SRILANKA INSTITUTE OF INFORMATION TECHNOLOGY

EYE CARE MANAGEMENT SYSTEM

Project Report

Information Technology Project 2023

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INTRODUCTION

The Eye Care management system is a well-managed system which is designed to provide extensive eye care services and products which are related to eye care to our patients. Our aim and focus are to improve eye vision and eye health of the nation with innovative technology, experienced professionals in the field, quality and sustainable eyewear products and our qualified and experienced staff are committed in providing great care to our valued customers or patients. This company comprises of numerous services including channeling facilities of surgeons/orthoptists, managing patient records medical assistance and production and distribution of world class are you there with high quality and with best range. In our system we value the time and health of the patient by providing timely and accurate diagnosis treatment plans assistance and education. we always look forward in serving the customers and patients with our team effectively by empowering them about their eye health.

Client/ Company Background

In the Eye Care Management system customer or patient need to register to the system by providing their personal details. After registering to the system customer need to log into the system by providing login credentials. Then customers can get an entire idea about the system and how the function of the system works by using the fast forward option. Customers/patients can create an account in the system by providing customer/patient ID and it contains all the personal information of the customer. Important documents related to eye health can be uploaded into this account. Staff members of the system can get an entire idea about the newly registered customer/patient by checking the created account and the uploaded documents. There is an online portal for the patients to make appointments and schedule them by selecting available orthoptists or surgeons. The system will keep track of all the appointments made by the patients, and they are directed to the relevant orthoptist or surgeon for the confirmation of the appointment. Then the system will inform the status of the appointment to the patient. After diagnosis of the patients' electronic medical reports are created by getting personal details, diagnosis, treatment plan and follow-up care. Created medical records are send to the patient via an email and they are uploaded to the patients account as well. Electronic prescriptions is also created by the system according to the doctors assistance and they will be directed to the nearest pharmacy of the patient or to the patient. If the customer/patient need to buy or design a spectacle the system will provide a variety of updated and newest designs to the customer and according to the specific requirements of the customer, they can customize their spectacles and repairing also can be done through our company inquiring the system. Customers can track the production or repairing process and after the production or repairing process is over spectacles can be delivered to the customers through our efficient distribution management of the system.

Customers can be paid to the offered services through various payment methods online through are system and insurance claims also will be permitted by the system. All the information and education related to eye health and improving vision can be granted through accessing our system. All the reports related to operations done via the system are produced for analytical purposes and for the improvement of the system.

Problem Statement

Customer should reach manually.

- We have identified that customers should reach manually to our company any branch to place appointments and to design their spectacles, buy spectacles and repair them and if customers need any assistance in some instances such as about their treatment plans, follow-up routines etc. So, it will be a difficult task to reach manually to get those things done and it will be easier and more efficient to those online.

Long waiting times and Lack of Reminders

- Customers and patients, especially patients with severe conditions that need assistance of a doctor immediately may have faced challenges in scheduling appointments with the surgeons/ Orthoptists due to long waiting times and due to unavailability appointments.
- Customers or patients may miss their scheduled appointments, collecting the spectacles after the production is over and any follow-up routines due to lack of timely reminders or any kind of notification.

Limited access to information

- Providers may struggle to access the data and insights they need to make informed decisions about patient care, inventory management, and financial planning. This may lead to improper understanding and diagnosis of patient conditions and past medical conditions, getting orders from customers without even having a proper knowledge about components that are available or out of stock in the inventory and various financial problems when moving forward in company routines.

Lack of Eye care information and Education

- Most of the patients are unaware of eye care information such as health tips, treatment plans or options, and resources available for eye care. Also, majority of the patients do not have a proper knowledge about eye illnesses, how to protect eyes during and after surgeries, and precautions and measures to keep their eyes protected and to improve their vision.

Lack of Visibility and Inefficient processes.

- Providers may have limited visibility into key aspects of their practice, such as patient flow, inventory levels, and financial performance. Manual processes for managing patient records, inventory, and orders can be time-consuming and prone to errors, which can negatively impact patient care and provider efficiency.

Physical Payments

- Whenever it comes to physical payments, the payer and the payee should come across several difficulties such as handling and depositing cash or check, Security risks, limited accessibility for physical payment methods and those physical payments methods are less in transparency. Also, it is a time consuming and a difficult task to keep track of payments records via paperwork.

Poor inventory management:

- Providers may struggle to manage their inventory effectively, which can lead to stockouts or overstocking of supplies. Also, this will lead to inconsistencies between the buyer and the provider.

Inefficient distribution:

- Providers may struggle to manage the flow of goods and supplies from the manufacturer to the eyecare provider and providers may face in difficulties in delivering the finished products to the customers when there is no proper distribution management within an organization.

SOLUTIONS

User Friendly interface with User Guidelines

- This enables the users to use eye care management system easily with the constantly changing company settings and new conditions in public and business organizations without having a technical expertise knowledge and training. Also, this system maximizes the user experience with a fast-forwarding option which convey an entire idea of the system and how it functions in the beginning with proper guidelines. Any individual including healthcare professional and customers with a basic knowledge of computer operations can handle this system.

Online Appointment Scheduling Platform

- This will provide the ability to patients in order to place their appointments and channeling via a user-friendly online portal without reaching physically. This will reduce the long waiting times and make the scheduling process more effective. Also, this will reduce the workload of the administrative staff in handling appointments.

Efficient Communication

- Through this effective communication between the patients, customers and eye care providers is established. Customers and patients can get timely and accurate information about their appointments, diagnosis, treatment plans, production and they will get reminders of their planned schedules such as appointments.

Access to Information and tracking.

- Health care providers can access to information and data through our system effectively. Specially Orthoptists and surgeons are able to access information related to patients past medical records, treatment options, preventive measures and success rates. Also, administrators can access up to date inventory details and get a clear idea about stocks in the inventory. This system allows monitoring of patients in success of their treatments, follow up plans etc.

Online Payment Methods

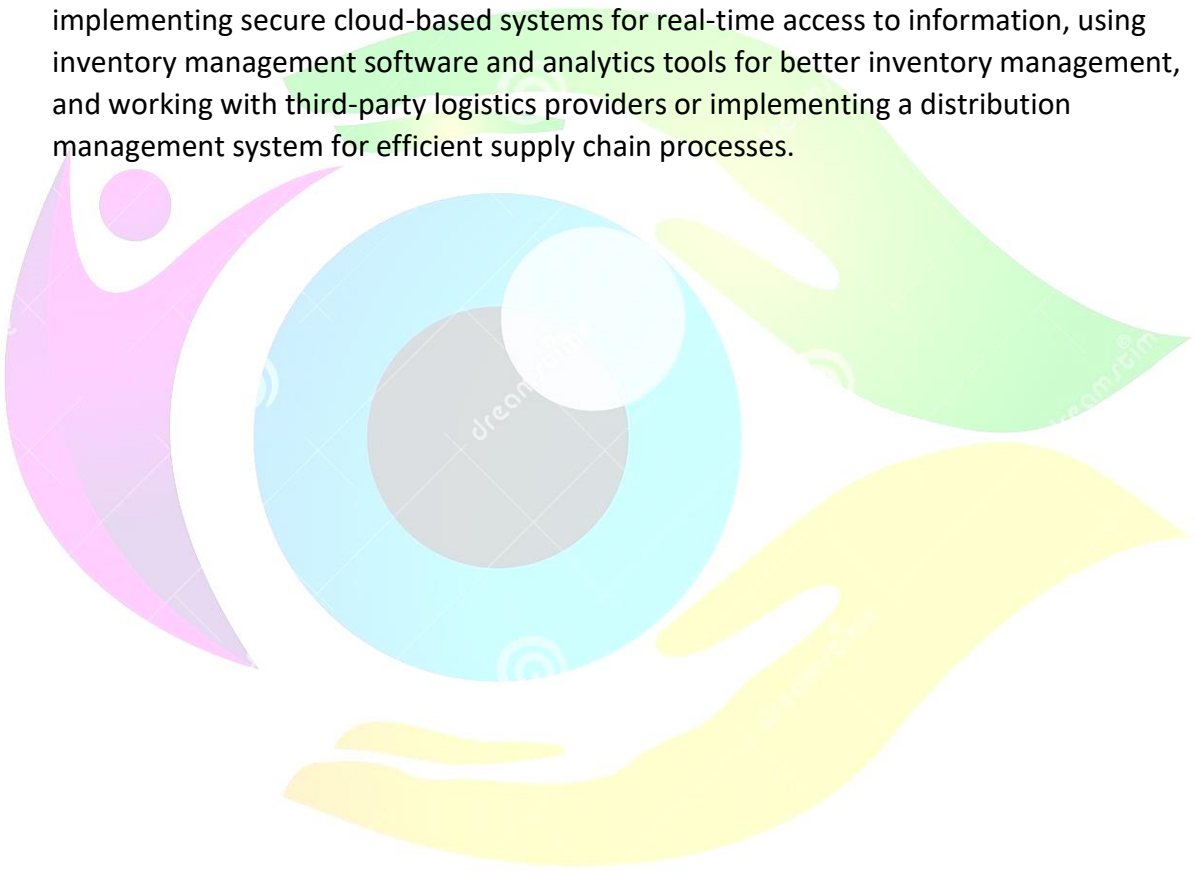
- All the payment methods are carried out online as they can be done at anytime from anywhere. The payments carried out are very much secured through encryption and in our system, payments are processed quickly without having waiting for a longer time. This online payment facility Is cheaper than the traditional payment methods and they are easy to track.

Online Database for Real time updating and backups.

- In our system all the operations conducted through our system are cloud based and all the operations are updated in real time and concurrent backup processes will be carried out automatically. This will reduce the responsibility and burden of the staff members in record keeping and storing them in a way that they can be easily retrieved.

EMR System and Cloud Based Systems

- Solutions to problems in the eyecare management system include implementing analytics and reporting tools for visibility and informed decision-making, using EHR and inventory management software to streamline processes and reduce errors, implementing secure cloud-based systems for real-time access to information, using inventory management software and analytics tools for better inventory management, and working with third-party logistics providers or implementing a distribution management system for efficient supply chain processes.



Benefits

Improved Patient Care

- The eyecare management system can help improve patient care by streamlining communication between providers, reducing errors in documentation, and enhancing the accuracy of diagnoses and treatment plans. The system can also help providers track and monitor patients' progress over time, ensuring that they receive the most appropriate and effective care.

Increased Operational Efficiency

- The eyecare management system can help eye care practices operate more efficiently by automating routine tasks such as appointment scheduling, prescription refills, and insurance claims. This can free up providers to focus on patient care and reduce administrative burdens.

Better Data Management

- The eyecare management system can help eye care practices manage patient data more effectively by centralizing all relevant information in one location. This can make it easier for providers to access and retrieve patient information quickly and accurately.

Improved Patient Engagement

- The eyecare management system can help improve patient engagement by allowing patients to access their own medical records, schedule appointments online, and receive appointment reminders and other notifications via email or text message. This can help increase patient satisfaction and loyalty.

Increased Revenue

- The eyecare management system can help eye care practices increase revenue by improving billing and payment management, reducing claim rejections, and enabling more accurate and timely payment processing.

Aim and objectives.

- **Aim**

  Eye care providers, such as optometrists, ophthalmologists, and opticians, must manage a vast amount of patient data, including medical history, test results, prescriptions, and billing information. Managing this data manually or using outdated software can lead to errors, delays, and suboptimal patient care.

  The eyecare management system project aims to address these issues by developing a comprehensive software solution that integrates all aspects of eye care practice management. The system should be designed to facilitate efficient and effective management of patient records, appointment scheduling, diagnostic testing, treatment plans, and billing.

  One of the primary goals of the system is to improve patient outcomes. The system should streamline communication between providers, enabling them to easily access and share patient information. This can help reduce errors in documentation, improve the accuracy of diagnoses, and enhance the quality of care provided to patients.

  The system should also improve the overall operational efficiency of eye care practices. By optimizing resource allocation, reducing administrative burden, and increasing revenue, the system should help eye care providers run their practices more efficiently. For example, the system can automate routine tasks like appointment reminders, prescription refills, and insurance claims, freeing up providers to focus on patient care.

  In summary, the eyecare management system project aims to develop a comprehensive software solution that improves patient outcomes, enhances operational efficiency, and facilitates better communication between eye care providers.

Objectives

- **Objective: Develop a patient record management system**

Step 1: Identify the necessary fields for patient record management.
Step 2: Develop a user interface for data entry and retrieval.
Step 3: Implement data validation and error-checking mechanisms.
Step 4: Test and refine the system for accuracy and efficiency.
Step 5: Deploy the patient record management system to eye care practices.

- **Objective: Create an appointment scheduling system**

Step 1: Identify the necessary features for appointment scheduling.
Step 2: Develop a user-friendly interface for appointment scheduling.
Step 3: Integrate the system with the patient record management system.
Step 4: Implement appointment reminders and confirmation mechanisms.
Step 5: Test and refine the system for accuracy and efficiency.
Step 6: Deploy the appointment scheduling system to eye care practices.

- **Objective: Design a diagnostic testing system**

Step 1: Identify the necessary types of diagnostic tests to be supported.
Step 2: Develop a user interface for ordering and retrieving test results.
Step 3: Integrate the system with the patient record management system.
Step 4: Implement mechanisms for tracking and reporting test results.
Step 5: Test and refine the system for accuracy and efficiency.
Step 6: Deploy the diagnostic testing system to eye care practices.

- **Objective: Develop a treatment plan management system**

Step 1: Identify the necessary features for treatment plan management.
Step 2: Develop a user interface for treatment plan creation and modification.
Step 3: Integrate the system with the patient record management system.
Step 4: Implement mechanisms for tracking and reporting treatment progress.
Step 5: Test and refine the system for accuracy and efficiency.
Step 6: Deploy the treatment plan management system to eye care practices.

- **Objective: Create a billing and payment management system**

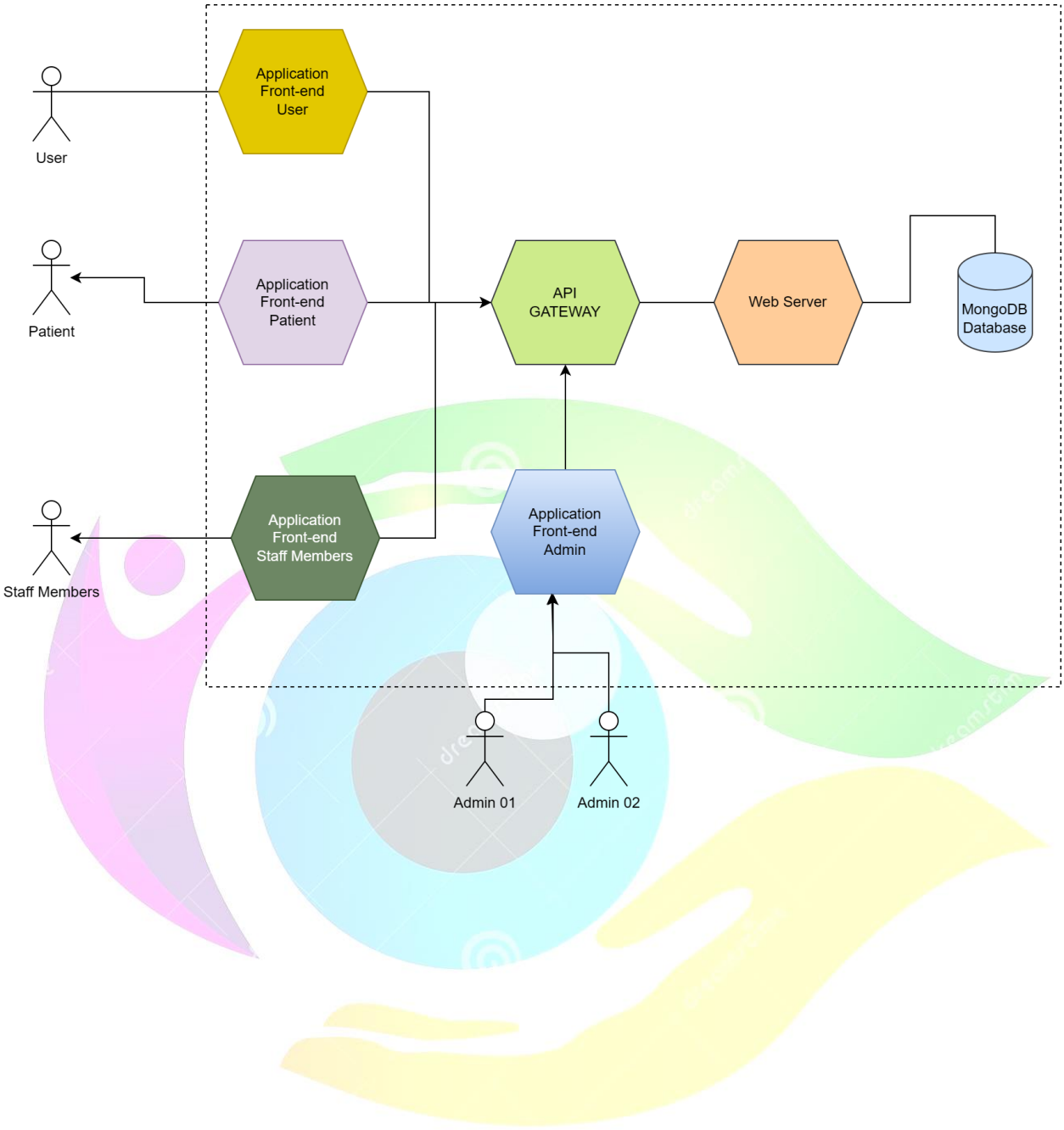
Step 1: Identify the necessary billing and payment features.
Step 2: Develop a user interface for billing and payment entry and retrieval.
Step 3: Integrate the system with the patient record management system.
Step 4: Implement mechanisms for insurance claims and payment processing.
Step 5: Test and refine the system for accuracy and efficiency.
Step 6: Deploy the billing and payment management system to eye care practices.
These measurable objectives and steps can be used to create a project plan with clear deliverables, timelines, and success criteria.

System Overview

This Eye Care management system primarily interacts with users which may include Customers, Patients, Orthoptists/surgeons and staff members and with the backend of the system. All the functions and features of the system is managed by the application server which is used by the company. There are 8 main key functions included in this Eye Care Management System.

Main Key Functions of Eye Care Management System.

- User Management.
- Patient Management.
- Eye Channeling and Patient Scheduling Management.
- Spectacle Design, Repairing, and Inventory Management.
- Content And Blog Management.
- Payment, Billing, and Claims Management.
- Surgeon (Orthoptists) And Staff Management.
- Analytics and Reporting for Clinical and Operational Insights and Distribution Management.


Application
Front-end
User
User
Application
Front-end
Patient
Patient
API
GATEWAY
Web Server
MongoDB
Database
Application
Front-end
Staff Members
Staff Members
Application
Front-end
Admin
Admin 01
Admin 02

User Management

User management is the most important component in the eyecare management system. It is where the user's first visit place in the system, its delivering a professional environment for every user comes in. it includes several functions such as fast forwarding (Tour in system), creating user accounts, login to the system using existing account and view products available on the site.

Creating account

The user can create an account by providing all the personal information of the user after that account created message will be displayed. User can upload their image to the account and also can update it with other information as well. An email will be sent through the system for the given email address.

Login

User can login to the system by using the provided email address and the password, if password is forgotten, user can use the forgot password option to reset their password. The system will send an email to the user provided email address and forgot password link is attached with it.

Fast Forwarding

If a user is not much familiar with the system, user can get advantage of the fast-forwarding option available, it will give a brief introduction to the system with some pop-up messages and short clips.

View Products

It is the homepage of the system, and every service and products can access through there, for get some services user must have a patient account and for some it's not.

In that component, system will display all the services and products a user can get from the system, and it will navigate the user to the required service/product.

Edit Profile

Users can update their user profile as they need with their new details.

Delete Profile

Users can delete their Account if they need to, system is asking to reenter the password for delete the account and after that users can delete their account with all their information.

Patient Management

Patient management is a virtual Component in an eye care management system, and it helps to deliver a high-quality care to the patients. It includes several processes such as patient account creation, creating electronic medical reports, creating electronic prescriptions, schedule appointments and communication.

Patient account creation and managing

After registering to the system, the patient can create an account by providing all the personal information of the patient and it is displayed in the account created. Important documents can be uploaded in the profile such as pervious medical records, results of the blood tests, prior ocular pressure readings and meditations. This collection of data enables the orthoptists and surgeons to get a clear idea about the patients and their conditions.

By using the patient ID, staff members can get (retrieve) patient's information and they can update the status of the patient.

All the treatment plans, follow-up care, production and repairing status is published in the account relevant to the customer/patient and they can manage according the requirement.

Creating electronic medical reports

After completion of the comprehensive eye exams which includes checking visual activity and checking for eye diseases such as glaucoma, cataracts, macular degeneration, and other conditions that causes vision problems or blindness, electronic medical reports are created. To begin, all the information is collected automatically from the patient account according to the patient ID. Then the results of the eye exams conducted should be entered using specific fields or templates. Finally, a medical report is created by summarizing the patient's information, eye exams finding results, diagnosis, treatment plan and follow-up care. After creating the report, it should be reviewed and finalized by sending it to a supervisor or to the orthoptist. If any change is made to the report after reviewing, it should be updated accordingly. Finally electronic medical reports can be shared to the patient or to other health care provider via email. Also, those created medical reports are stored in the patient's account as well.

Creating electronic prescriptions

When creating a prescription, a patient's information should be verified and standardized medication names must be used when creating. Dosages of medicine and clear instructions to take medicine must be included. Drug interactions of the patients should be checked with other meditations. After creating the prescription, it should be signed and approved. Then it will be sent to the patient's preferred pharmacy or to the patient.

Schedule appointments

A patient schedule is maintained by the staff, and they schedule an appointment date and time for the patient to undergo therapy. Attendance of the patients is confirmed early by contacting them. And their appointment will be cancelled if they notice their absence. When cancelled, appointments records will be deleted from the system.

Telemedicine (OPTIONAL)

Video conferencing (**Optional – Depends on time**) and messaging technologies are provided to the patients to get remote medical care and consultation.

Eye Channeling and Patient Scheduling Management

Eye channeling

To begin, a patient should make an appointment by contacting the health care provider via an online portal. Then the information temporal span, and surgent is provided according to the patient requirement. The option of selecting a surgeon is given to the patient and after selecting the available time slots are displayed to the patient. Patients can select the convenient time slot for them. This enables the management of patients to be connected to the selected surgeon. When channeling several factors such as doctor availability, patient preferences and severity of the patient's condition are also considered.

Appointment Handling

After the patient places an appointment, we keep track an all the appointments. This placed appointment can be viewed by the surgeons or orthoptists can be viewed be approved or reject the appointment. This enables a link with surgeon management. After the channeling payment is done by the patient, an email is sent to the patient with all the data of the appointment. If the appointment is rejected by the surgeon or orthoptist, it is also informed of the exact reason.

Patient scheduling

This system should be capable of handling many appointments and new appointments should not conflict with other scheduled appointments. Also, this should include some features such as automatic reminders, waitlist management, and rescheduling capabilities.

Create and delete reports on channeling

When appointments are approved, we create reports on the channeling and the channeled surgeon. If the patients cancel the appointment, the reports on channeling are deleted.

Spectacle Design, Repairing and Inventory Management

In this service, we have included all the designs of spectacle that have been produced previously and new designs. Also, spectacles can be customized according to the customer's requirement and according to the patient's prescription. Customization can be done for the items such as frame design, frame color, material, lens power, thickness, and other features of the spectacle. The administrator will update every component selected by the customer. The administrator is able to create new designs of the spectacles according to the customer requirements and inventory of the eye wear components and design of the spectacle can be managed. Based on the availability of the component in the inventory. Administrators can update or remove the components in the inventory.

After finalizing the design of the spectacle, the administrator will send the design of the spectacle for production. Customers can track the progress of their order and after completion of the order, it is informed to the customer via an email.

Customers can collect their product from our company, or it can be delivered after the payments are done. Cash and delivery options are also available.

Separate reports are created on the production of spectacles and the status of the components in the inventory.

Repair management

Produced spectacles can be repaired if some damage occurs or customers can redesign/reshape their spectacles. In order to request for a repair or redesign customer should log in to the repair section/page by providing the customer ID and the email. Repairing frames (metal/plastic), lenses hinges, and nose pads are some of the services in the repair section and also customers can apply for any type of redesigning of the spectacles. After login, the customer can provide information about the repair or the redesign via a form. Customer can update the previously submitted data or cancel them. If requested, we can arrange a shipping method of the spectacles to the repair center by the customer. Once the glasses have been received technicians should identify the repairs and should communicate with the customer to discuss further about repairs and costs. Customer can observe the status of the repairment, and administrator can manage (CRUD) repair code, customer's name, received date, return date, repair status and repair cost. Finally, when the repair process is over it is delivered to the customer system will generate a monthly report of all repairing process.

Payment Billing and Claims Management

Payment, billing, and claims management is an essential component in an eye care management system which helps in managing revenue and ensuring that patients receive accurate and timely billing information. All the transactions done via the system are managed including patient/customer payments, insurance claims and salary distribution of staff.

Payment management- create transactions.

a. Patient/customer payment section

When a payment is done, the system will direct the patient/customer to the payment section. Basic details of the customers are collected such as name, ID, age and all the required information to create the payment receipt. Front validation is done by validating the ID number and the system will check for the payment amount as the background validation.

After the validation is completed, the patient/customer will directly go to the payment gate where he/she can choose the method of payment. When the payment is done, payment receipt will be sent via email, and the customers get a text message confirming it.

b. Insurance claims section

As the first step patient's insurance coverage should be verified by checking if the insurance plan covers the eye care services provided and by verifying the patient's eligibility and benefits for some tests are procedures per-authorization should be taken from the insurance company. After the services have been provided to the customer/ patient, the system should submit a claim to the insurance company which is electronically generated. Bills or electronic invoices are sent to the customer/patient via an email after the payments are received from the insurance company. After the payments are done by the insurance company and if there is any remaining balance to be paid by the patient, a bill is created and sent to the patient.

c. Payment of salary for staff

This payment section is only accessible to the administrator of the system and the administrator will be able to calculate add and remove salary according to the employee information in the database and according to the time and attendance tracking of the system. After the payroll is completed, salaries should be distributed to the employees through direct deposits.

Retrieve and update transactions.

The system will record all the payments/transactions done via the system and they can be viewed according to the transaction ID by searching if necessary.

When payments are completed, the details and the status of the payment is posted in the patient's account. The payment of remaining balances after insurance payments by the patients can be updated and the patients who pay the bills under installment plans can also be updated in the patients accounts when the installments are completed.

Deleting Transactions

Transactions can be deleted if the patient cancels their appointment. After the cancellation that request is passed to the administrator with the transaction ID and a refund is made to the patient when canceling the appointment and refunding administrator will delete the relevant transaction from the database.

Generating Reports

All the reports of transactions will be generated by the system for financial purposes.

Surgeon and Staff Management

An eye care management system can have several functions related to surgeon (orthoptists) and staff management. Here are some possible product scope explanations:

1.**Surgeon/Orthoptist Management**:

An eye care management system has a feature called Surgeon/Orthoptist Management that enables clinics to control the availability and schedules of orthoptists and surgeons. The system can assist in optimizing resource usage while giving patients prompt access to the care they require. Clinics can view schedules, assign patients, and manage staff availability with easily view to Surgeon/Orthoptist Management. The system can assist in reducing wait times and raising patient satisfaction by streamlining these procedures. It can also enhance staff productivity and communication, resulting in better clinic performance all around. Any successful eye care practice must have effective surgeon/orthoptist management.

2.**Staff Management:**

An eye care management system's staff management feature enables clinics to oversee the work schedules, responsibilities, and performance of employees like nurses, technicians, and support staff. By assigning staff members to the suitable tasks and roles, the system can assist clinics in ensuring adequate staffing levels and improving staff productivity. Clinics can easily view schedules, assign tasks, and monitor staff performance thanks to staff management. The system can help reduce errors and boost staff satisfaction by streamlining these processes. Additionally, it can enhance staff communication, which will enhance clinic performance in general. Any successful eye care practice must have effective staff management.

In general, an eye care management system can assist clinics in giving their patients effective, high-quality care while optimizing their resources and operations.

Content and Blog Management

Content Management

In the content management all the contents of the system are managed by organization and publishing content related to eye care management system and services. This may include about us, privacy and policy, terms and conditions, contact us, quick links, client site images, testimonies etc. The format color alignment of the texts images videos and all other multimedia contents are managed by this section. this involves creating new content categorizing and tagging content in a user-friendly manner, ensuring the published content is displayed correctly and consistently across cross different devices and browsers, checking, updating the content by ensuring that they are up to date accurate and relevant, and all the contents should be optimized for any search engine by using suitable or relevant SEO techniques.

finally reports can be generated by analyzing website traffic, user behavior and other components to improve the content of the system.

Blog Management

Blog management in an eye care management system is a process of creating, organizing and publishing all the information regarding eye care and educational stuff regarding vision health. This includes I care and vision health advice, informative articles about vision health and eye illnesses, articles and instructions to protect ice after surgeries, patient success stories and news updates. All these articles and information are updated with time and with new findings.

Promoting of Eye Care services and products he's also done by this section in social media, e-mail newsletters, and in other platforms to engage patients towards the company. comments on blog posts are moderated, deleted and responded through this section. Patients can also make request to get information about their unique circumstances and after getting those requests administrator will send related information to the patient via an e-mail. A Chat bot is also established for quick answers. Also, a FAQ is also managed by this section.

Analytics and Reporting for clinical and operational insights and Distribution Management

Analytics and Reporting for clinical and operational insights

Analytics and reporting for clinical and operational insights in an eyecare management system involve using data to gain insights into patient care and the operational efficiency of the eyecare organization. Clinical insights may include analyzing patient data such as medical history, treatments, and outcomes to identify trends and predict outcomes. Operational insights may involve analyzing resource utilization, workflow optimization, and financial performance to identify areas for improvement and reduce costs. By leveraging analytics and reporting, eyecare management systems can improve patient outcomes, optimize resources, and increase efficiency.

In this function, collect all the reports that are generated by other all functions and analyzing each report thoroughly, and generating a new report at the end of every month as a combination of all of them.

Distribution Management

This System is used to manage the distribution of eyewear products, enabling eyecare providers to manage inventory, track orders and monitor shipments to ensure patients receive the correct products on time.

In this function, Creating new product records, adding new products to the inventory, or creating new reports and dashboards to monitor inventory levels and product demand, Accessing inventory data, analyzing data to identify trends and patterns, and generating reports and dashboards for distribution management insights, Updating inventory records with new product information, modifying reports and dashboards to reflect changing needs, or adjusting data models to better capture relevant information and Removing outdated or unsellable products from the inventory, deleting unnecessary reports and dashboards, or removing unnecessary fields from data models.

In Here, the spectacles are collected from the customer and the repaired spectacles are sent back to the customer.

Collecting spectacles: In here providers have a system in place to collect eyeglasses from patients, such as having a drop-off point or arranging a pickup service.

Communication with the customer: Here the providers keep the customer informed throughout the process and provide updates on the status of their glasses.

Returning Glasses: Once the glasses are repaired, suppliers arrange to return them to the customer via pickup or delivery.

Non-Functional Requirements

Usability

- This system will provide a user interface design which is easy to navigate with clear guidelines even to a person with a little understanding of the technology. Users can customize the views and settings which improves the efficiency and productivity of the system. User satisfaction is also improved by providing real- time responses to the user in time-sensitive tasks. The system usage limit is unlimited, and it can be used at any time at anywhere when a proper internet connection is established.

Fast and Reliable

- This system will reduce the time and effort needed from the staff members to carry out the processes and responsibilities because of the effectiveness of the system. Also, this will operate and perform functions without any interruptions and errors which will reduce data loss and corruption. This system allows to reduce the labor-intensive operations and manpower can be used in other important circumstances.

Fast and Reliable

- This system will reduce the time and effort needed from the staff members to carry out the processes and responsibilities because of the effectiveness of the system. Also, this will operate and perform functions without any interruptions and errors which will reduce the data loss and corruption. This system allows to reduce the labor-intensive operations and manpower can be used in other important circumstances.

Security

- Best practices and measures have been taken to improve the protection of information, system and resources from security breaches because security is an essential factor to be considered. This will ensure the confidentiality, integrity and protection of sensitive data and resources of the organization by encryption and authentication.

Positioning

- Positioning helps organizations to create a unique identity of that organization or their products that can be distinguished among consumers rather than the competitors of the organization. By using this marketing strategy in our system, it will create a memorable brand of our company to the targeted audience, and it will help to capture the attention and loyalty of the consumers. and it will help to capture the attention and loyalty of the consumers. This will attract good reviews to the company by the consumers which may lead to build up a brand among other organizations.

Increased Scalability

- Companies with better services are only available in the metropolitan areas for last few decades. The people who are away from those areas are being deprived of important services. By automating the systems of the companies, they can be scale up to the rural areas and increase their productivity and the marketplaces as well.

Literature Review

The Eye care Management system manages all the operations relation to eye health such as diagnosis, treatments etc. and producing spectacles. The distribution of the eye wear is also permitted through this management system. The existing companies will not provide both the facilities together. Either they will provide assistance and treatments in eye illnesses, or they will produce spectacles only. Also, most of the systems are unable to provide proper education of eye care to the customer/patients. The existing systems do not have a methodical way to identify the patient and their condition properly by viewing past medical records and reminding the patients about their scheduled appointments, treatment plans and follow-up care routines and are also lack of patient progress tracking criteria in order to monitor on treatment plans, success of the treatments etc. Also, customers do not have a proper way to get an idea about the production or repairing process of their product. Most of the existing companies face huge conflicts on creating and storing records and management of their inventories.

The newly designed Eye Care Management system will be a solution to these all the problems identified in other systems and this system will provide all the treatments for eye illnesses as well as this system will manage the production of spectacles. This system will be a library for the patients to get knowledge about their eye health.

Some of the existing systems that we have reviewed in developing our system are listed below.

- Vision Care – This system mainly focuses on producing spectacles and they are approaching for the treatments to be done for the eye illnesses but there is no proper way of monitoring the patient progress in eye health.
- Eye Mantra - This is an entire system designed for the patients looking for eye treatments and they are mainly focused on eliminating curable eye blindness.
- Clear Vision – This is a company which provides the customers with perfect eye wear with high range of designs and fashions to a very much affordable rate.

Tools And Technologies

In our information technology project, we are going to use tools and technologies like UML apparatuses and strategies, project management tools, and many development tools. We have divided our work into sections and are working on it independently.

When comes to the Requirements Engineering Methods, we must identify and document the system requirements using the following methods.

- Interviews with stakeholders: We can interview the clients, doctors, patients, and staff to get a better understanding of their needs and expectations.
- Surveys and questionnaires: We can use surveys and questionnaires to gather quantitative and qualitative data from a larger sample of users.
- Use cases and user stories: We can create use cases and user stories to describe the functional and non-functional requirements of the system.

In this stage, we can use online shared tools such as Microsoft Word, PowerPoint, and Excel for documenting, and Draw.io, StarUML, and Mock flow can be used. Then one and each colleague can be fulfilled their respective commitments using those online tools.

Model one part used Microsoft PowerPoint to create the task proposition presentation, and it is also used to create the scrum presentation in the second model. To complete our task proposition record, we used Microsoft Word. Consequently, the Microsoft office package has proven to be extremely beneficial in helping us complete our project proposal planning and finish our sanction archive. Each colleague independently depicted their capability in Microsoft Word, and then they all combined their work into a unified word archive.

As design methods use the following design methods to create a user-friendly and visually appealing interface.

- Wireframes and mockups: We can use wireframes and mockups to visualize the layout and features of the system.
- User-centered design: We can use the principles of user-centered design to ensure that the system meets the needs and expectations of the users.
- Responsive design: We can design the system to be responsive, which means that it adapts to different screen sizes and devices.

The Figma design tool is used to ensure that the design is clear and effective. When it comes to designing interfaces for websites or apps, Figma is a powerful vector program that was created specifically for those who want to be productive and creative at the same time.

Draw.io is a valuable free outlining administration that offers strong collaboration features to its users. It has several different shape libraries, each of which contains hundreds of visual components. In this section, we can create and share graphs directly from within a browser. As

a result, we were able to use it to create our framework outline chart. Aside from that, we've made use of StarUML as well. It is a collection of language-display apparatuses that have been brought together. It is also employed in the creation of UML diagrams.

A Hackolade will also be used as the database displaying apparatus for our database, in addition to the rest of the equipment. (MongoDB) These are the tools and technological advancements that we have made use of. As part of our executive project management process, we used the Microsoft Project/MS Project software. We will make use of a variety of resources to complete our project on time.

In the development stage, we use the following tools and technologies to develop the system.

- MERN Stack: We can use the MERN Stack (MongoDB, Express.js, React, and Node.js) to build a full-stack web application.
- Git and GitHub: We can use Git and GitHub for version control and collaboration.
- IDEs: We can use IDEs (Integrated Development Environments) such as Visual Studio Code or WebStorm to write code and debug.

As a programming language, we will use JavaScript and Node.js to accomplish our goals. We use JavaScript for front-end development and Nodejs for back-end development. JavaScript is a high-level language that is interpreted, which means that it is executed by a web browser without the need for a separate compiler. Node.js is a cross-platform, open-source server environment and back-end JavaScript runtime environment, that runs on the V8 JavaScript Engine, and executes JavaScript code outside a web browser. Nodejs offers a genuine opportunity to build high-performance web applications from the ground up. We decided to use Typescript to write type-safe code and it makes many benefits. TypeScript is a superset of JavaScript, and it makes it easier to write object-oriented code and improves the developer experience.

WebStorm and Visual Studio Code will serve as our primary integrated development environments, with Sublime Text serving as our secondary editor.

We will use React as the front-end framework and Express as the back-end framework for our application. React is an open-source JavaScript library and uses a component-based architecture. React uses a virtual DOM, which is a lightweight copy of the actual DOM, to perform updates efficiently. It is used to put together SPA - single-page applications on the web.

Express is a Nodejs web application framework that adds features to web and multi-platform applications while maintaining simplicity. For authentication, we use PassportJs and JWT. Passport is authentication middleware for Node.js. JSON Web Token (JWT) is an open standard for securely transmitting information between parties as a JSON object.

As our database system, we decided to use an unstructured database (NoSQL) system. MongoDB is a popular document-oriented NoSQL database that stores data in flexible, JSON-like documents, rather than in rigid, structured tables like traditional relational databases. With MongoDB, we can use Mongoose (ODM) to make easy queries. Mongoose is a popular object modeling library for MongoDB and Node.js. It provides a simple and easy-to-use API for interacting with MongoDB databases, allowing developers to define schemas and models for their data.

HTML, CSS and JSON, XML will be the web technologies that we will be utilizing for our project. We use Bootstrap to get a well-defined CSS structure, in addition, allows for the incorporation of JavaScript augmentations. Bootstrap is a CSS library that defined classes to easily use. In React we can't use pure HTML, so there we have to use JSX. JSX means JavaScript XML. JSX allows us to write HTML in JavaScript. JSX makes it easier to write and add HTML in React.

As a most important testing stage, we use the following testing methods to ensure that the system is working correctly:

- Unit testing: We can use unit testing to test individual components and functions of the system throughout development.
- Integration testing: We can use integration testing to test how different components of the system work together.
- Acceptance testing: We can use acceptance testing to ensure that the system meets the requirements and expectations of the users.

As tools, we can use Jest. Jest is a JavaScript testing framework designed to ensure the correctness of any JavaScript codebase. We have to write test cases using the Jest testing framework. Jest can also be used to test our Node.js application, so we can test our backend codebase with Jest.

And we can use Postman for API testing. Postman is an API platform, it can be used to write functional tests, integration tests, regression tests, and more.

As Integration Methods we use the following integration methods to integrate the different components of the system:

- API: We can use API (Application Programming Interfaces) to connect the front-end and back-end of the system.
- Apache Server: React Node.js applications can be deployed on an Apache server.

Apache is a web server that is free and open-source software that distributes web content over the internet.

Work Distribution

	Registration Number	Name With Initials	Work Allocated
1.	IT21160448	Akalanka P.A.A	♦ Patient Management ♦ Introduction ♦ Company Background
2.	IT21189562	Dodangoda P.N	♦ Payment, Billing and Claims Management ♦ Problem Statement
3.	IT21169908	Prashantha K.G.M	♦ Eye Channeling and Patient Scheduling Management ♦ Tools and Technologies
4.	IT21167614	Mahagedara D.N	♦ User Management ♦ Benefits
5.	IT21169762	Keegal S.D	♦ Content And Report Management ♦ Solutions
6.	IT21174780	Dissanayaka D.M.M.I.T	♦ Content and Blog Management
7.	IT21156038	Nawanjala N.K.N	♦ Analytics and Reporting for clinical and operational insights and Distribution Management ♦ Aim and Objectives ♦ Benifits
8.	IT21156410	Fonseka M.M.N.H	♦ Spectacle Design, Repairing and Inventory Management

Gantt Chart

TASK	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12
Requirement analyst												
Planning												
Frontend Design												
Database Designing (EER diagram)												
Frontend Development												
Creating Database												
Backend Development												
Testing												
Launch												

Diagram Key (Beta)

- Completed Steps
- Already Started Steps
- Not Start Steps

Summary Of the Gantt Chart

A Gantt chart is used for project planning. It's a useful way of showing what work is scheduled to be done in a specific week. So, this project's first step should be completed during the first week of February. If necessary, we can identify a client and the project can be done with the client. But we didn't find a client and the client is represented as an imaginary client. Our hypothetical client is appeared for 'Eye Care Company'. This company behaves as an intermediary between customers and suppliers as well as patients and surgeons. In order to do that we accumulate requirements from web applications, online channeling applications, and then discuss with the shop owners and find out their needs. There after we decided what are the required functions, we needed to develop the system and we divided the function wise among the team members. First, we have analyzed the requirements. In order to do that both the charter submission and the charter discussion have been scheduled for the first week. We already done it. If the charter is accepted, we will enter the second week. It is necessary to create user stories, product backlogs, and spring backlogs during this process. In addition to that we must do the presentation and the proposal submission. We must deliver it by the end of that week. In the proposal presentation we should have included all the requirements, system overview, tools and techniques, problem statements and the solutions, and finally the Gannt chart. In the third and fourth week we must design a user interface (UI) which is known as frontend and submit it and, we will design conceptual database designing (EER Diagram) using the ER diagram in the third week. We will expect to complete the front-end development and we can begin coding part during the fifth, sixth, seventh weeks. While we create a front end, we should design a database. Frontend development and the database design are moving on parallelly. As well as once the database will be created, we can move on to back-end development in the seventh week and it will be up to the tenth week. The system testing portion of the project is scheduled to begin during the eleventh week. Finally, during the last week, we made the decision to finish our final report on the project.

Resources and Appendix

Collatree - Eye Hospital Management System For Eye Clinics and Hospitals (collatree.com)

Youtube - Online Eye Clinic Management System project developed using PHP & MySQL - YouTube

Tutorials point - Tutorials - Spectrum Eyecare Software - Visual Acuity Software

WHO - Eye care in health systems: guide for action (who.int)

Appendix