuing system stores gathered data from the requestor to be evaluated by its level of importance and urgency by Artificial intelligence.

3.) **Artificial Intelligence** - The purpose of the AI is to scan the data from the queuing system and analyze the levels of importance and urgency to evaluate which request should be prioritized

4.) **Administration Office** - The admin office is the one who manage the services, and who receives the request letter so that, they will call the workers to do maintenance

Statement of the Problem

The administration office faces challenges in managing workloads and struggles to sort requests based on its level of importance and urgency. This results in delays, less productivity and prioritizing tasks effectively.

OBJECTIVES OF THE STUDY

General Objectives

This paper aims to address these issues by making use of artificial intelligence to automate the categorization of the administrations tasks and enhancing workflow efficiency and improve task management.

Specific Objectives

1. To avoid influx of requests and leaving the important requests unattended while giving attention to other requests and potentially creating a problem within the department.

2. To lessen the waiting time of the requestors and create an environment for smooth operations within the administration office.

3. To develop a management system that uses artificial intelligence to provide support and assistance for services that administration office offers.

Scope and Delimitation of the Study

The purpose of this study is to help and make it easy for administration office to manage their workloads and make use of artificial intelligence to sort the importance of the requests. The locale of the study is the City Building Admin Offfice of Paranaque. The researchers decided to make a system on Parañaque mainly because the residents and also the employees are struggling about the inflow of the workloads. As for the limitation of the study, the system will only be accessible to the departments that have access in our system. The project will take about a year under develop.

Significance of the Study

The goal of this study is to implement Artificial Intelligence's assistance with the Administration Office's Management System. The following groups are the beneficiaries:

Administration Officers – This study focuses on implementing Multifaceted Services Management System using Artificial Intelligence in Parañaque City Hall. The system can provide a suggestion on Admin Officers that can benefit them by lessen or decreasing their work. The system can avoid influx of request.

Parañaque City Hall's Employees – The system can benefit employees inside Parañaque City Hall. By implementing this system, employees will be able to attain their needs instantly even if it is urgent or not.

Parañaque Locals – The objective of the study is to help and assist the residents of Parañaque by decreasing the waiting time of influx workload.

Future Researchers – This research aims to benefit and support the future researchers to conduct study about the understanding of Information Technology. The future researchers can use this study as their reference and source of information to promote their study.

Definition of Terms

Automate - make automatic or control or operate automatically.
Alertus - a mass notification system designed to provide emergency alerts
Artificial Intelligence - simulation of human intelligence processes by machines, especially computer systems.
Drastically – extremely or huge change.
Idle time - a period of time in which an asset (machine or an employee) is ready and available, but is not doing anything productive.
Influx - an arrival or entry of large numbers
Inflow – A large data or information transferred into a place

Chapter 2

REVIEW OF LITERATURE AND STUDIES

Technological Background

The researchers will keep searching and conducting for studies and softwares in order to improve the system's performance while it is under maintenance. The Queuing System is a software program used to order, notify, assist and provide efficiency to user. The technical terms used in this study that only IT professionals can conceive. These are the following technical terms that are being used in the project: HTML, CSS, Python, MySQL, JavaScript, VS Code, Xampp.

Web-based System for Notification/Alerts

The Web-based Multimedia Information Display Terminal Using Raspberry Pi with Mobile Notification that can receive messages from number, and the administrator will be permitted. And the admin can plan event ahead of time by the use of the event Calendar (Aranas J. et al., 2019). Using supervised learning and calculates the likelihood that an alert will result a trouble ticket. A data trouble tickets obtained from the network operation center is used to train the model. And the whole model of the center of the technique is constructed. (Torim M. et al., 2020). Using cellphones, the residents report a series of problems, leading to this discovery of faults. To address these issues more effectively, a new smartphone app was created. The app lets people report problems with city services, using photos, videos, and other relevant information specific to their location. (Tuncay Y. et al., 2020).

The Sandia National Laboratories created a reliability analysis on the system, In order to ascertain if the Alertus mass notification system needs to enhancements in order to boost dependability. Focusing on specific parts, the researchers evaluated the Alertus mass notification system in Building 803. (Muna A. et al., 2019)

Priority Queuing Management System

Base on the researchers, the provided system named "Community Request Queue Management System" is a study that evaluates its usefulness and effectiveness in our environment. The system shows the efficiency, successfulness and productiveness in barangay authorities. (Gail A. et al., 2023)

The residents of Cabanatuan Sumacab Sur could use the Community Request Queue Management System to ask questions, report issues, and request documents, while barangay personnel provided responses via email and printed documents.(Himo, A. J., 2022) As stated by the researchers, both clients and staff can observe lineups; the developed queue management system is more client-friendly than the conventional queuing procedure. In addition, when the customers are about to visit the Office of the University Registrar, it will be less confusing with the help of the system, this is a big help for the staff members because they can now easily assess the client more quickly. (Yap D. et al., 2022) As specified by the researchers, the Define, Measure, Analyze, Design, and Verify (DMADV) method was implemented in the research to recognize the influx in the present queuing system and to suggest rearrangement or substitute that will lessen the customer's wait times. (Bare M. et al., 2021)

According to the researcher (Dela Cerna M., 2023), the typical help desk come up with a knowledge-based approach. In order to ensure proper and stability processing, it provides a way to operate ticket request make use of the Priority-Based Scheduling Algorithm. AI-powered building service system analyzes data in real-time, it will be smarter building that uses energy efficiently, keeps occupants satisfied, minimizes risks, reduces costs, and boosts worker productivity.(Zhu, W., et al 2021) The gap between business and AI goals for service systems, this will be propose a general business-AI alignment model. However, its broad nature requires tailoring to individual projects for best results.(Takeuchi, H., & Yamamoto, S. 2020)." Based on the researchers (Bouabdallaoui, Y. et al., 2021), the Lyapunov optimization problem focused on a Deep Reinforcement Learning (DRL) viewpoint in order to decreased the time-average while maintaining queue balance. As for Lyapunov optimization, a suitable Markov Decision Process (MDP) is formed by providing suitable action spaces. As stated by the researchers, due to the high influx of idle time, waiting in line might be a problem for the customers because it can be stressful and draining for them. The idea of queuing has been extensively implemented in assessing customer wait times, streamlining, employee schedules, protecting queuing system against alternate service demand. (Garcia A. et al., 2020)

Effects and Application of Artificial Intelligence Based Systems

In this study conducted by (Ramos J., 2023) The literature review's conclusion offers a priceless tool for academics, decision-makers, and businesspeople looking to harness artificial intelligence's revolutionary potential while prudently lowering the dangers involved. This review serves as a compass, guiding stakeholders toward a harmonious convergence of AI and human potential and illuminating the path toward realizing the full extent of AI's benefits while fostering a forward-thinking and supportive work environment for the Filipino workforce. It does this by thoroughly evaluating the body of existing literature.

In order to reduce ticket resolution times, conserve human resources, and improve customer happiness, the best way is to use an accurate machine learning model for ticket classification to link a help desk ticket with the appropriate service right away. The next processes are included in the experimentally established technique to generate models:creating training tickets, preprocessing ticket data, stemming words, feature vectorization and fine-tuning machine learning algorithms (Al-Hawari F. et al., 2019). According to (Cakir M. et al., 2020) The IIOT (Industrial Internet Of Things) idea offers dependable and simpler maintenance. In comparison to traditional maintenance, IIOT systems that monitor in real-time may help organizations by alerting the relevant factory maintenance team members before dominant breakdown happens. Finding malfunctioning bearings before they become problematic during rotation is crucial.

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