­­­A Research Project on

**PRENATAL AND TB PATIENT SCHEDULING AND MONITORING SYSTEM: HEALTH AWARENESS AND MAINTENANCE AGAINST HEALTH DIFFICULTIES.**

As partial requirement for the Subject

**IT ELEC 3**

**Web Systems and Technologies**

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4.1 Summary

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**CHAPTER I**

**RESEARCH DESCPRITION**

**Overview of the Current state of Technology**

In the current era dominated by technology, its pervasive influence extends into every facet of our lives, promising an unending progression towards becoming central to human existence. This technological wave has significantly shaped healthcare over the past decades, with advancements often operating invisibly but undeniably integral to the field. Notably, the introduction of asepsis by Lister serves as a historical testament to technology's role in contemporary medical practices, saving countless lives and safeguarding patient health (Ackerknecht, 1982; Rajesh Bhatia, February 28, 2021).

Amidst this backdrop, ScheduCare emerges as a testament to the ongoing digital transformation in healthcare. It aligns with the trajectory of technological innovation, leveraging trends like wearable and information technology, virtual reality, and the Internet of Things. These elements redefine healthcare business and operations, offering patients a broader array of healthcare choices within a new era defined by a patient-centric culture (Angelos I. Stoumpos, August 2022). ScheduCare, designed for doctors, and patients, seamlessly integrates these digital trends I. Online Appointment Booking: ScheduCare facilitates online appointment booking, providing an efficient and accessible scheduling process for patients. II. Real-Time Schedule Displays: The system offers real-time displays of doctor availability on the landing page, enhancing transparency in scheduling processes. III. Customized Patient Profiles: Patients can create and personalize profiles within the system, contributing to a more efficient and personalized healthcare experience. IV. Automated Invoicing: The platform incorporates automated invoicing, streamlining financial transactions and ensuring transparent record-keeping. V. Empowerment of Healthcare Workers: ScheduCare empowers healthcare workers by providing easy access to patient data, enabling informed decisions and precise prescription practices (Zaldy C Collado, August 1, 2019).

In essence, as technology continues to evolve, ScheduCare stands at the intersection of healthcare and digital innovation, offering a glimpse into the future of patient-focused, efficient, and technologically advanced healthcare services. The system's alignment with the ongoing digital transformation underscores its potential to create opportunities in the health sector, provided the necessary infrastructure and training are in place. The journey towards a more connected, data-driven, and patient-centric healthcare landscape is not only a reflection of our technological era but a promising stride toward improved healthcare outcomes and experiences.

**WEBSITE OBJECTIVE**

**GENERAL OBJECTIVE**

The researchers aim to develop the ScheduCare system with the overarching goal of revolutionizing healthcare management. This automated platform not only expedites patient scheduling but also ensures continuous monitoring, accurate prescriptions, patient education, and fortified data security, collectively enhancing the efficiency, safety, and overall quality of patient care.

**Specific Objectives:**

**Only include here ano ang main solution na maprovide ng system nyo**

* To be able to develop a web-app enabling patients to book schedules online, ensuring streamlined and automated scheduling processes for improved efficiency.
* To be able to develop a web-app that provide doctors with real-time displays of their schedules on the platform, offering immediate visibility into their availability.
* To be able to develop a web app allowing doctors to monitor patient bookings and access symptoms reported by patients, fostering timely interventions and personalized care.
* To be able to develop a web app a secure patient login system, allowing individuals to access the platform using their PhilHealth ID or by creating an account, enhancing user accessibility.
* To be able to develop a web app enabling doctors to create and manage their schedules within the system, providing them with autonomy and flexibility in organizing their appointments.
* To be able to develop a web app that enables chat support for both patients and doctors, allowing them to have health checks and receive prescriptions through online.

**SCOPE AND LIMITATIONS**

**Add a short introduction for scope.**

**Automated Patient Scheduling**

A feature providing patients with a seamless and efficient online booking experience. This feature aims to reduce wait times and enhance overall appointment efficiency.

**Real-Time Schedule Displays**

Provide immediate visibility into their schedules. This functionality ensures efficient time management, minimizes scheduling conflicts and allows healthcare providers to stay organized in their practice.

**Continuous Patient Monitoring**

A pivotal feature that equips healthcare providers with insights into patient bookings and access to reported symptoms. This continuous monitoring facilitates timely interventions and personalized care, nurturing a dynamic and responsive doctor-patient relationship.

**Patient Login through PhilHealth ID or Account Creation**

Patients can conveniently log in using their PhilHealth ID or create an account, ensuring a secure and personalized healthcare experience.

**Automated Invoice Generation**

Streamlining financial transactions associated with booked appointments. This feature not only contributes to transparent and efficient record-keeping but also enhances the overall financial management of healthcare services.

**Real-Time Chat Functionality**

Enable patients and doctors to engage in real-time text-based communication. Facilitate instant communication for discussing health concerns, asking questions, and receiving medical advice. Ensure a secure and private chat environment to protect sensitive health information.

**Limitations of the Research**

The proposed web app, ScheduCare, has some limitations. It needs a good internet connection to work well, so users in areas with bad or no internet might face issues. Right now, it's mainly for scheduling and basic patient info; it doesn't have a full electronic health record. Also, it doesn't handle prescriptions. While we've put in security measures, there's always a risk of cyber threats. These are things we're aware of and working on for future improvements. The real-time chat functionality may be limited to text-based communication only, excluding other forms of communication such as video or voice calls.

**Top of Form**

**Definition of terms**

**Asepsis -** The introduction of procedures to prevent infection and maintain aseptic (free from contamination) conditions, such as in medical practices. Notably introduced by Lister.

**Data Analytics -** The process of examining and interpreting data sets to extract meaningful insights, patterns, and information, often used in healthcare to improve patient well-being and service efficiency.

**Digital Transformation -** The integration of digital technologies into various aspects of healthcare and medical practices, aiming to enhance efficiency, patient care, and overall experiences.

**Healthcare Infrastructure -** The underlying framework of technological and organizational components that supports the delivery of healthcare services, including hardware, software, networks, and personnel.

**Internet of Things (IoT) -** A network of interconnected devices that can exchange data and information, contributing to the automation and improvement of various healthcare processes.

**Medical Education -** The process of training and educating healthcare professionals, including doctors, nurses, and technicians, to ensure competence and proficiency in delivering healthcare services.

**Patient-Centric Culture -** A healthcare approach that prioritizes and revolves around the needs, preferences, and experiences of patients, aiming to empower them in making informed decisions about their health.

**Quality Control -** The process of ensuring that products or services meet established standards and comply with regulations. In healthcare, it involves maintaining the quality of data, services, and patient care.

**Resistance to Change -** The reluctance or opposition to adopting new practices or technologies, which may hinder the successful implementation of digital transformation in healthcare.

**Technological Integration -** The incorporation and seamless blending of various technological advancements, such as wearable tech, information technology, virtual reality, and IoT, into healthcare practices to enhance overall efficiency and outcomes.

**CHAPTER II**

**REVIEW OF RELATED LITERATURE**

**Conceptual Framework**

Interviewing Variable

Dependent Variable

Independent Variable

Efficiency of Patient Scheduling

Accuracy of Prescriptions

Patient Care Quality

User Accessibility

Financial Management of Healthcare Services

Real-Time Communication Effectiveness

**SYSTEM TITLE DAPAT DIRI**

Online Appointment Booking

Real-Time Schedule Displays

Implementation of ScheduCare System

Continuous Patient Monitoring

Secure Patient Login System

Doctor Schedule Management

Real-Time Chat Functionality

Healthcare Provider Organization,

Efficiency of Time Management

Information Security Measures,

Communication Privacy

**Summarized problems diri!**

**RELATED STUDIES**

**Local**

**Optimizing Vaccine Access: A Web-Based Scheduling System with Geo-Tagging Integration and Decision Support for Local Health Centers**

According to Jayson Angelo Batoon and Keno Cruz Piad (May 2023) The system created aims to produce an online vaccination appointment scheduling system with geo-tagging integration and a decision-support mechanism for neighborhood health clinics. With a decision support mechanism that suggests the essential vaccines based on their account details, it is made to meet the unique vaccination needs of each patient. The system includes immunizations that are accessible locally, and patients and midwives can manage their own corresponding information through personal accounts. Viewers of websites can visualize the distribution of vaccines by purok thanks to geotagging. The Agile Scrum Methodology was modified by the researchers for early delivery, change flexibility, and continual system improvement in order to accomplish the study’s main goal. In order to assess the system’s acceptability in terms of functional adequacy, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability, it was designed in accordance with the ISO 25010 Product Software Quality Standards. Following the assessment, the system was given an average total weighted mean score of 4.62, which represents a verbal interpretation of “strongly agree”. This score demonstrates that the evaluators were in agreement that the system met the requirements of ISO 25010 for Product Software Quality Standards.

**Ob-Gyn Clinic Online Scheduling System**

According to Justine May T. Reguyal Ann and Michelle S. Agno (March 2023) This study aimed to design, develop, and assess an Ob-gyn Clinic Online Scheduling System using the stages of the software development life cycle. The respondents were IT experts and end-users who were purposively sampled from the Science City of Munoz, Nueva Ecija, Philippines. The system was evaluated using the International Organization for Standardization (ISO) 25010 software standards. The results indicated that the SDLC model was effective in designing and developing such a system. The IT experts and end-users assessed the technical features and quality of using the system and gave favorable and acceptable ratings. The developed system was intended to help hospitals in accommodating their outpatients, particularly pregnant women or people with uterus problems, by making it easier for them to schedule their available time, date, or days and reducing their time spent waiting for their turn. Based on the assessment, the researchers recommended that this study could serve as a first step for gynecologists in developing the easiest way to schedule. Future researchers were encouraged to investigate the benefits and drawbacks of the system and its effects on patients and gynecologists. Understanding this research could assist future researchers in developing better systems.

**IoT-based Pregnancy Health Monitoring System**

According to Mary Jane C. Samonte, Bea Shaneal Francesca F. Franco and Helisha A. Ocampo (August 2023) Pregnancy health monitoring systems enable women to access remote quality care during pregnancy. The integration of wearable devices has positively impacted maternal healthcare monitoring technologies. Maternal health requires a comprehensive structure permitting pregnant women to be monitored continuously. As a result, the necessity to assess its usability grows. A web-based pregnancy monitoring system that utilizes Internet-of-Things (IoT) wearables such as a smartwatch, blood pressure device, and fetal doppler to aid in vital sign monitoring was developed to evaluate its usability. With this, the system aimed to identify what usability principle is the most significant in pregnancy health monitoring systems. Profiling and treatment modules were implemented wherein a doctor-patient consultation and journal-styled milestone feature were made available to aid pregnant women in their pregnancy health journey. A mobile-based application was also developed to allow the syncing of vital sign information as part of the treatment module. The system's functionality was tested for two iterations to ensure that all features could meet all specific objectives. The plan was then deployed for usability evaluation wherein the five usability categories according to the Nielsen Model Standard: learnability, efficiency, memorability, error, and satisfaction were assessed. Based on the results obtained, user expectations were met overall. The results show that the system is easy to use, navigate, and remember. Finally, among the five (5) components based on Nielsen's usability components, efficiency had the highest mean and thus making it the most significant usability component.

**Online Scheduling System for Doctors and Patients in a Hospital**

According to Marion Rylan Q. De Guzman, Jonn Louis N. Ordoñez and Ronald O. Somocierra (November 5, 2021) The outpatient department (OPD) of a hospital provides diagnoses for non-urgent patients that do not require them to be admitted for long periods. The department has multiple physical facilities and medical equipment with several doctors and consulting rooms, each is an expert in a specific field. This study aims to create an online scheduling system for the outpatient department of a hospital. It will be an online system that will assist the appointment system of the outpatient department of a hospital. This will benefit not only the hospital but also the patients in scheduling their appointments as the patient can check the doctor’s availability. The waiting time of the patient will be lessened since the patient will only go to the hospital at their specified scheduled appointment. The list of appointments can also be viewed by the doctor to check how many patients are currently scheduled within the day.

**E-healthcare: Child Monitoring Health System (CHMS) with SMS Functionality**

According to Gloren S. Fuentes and Grace Lorraine D. Intal (27 May 2020) Children go through distinct stages of development as they move through from infants to young adults. These stages are as follows: (1) Infants/Babies whose age ranges from birth to two years of age; (2) Toddlers/Preschoolers ranging from two to five years of age; (3) School Age Children considers those who are of six to twelve years old; and (4) Adolescents/Teenagers who are of thirteen to eighteen years old. During these stages their health and safety are utmost important because these will influence their formative years. The study emphasizes the benefits of implementing a Child Health Monitoring System (CHMS) to a private hospital in order to provide a more efficient way of monitoring child's health. The researchers were able to determine the system requirements through survey and interviews with hospital key personnel as well as the parents. Design of the different modules were also presented.

**Public Health Record Management System: An Up-Close Monitoring System**

According to Jayson A. Batoon, Alfredo B. Benitez and Kurth Z. Cajucom (: June 06, 2022) The researchers developed a public health recordmanagement system for the barangay health center of Sto.Rosario, Paombong, Bulacan, recognize the existingproblem, circumstances and reduce the risk of data lost dueto unprecedented accidents or human errors and decreasethe probability of data redundancy for the patients. Thedevelopers used an illustrative and user-friendly design thatpresents the data in the easiest way possible. Public HealthRecord Management System (PHRMS) aims to elevate the current state of record management of the public health center by incorporating technology to further enhance the productivity securely and a faster way of data processing tosave time and serve more patients. For the acceptability ofthe developed health information system, the researchersconsulted with IT professionals from different fields, ITinstructors from Bulacan State University, and the endusers or clients of the developed system such as themidwife, and barangay health workers. The evaluationform has the following criteria for software qualityevaluation as follows: (1) functional suitability; (2)performance efficiency; (3) usability; (4) reliability; (5)

security; and (6) portability.

**Project Clinik: A Cross-Platform Scheduling and Appointment Reservation System**

According to Mark Angelo M. Dela Fuente, Joshua A. Facunla and Hannah Noreen F. De Guzman (March 2023) This study aimed to design, develop, and assess a cross-platform scheduling and appointment reservation system for clinics. The software development life cycle (SDLC) was used to guide the development of the system, which included planning, defining requirements, design and prototyping, development, testing, and operations and maintenance. A developmental expert’s research design was employed, and the technical features of the system were assessed by IT following the ISO 25010 standards, while end-users evaluated the quality of using the system based on selected ISO 25010 standards. The results showed that the SDLC was appropriate in developing the system, and both IT experts and end-users found the system to be of high quality. Based on the results, the researchers drew conclusions and provided recommendations for future studies. The study revealed that a cross-platform scheduling and appointment reservation system for clinics can be developed using the SDLC with the involvement of IT experts and end-users in the assessment process. It is crucial to incorporate the ISO 25010 standards to ensure that the system is of high quality and meets the needs of the end-users.

**Foreign**

**Online Appointment Management System in Hospitals Using Distributed Resource Allocation Algorithm**

According to B. Jency A. Jebamani, R. Murugeswari & P. Nagaraj (26 October 2021) Every day, people all around the world strive to make their lives more comfortable through technological advancements. Nobody anticipates wasting their time, effort, and money by waiting in line at a counter especially during their hospital visits. Henceforth, this paper proposed web development as a solution for the patients to schedule hospital appointments online, with doctors approving them based on their availability. The developed system aims to regulate the knowledge of patients based on doctor availability, hospital and specialist schedules, and patient appointment. The proposed system has been designed within the ASP to automate the day-to-day activities in a hospital like room activities, admission of latest patient, doctor visits. The proposed distributed resource allocation algorithm aims to search the availability of nearby hospitals to make an appointment. Similarly, once the user has registered for an appointment and if the appointment has been accepted by the appropriate doctor, the user will receive a confirmation email. The proposed model has used Visual Studio.NET 2008 environment, ASP.NET for frontend processing, and MS-SQL SERVER 2008 for backend processing.

**Dynamic appointment scheduling for outpatient clinics with multiple physicians and patient choice**

According to Chongjun Yan, George G.Q. Huang and Yong-Hong Kuo (March 2022) Mitigating the adverse effects of uncertainty in appointment systems, arising from heterogeneous patient needs and preferences, is critical to the effective use of scarce medical resources and patient satisfaction. This study addresses an online scheduling problem with multiple servers and consideration of patient preference for physicians and their appointment times. The receptionist immediately determines whether a request should be accommodated and offers an appointment time slot for each accepted patient request. The patient may reject an undesirable appointment time slot with a certain probability, or may accept it, but the no-show probability will be higher. A stochastic overbooking model is formulated to maximize the expected profit, which is defined as the revenue generated from accepted requests minus the cost incurred by patients waiting and physicians’ overtime. A myopic scheduling policy is developed based on certain structural properties of the objective function. This study advances the study of appointment systems by generating a non-unimodal profit evolution. Moreover, both the decision of accommodating more requests for certain slots and the scheduling of appointments depend on the patient choice rather than the patient type. Further, computational experiments and analysis offer valuable insights into performance improvement in outpatient clinics.

**Machine learning based integrated scheduling and rescheduling for elective and emergency patients in the operating theatre**

According to Masoud Eshghali, Devika Kannan and Navid Salmanzadeh-Meydani (19 January 2023) As the only largest source of revenue and cost in a hospital, the operation room (OR) scheduling problem is a hot research topic. Nonetheless, an integrated model is the missing key to managing and improving the efficiency of ORs. This paper presents a fully integrated model regarding three concepts: meditating elective patients and emergency patients together, considering ORs and downstream units, and proposing hierarchical weekly, daily, and rescheduling models. Due to the inherent randomness in emergency patient arrival, a random forest machine learning model and geographical information systems are used to obtain the emergency patient surgery duration and arrival time, respectively. According to the machine learning model in weekly and daily scheduling, initially, fixed capacity is reserved for emergency patients. When an emergency patient arrives, the surgery starts if a reserved OR is available. Otherwise, the first available OR will be dedicated to the patient due to an emergency patient's higher priority than an elective patient. In this case, it is needed to reschedule the OT schedule for the remaining patient. Moreover, the three-phase model guarantees that an emergency patient assigns to an OR within a specific time limit. To solve the models, genetic algorithm and particle swarm optimization are developed and compared. In addition, a real-world case study is undertaken at a hospital. The results of comparing the proposed approach to the hospital's current scheduling show that the three-phase model had a considerable positive effect on the ORs schedule.

**Staff scheduling for residential care under pandemic conditions: The case of COVID-19**

According to Amirhossein Moosavi, Onur Ozturk and Jonathan Patrick (October 2022) The COVID-19 pandemic severely impacted residential care delivery all around the world. This study investigates the current scheduling methods in residential care facilities in order to enhance them for pandemic conditions. We first define the basic problem that addresses decisions associated with the assignment and scheduling of staff members, who perform a set of tasks required by residents during a planning horizon. This problem includes the minimization of costs associated with the salary of part-time staff members, total overtime, and violations of service time windows. Subsequently, we adapt the basic problem to pandemic conditions by considering the impacts of communal spaces (e.g., shared rooms) and a cohorting policy (classification of residents based on their risk of infection) on the spread of infectious diseases. We introduce a new objective function that minimizes the number of distinct staff members serving each room of residents. Likewise, we propose a new objective function for the cohorting policy that aims to minimize the number of distinct cohorts served by each staff member. A new constraint is incorporated that forces staff members to serve only one cohort within a shift. We present a population-based heuristic algorithm to solve this problem. Through a comparison with two benchmark solution approaches (a mathematical programme and a non-dominated archiving ant colony optimization algorithm), the superiority of the heuristic algorithm is shown regarding solution quality and CPU time. Finally, we conduct numerical analyses to present managerial implications.

**RELATED LITERATURE**

**Local**

**ARTTS: PLHIV Monitoring System on Treatment and Antiretroviral Therapy with Analytics and Social Integration**

According to John Rogel DC. Mallari, Jude G. Matira and Amzen D. Ramos (2022) The most vital part of life for those people living with HIV/AIDs is medication. Without it, their situation could progress into more serious complications that could put their lives at risk. However, this current pandemic that our world faces today appended on the existing barriers PLHIVs experience. As a result, their adherence to their medication is slowly declining. With that, this study was made to provide computing solution that could ease PLHIV's pain points when it comes to their complete adherence to their medication. With the help of SCRUM as the project methodology, the project deliverables were fulfilled as swiftly as possible while minimizing cost and time. The capstone project was able to develop a mobile and web-based antiretroviral tracking system for PLHIV. The system enables the health staff to monitor the medication that is happening with the PLHIV by seeing the total number of pending proof of intakes, confirmed proof of intakes, total proof of intakes, those who are in ongoing medications, those who stopped medicating, and those with complete medications. Also, the system sends a notification reminder that will notify the PLHIV users about the necessary updates regarding the medication and checkup appointments. In addition, the system allows the PLHIV users to exchange messages and pictures that will help them to encourage one another to completely adhere to their medication. Lastly, the system allows the users to be updated and aware about the recent update regarding the status of HIV in the Philippines via the various analytics available in the system.

**Cloud-Internet of Health Things (IOHT) Task Scheduling Using Hybrid Moth Flame Optimization with Deep Neural Network Algorithm for E Healthcare Systems**

According to N. Arivazhagan, K. Somasundaram and D. Vijendra Babu (05 Jan 2022) Considering task dependencies, the balancing of the Internet of Health Things (IoHT) scheduling is considered important to reduce the make span rate. In this paper, we developed a smart model approach for the best task schedule of Hybrid Moth Flame Optimization (HMFO) for cloud computing integrated in the IoHT environment over e-healthcare systems. The HMFO guarantees uniform resource assignment and enhanced quality of services (QoS). The model is trained with the Google cluster dataset such that it learns the instances of how a job is scheduled in cloud and the trained HMFO model is used to schedule the jobs in real time. The simulation is conducted on a CloudSim environment to test the scheduling efficacy of the model in hybrid cloud environment. The parameters used by this method for the performance assessment include the use of resources, response time, and energy utilization. In terms of response time, average run time, and lower costs, the hybrid HMFO approach has offered increased response rate with reduced cost and run time than other methods.

**An Integer Linear Programming for Hospital Bed Scheduling and Capacity Management**

According to Parida Jewpanya and Arni Acla (April 2022) COVID-19 has struck the Philippines in December 2019 and has brought great panic to the country's healthcare system. In a short period of time, the number of infected increased exponentially. Hospitals are suddenly filled with patients infected by the virus to the extent that patients wait for hours to days to be admitted. Others die on the road even before finding hospitals that can accommodate them. The hospitals and the country's healthcare system must consider this increasing demand to serve patients fully. Patient planning is commonly used in other countries to maximize bed allocation. A recent study using Bernoulli Distributed Random Variable represents the binary integer program. The approach combines the queuing model and simulation to reduce the patient dismissal rate and increase hospital output. On the other hand, this paper deals with strategic hospital bed capacity optimization using linear integer programming by considering the diverse resources, such as doctors, nurses, beds, and hospital rooms.

**Foreign**

**Systematic review of smart health monitoring using deep learning and Artificial intelligence**

According to A.V.L.N. Sujith, Guna Sekhar Sajja and V. Mahalakshmi (16 November 2021) In the rapidly growing world of technology and evolution, the outbreak and emergences diseases have become a critical issue. Precaution, prevention and controlling the diseases by technology has become the major challenge for healthcare professionals and health care industries. Maintaining a healthy lifestyle has become impossible in the busy work schedules. Smart health monitoring system is the solution to the above poses challenges. The recent revolution of industry 5.0 and 5G has led to development of smart cum cost effective sensors which help in real time health monitoring or individuals. The SHM has led to fast, cost effective, and reliable health monitoring services from remote locations which was not possible with traditional health care systems. The integration of blockchain framework improved data security and data privacy of confidential data of patient to prevent the data misuse against patients. Involvement of Deep Learning and Machine learning to analyze health data to achieve multiple targets has helped attain preventive healthcare and fatality management in patients. This has helped in the early detection of chronic diseases which was not possible recently. To make the services more cost effective and real time, the integration of cloud computing and cloud storage has been implemented. The work presents the systematic review of SHM along with recent advancements in SHM with existing challenges.

**A Smart Healthcare Monitoring System Based on Fog Computing Architecture**

According to Ajay Reddy Yeruva, C S L Vijaya Durga and Gokulavasan B (28 December 2022) Access to adequate medical care can be difficult in many countries, particularly in economically developing countries. There aren't enough medical professionals, such as doctors or nurses, and the nearest hospitals are too far away. Because there is such a severe shortage of resources, it is extremely challenging to provide preventative therapy to persons who are ill. As a direct consequence of this, even persons in good health are falling more behind in their surveillance of their fitness. It is crucial to have a plan in place to address this problem in order to guarantee that persons will not experience a disruption in their capacity to get necessary medical care in the event that this problem arises. Applications of the Internet of Things include ensuring public safety and improving operational efficiencies in transportation, municipal management, manufacturing, and physical activity (IoT). This study investigates its application in medical equipment and suggests an innovative approach to combining the ideas of fog computing and the Internet of Things. A poor health care system that focuses on clinics can be converted into a high-quality system that puts patients at the center with the help of the framework that has been proposed.

**Edge device based efficient data collection in smart health monitoring system using wireless body area network**

According to Kalaivanan Karunanithy and Bhanumathi Velusamy (February 2022) Wireless Body Area Network (WBAN) provides continuous remote patient health monitoring without disrupting their normal daily activities. In WBAN, the bio-sensor is placed on the human body to detect vital changes due to the abnormal behavior of human organs and send the sensed data via the Internet to the medical/cloud server. However, due to the processing of huge amounts of data generated by the EEG and ECG sensor, resource-limited networks face a big challenge in satisfying the required Quality of Services (QoS). Moreover, the WBAN often meets the major problem of QoS degradation due to congestion. In this paper, Minimum Edge-shared Vertex Path Selection (MEVPS) for WBAN seeks to mitigate the congestion problem and decreases the latency during emergency packets delivery. A minimum edge-shared vertex path between the source and the Base Station (BS) is created by updating neighbor information using Ant Colony Algorithm (ACA). In addition, the body controller in the proposed system minimizes the data traffic entered into the network through the use of packet discard policy. It is observed from the simulation results that the proposed routing strategy demonstrates a better efficacy of QoS parameters.

**Synthesis (Isa lang pilia diri, also add sino ang author and ano year niya gihimo ang review)**

**Vaccine Access Optimization System:**

**Objective:** To create an online vaccination appointment scheduling system with geo-tagging integration and decision support for local health clinics.

**Features:** Agile Scrum Methodology, decision support based on patient account details, geotagging for vaccine distribution visualization.

**Assessment:** Aligned with ISO 25010 standards, achieving a high acceptability score (4.62) for functional adequacy, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

**Ob-Gyn Clinic Online Scheduling System:**

**Objective:** Design, develop, and assess an Ob-Gyn Clinic Online Scheduling System to ease appointment scheduling for pregnant women and individuals with uterus problems.

**Features:** Utilizes SDLC model, favorable ratings from IT experts and end-users, aims to reduce patient waiting time and enhance scheduling efficiency.

**IoT-based Pregnancy Health Monitoring System:**

**Objective:** Develop a web-based pregnancy monitoring system utilizing IoT wearables for continuous vital sign monitoring.

**Features:** Integration of smartwatch, blood pressure device, and fetal doppler, doctor-patient consultation module, mobile app for data syncing, emphasis on learnability, efficiency, memorability, error, and satisfaction.

**Online Scheduling System for Doctors and Patients in a Hospital:**

**Objective:** Create an online scheduling system for the outpatient department, facilitating appointment scheduling for non-urgent patients.

**Benefits:** Allows patients to check doctor availability, minimizes waiting time, and provides doctors with a view of daily appointments.

**E-healthcare: Child Monitoring Health System (CHMS) with SMS Functionality:**

**Objective:** Implement a Child Health Monitoring System (CHMS) for a private hospital, emphasizing efficient child health monitoring.

**Features:** System requirements determined through surveys and interviews, modules for doctor-patient consultation and milestone tracking.

**Public Health Record Management System: An Up-Close Monitoring System:**

**Objective:** Develop a public health record management system for a barangay health center, enhancing data processing efficiency and patient service.

**Features:** User-friendly design, consultation with IT professionals, midwives, and health workers, aligned with ISO 25010 standards.

**Project Clinik: A Cross-Platform Scheduling and Appointment Reservation System:**

**Objective:** Design, develop, and assess a cross-platform scheduling system for clinics, involving IT experts and end-users.

**Assessment:** Positive results indicating high quality and appropriateness of the system development life cycle.

**Online Appointment Management System in Hospitals Using Distributed Resource Allocation Algorithm:**

**Objective:** Propose a web-based appointment management system with a distributed resource allocation algorithm for efficient hospital visits.

**Features:** Uses Visual Studio.NET, ASP.NET, and MS-SQL SERVER 2008, focuses on doctor availability, hospital schedules, and patient appointments.

**Dynamic appointment scheduling for outpatient clinics with multiple physicians and patient choice:**

**Objective:** Address uncertainty in appointment systems with a myopic scheduling policy for outpatient clinics.

**Features:** Considers patient preferences, minimizes patient dismissal, and increases the efficiency of medical resources.

**Machine learning based integrated scheduling and rescheduling for elective and emergency patients in the operating theatre:**

**Objective:** Propose an integrated model for scheduling elective and emergency patients in the operating theatre, considering patient choice and preferences.

**Features:** Utilizes machine learning, hierarchical scheduling models, and addresses the impact of emergency patient arrival.

**Staff scheduling for residential care under pandemic conditions: The case of COVID-19:**

**Objective:** Investigate and enhance staff scheduling methods in residential care facilities for pandemic conditions.

**Features:** Adapts basic scheduling problems to pandemic conditions, considers communal spaces and cohorting policies, introduces new objective functions.

**ARTTS: PLHIV Monitoring System on Treatment and Antiretroviral Therapy with Analytics and Social Integration:**

**Objective:** Develop a mobile and web-based antiretroviral tracking system for people living with HIV/AIDS (PLHIV).

**Features:** SCRUM methodology, real-time monitoring of medication adherence, analytics for PLHIV status updates, and social integration for peer support.

**Cloud-Internet of Health Things (IOHT) Task Scheduling Using Hybrid Moth Flame Optimization with Deep Neural Network Algorithm for E Healthcare Systems:**

**Objective:** Propose a task scheduling model for IOHT in e-healthcare systems, using Hybrid Moth Flame Optimization for QoS improvement.

**Features:** Trained model with Google cluster dataset, simulation on CloudSim, focus on resource utilization, response time, and energy efficiency.

**An Integer Linear Programming for Hospital Bed Scheduling and Capacity Management:**

**Objective:** Optimize hospital bed capacity using linear integer programming, considering diverse resources.

**Features:** Addresses the COVID-19 impact, combines queuing model and simulation, focuses on maximizing bed allocation and reducing dismissal rates.

**Systematic review of smart health monitoring using deep learning and Artificial intelligence:**

**Objective:** Explore the integration of deep learning and AI in smart health monitoring systems through a systematic review.

**Features:** Highlights the role of smart sensors, blockchain for data security, and cloud computing for real-time data analysis.

**A Smart Healthcare Monitoring System Based on Fog Computing Architecture:**

**Objective:** Propose a smart healthcare monitoring system based on fog computing and IoT, aiming to improve accessibility to medical care.

**Features:** Focuses on remote patient monitoring, integrates fog computing and IoT, provides a framework for transforming healthcare systems.

**Edge device based efficient data collection in smart health monitoring system using wireless body area network:**

**Objective:** Mitigate congestion and improve QoS in Wireless Body Area Network (WBAN) for health monitoring.

**Features:** Minimum Edge-shared Vertex Path Selection (MEVPS), Ant Colony Algorithm, packet discard policy for efficient data traffic management.