

Project ID :

TMP-2023-24-100

Important instructions to students:

1. According to the comments given by the supervisor, make the necessary modifications and finally, get the approval from the Supervisor and the co-supervisor.
2. If the project topic is rejected, identify a new topic, and follow the process as before.
3. The approved form must be submitted to the folder (will be notified later) on or before 10th July 2023.

(Students should ensure that they complete all sections ranging from 1 to 7. Then, download the form and email to your supervisor before 26th June 2023. Please note that the corresponding supervisor of the project is responsible for completing sections 8 to 10.)

1. Topic (12 words max)

Apeksha Hospital Donor Engagement System

2. Research area the project belongs to

Machine Learning and Soft Computing (MLSC)

3. Team member details

Student Name	Student ID	Specialization
Leader: Punchihewa S. N	IT20665166	SE
Member 2: Prabodha K. W. D. S	IT20665098	SE
Member 3: Bandara H. R. H. S	IT20662028	SE
Member 4: Wijesooriya P. L. P. G. D. S	IT20660352	SE

4. Brief description of the research problem including references (200 – 500 words max) – references not included in word count

Intelligent Donor-Driven Inventory Management and Recommendation System

The research component aims to optimize inventory management and facilitate donor-driven item recommendations in the Apeksha Hospital Donor Engagement System. By developing an intelligent system that analyzes donor behavior and item preferences, personalized item recommendations can be made. The system will also provide an interactive interface for donors to select items and track their impact. Through evaluation using donor satisfaction surveys and donation patterns, the research will assess the system's effectiveness in enhancing donor engagement and resource allocation. The goal is to improve overall efficiency in managing donated items within the system.

Secure and Transparent Blockchain-based Fund Donations

The research component focuses on utilizing blockchain technology to ensure the security, transparency, and traceability of fund donations in the Apeksha Hospital Donor Engagement System. The goal is to develop a blockchain-based system that records and verifies donation transactions, automates processes using smart contracts, and enhances donor trust. Machine learning algorithms can also be used to analyze transaction patterns for improved security. The research aims to enhance fund donation security, increase transparency, and promote accountable use of funds in the system.

Predictive Analytics for Donation Campaign Success

The research component focuses on improving the effectiveness of donation campaigns within the Apeksha Hospital Donor Engagement System. Using predictive analytics techniques, the research aims to develop models that can forecast campaign success by considering factors such as content, timing, and donor segmentation. Analyzing historical campaign data, the research identifies patterns and predictors of successful campaigns. By evaluating the accuracy of predictive models, the research guides campaign planning and resource allocation for optimal donor response. The goal is to enhance donation campaign strategies, leading to increased fundraising success for Apeksha Hospital.

Promoting quality hair donation for cancer patients

The research component addresses the absence of a comprehensive hair donation program at Apeksha Hospital. Donors ensure the quality of donated hair by checking characteristics such as length, absence of split ends, and condition using image processing techniques. By promoting high-quality hair donations, the research aims to provide cancer patients with excellent wigs or hairpieces, contributing to their well-being during treatment.

<https://ieeexplore.ieee.org/abstract/document/9565320>

<https://dl.acm.org/doi/abs/10.1145/3441000.3441014>

<https://ieeexplore.ieee.org/abstract/document/8943788>

<https://www.jstor.org/stable/20720782>

<https://www.sciencedirect.com/science/article/abs/pii/S1567422321000302>

<https://dl.acm.org/doi/abs/10.1145/3272973.3274053>

<https://rucore.libraries.rutgers.edu/rutgers-lib/41237/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6436617/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6602105/>

<https://www.scss.tcd.ie/publications/theses/diss/2018/TCD-SCSS-DISSERTATION-2018-073.pdf>

<https://www.inderscienceonline.com/doi/abs/10.1504/IJBM.2022.121795>

5. Brief description of the nature of the solution including a conceptual diagram (250 words max)

Intelligent Donor-Driven Inventory Management and Recommendation System

Develop an intelligent donor-driven inventory management and recommendation system in Apeksha Hospital. Utilize machine learning to analyze donated item data, identify donor preferences, and develop personalized recommendations. Implement an interactive inventory interface for donors to select and track their impact. Evaluate system effectiveness through surveys, donation patterns, and inventory metrics. Analyze impact on donor engagement and resource efficiency.

Secure and Transparent Blockchain-based Fund Donations

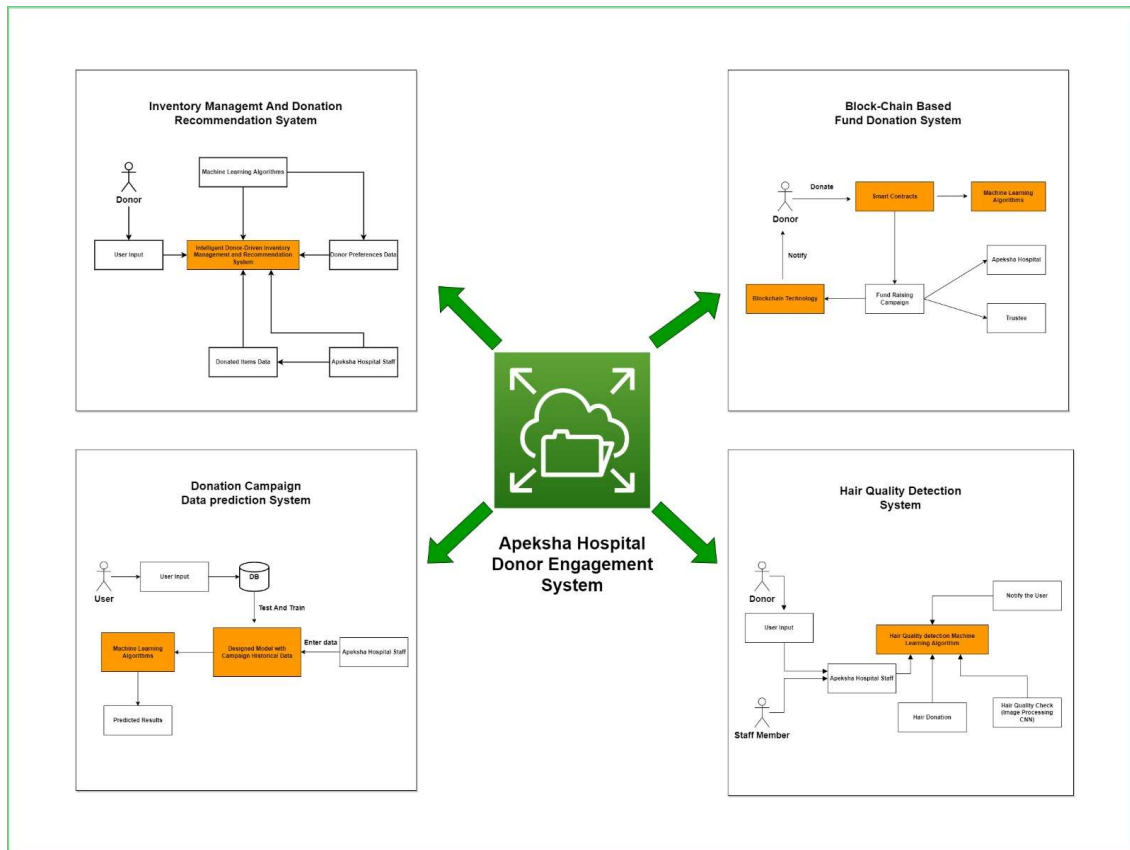
Explore blockchain for secure, transparent fund donations. Develop a system recording and verifying donation transactions, ensuring immutability and transparency. Investigate smart contracts for automated donations and enhanced trust. Evaluate effectiveness in fraud prevention, transparency, and improving donor confidence. Use machine learning for transaction analysis and anomaly detection to enhance security.

Predictive Analytics for Donation Campaign Success

Utilize predictive analytics to forecast campaign success. Develop models considering content, timing, segmentation, and external factors. Analyze historical data for patterns and predictors. Evaluate model accuracy in planning and resource allocation for optimal donor response.

Promoting quality hair donation for cancer patients

Donors ensures donated hair meets hospital standards. Image processing checks hair length, split ends, and condition. Only accept natural color dye or bleached/highlighted hair if in good condition. Encourages donors to provide hair meeting relevant standards.



6. Brief description of specialized domain expertise, knowledge, and data requirements (300 words max)

Intelligent Donor-Driven Inventory Management and Recommendation System

Domain expertise in inventory management and donation processes. Knowledge of machine learning algorithms for collaborative filtering and reinforcement learning. Access to data on donated items, including attributes, utilization history, and departmental needs. Understanding of donor behavior and preferences. Data on donor interests, previous donations, and overall engagement. Inventory data, including item availability and utilization metrics. Donor satisfaction surveys and donation patterns.

Secure and Transparent Blockchain-based Fund Donations

The research component requires specialized domain expertise in blockchain technology, smart contracts, security measures, transparency, and machine learning algorithms. In-depth knowledge of the Apeksha Hospital Donor Engagement System, fund donation regulations, access to historical donation data, and an understanding of donor expectations for transparency and security are also crucial.

Predictive Analytics for Donation Campaign Success

The research component requires expertise in predictive analytics, campaign dynamics, data analysis, and donor segmentation. Access to historical campaign data, understanding of the Apeksha Hospital Donor Engagement System, and knowledge of donor behavior and preferences are essential. Evaluation of model accuracy and awareness of industry benchmarks are also necessary for effective analysis and improvement of donation campaigns.

Promoting quality hair donation for cancer patients

Specialized domain expertise in hair donation programs and quality standards is required for this research component. Knowledge of image processing techniques is necessary to analyze hair characteristics. Access to hair donation data, including donor records and images, is crucial for developing the intelligent system. Understanding the guidelines set by Apeksha Hospital for hair donations is essential for ensuring compliance with their standards.

7. Objectives and Novelty

Main Objective

The Main Objective of our research is to develop an intelligent system that optimizes inventory management and facilitates donor-driven item recommendations, leading to improved utilization of donated items by aligning them with departmental needs and donor preferences. Additionally, we aim to implement a blockchain-based system to ensure secure, transparent, and traceable fund donations, enhancing the overall security and transparency of the donation process and fostering trust between donors and the hospital. Moreover, we will utilize predictive analytics techniques to forecast the success of donation campaigns, enabling us to enhance their effectiveness by accurately predicting donor response and providing valuable insights for campaign planning and resource allocation. Lastly, we seek to establish a program that encourages high-quality hair donations for cancer patients, ensuring that the received hair meets the required standards and promoting better outcomes for the recipients. Through these objectives, our goal is to create a comprehensive and efficient donor engagement system at Apeksha Hospital.

Member Name	Sub Objective	Tasks	Novelty
Punchihewa S.N	<p>Analyze donor behavior patterns, preferences, and engagement levels to gain insights into their donation habits, interests, and item preferences. This sub-objective aims to understand donor motivations and identify patterns that can inform personalized item recommendations.</p> <p>Develop machine learning algorithms, such as collaborative filtering or reinforcement learning, to effectively analyze donor data and generate personalized item recommendations.</p> <p>Implement a recommendation system that incorporates machine learning models and donor data to suggest specific donated items to</p>	<p>1. Gather relevant data on donated items, including attributes, utilization history, departmental needs, and donor information. Preprocess the data to ensure its quality, consistency, and compatibility with machine learning algorithms.</p> <p>2. Analyze donor behavior patterns, preferences, and engagement levels using statistical techniques and data mining approaches. Identify key donor segments and understand their donation habits, interests, and item preferences. Develop machine learning algorithms, such as collaborative filtering, reinforcement learning, or</p>	<p>This research component introduces an innovative approach that combines donor engagement and machine learning techniques for inventory management and recommendations. By incorporating donor preferences and behavior analysis, the system aims to personalize item recommendations and enhance the overall donor experience.</p> <p>The use of machine learning algorithms enables the system to</p>

	<p>donors based on their interests and previous engagement.</p>	<p>deep learning models, to effectively analyze donor data and generate personalized item recommendations. Train and optimize the models using the collected data.</p> <p>3. Implement the recommendation system that integrates the machine learning models with the donor engagement platform. Design an interactive interface that allows donors to view and select from recommended items based on their interests and previous engagement.</p> <p>4. Develop an intuitive and personalized inventory management interface for donors. Design features that allow donors to actively engage with donated items, select items from recommendations, track their impact, and view inventory utilization metrics.</p>	<p>learn and adapt to donor preferences over time, improving the accuracy of recommendations.</p> <p>This component promotes active donor involvement in inventory management, allowing them to select from recommended items. The intelligent donor-driven inventory management and recommendation system contributes to optimizing donor engagement, resource allocation, and the overall efficiency of utilizing donated items within the Apeksha Hospital Donor Engagement System.</p>
Prabodha K. W. D. S	<p>Develop a secure and transparent blockchain-based system for fund donations within the Apeksha Hospital Donor Engagement System.</p>	<p>Conduct a literature review on blockchain technology and its applications in the healthcare and donation sectors.</p> <p>Identify the specific requirements and challenges of the Apeksha Hospital Donor Engagement System in terms of fund donations.</p>	<p>The novelty of this research component lies in the integration of blockchain technology, smart contracts, and machine learning algorithms specifically tailored for fund donations within the Apeksha Hospital Donor Engagement System. By addressing</p>

		<p>Design and develop a blockchain-based system that records and verifies donation transactions securely and transparently.</p> <p>Investigate and implement smart contract functionality to automate donation processes, such as releasing funds based on predefined conditions.</p> <p>Evaluate the effectiveness of the blockchain-based system in preventing fraud, increasing transparency, and improving donor confidence.</p> <p>Explore the integration of machine learning algorithms to analyze transaction patterns and detect anomalies within the blockchain network.</p> <p>Develop and deploy machine learning models for enhanced security and fraud detection within the blockchain-based system.</p> <p>Test and validate the system using real-world scenarios and donation data from Apeksha Hospital.</p> <p>Assess the performance and usability of the system through user feedback and satisfaction surveys.</p>	<p>the unique requirements and challenges of the hospital, the research aims to provide a secure, transparent, and automated donation process, ensuring the integrity of transactions and increasing donor confidence.</p> <p>The combination of blockchain, smart contracts, and machine learning algorithms in the context of fund donations within a hospital setting contributes to the advancement of donation management systems and can serve as a blueprint for similar initiatives in the healthcare sector.</p>
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Bandara H.R.H.S	<p>Identify the factors that influence the success of donation campaigns. This could include factors such as the timing of the campaign, the content of the campaign, and the target audience.</p> <p>Develop predictive models that can forecast the success of donation campaigns. These models could be used to guide campaign planning and resource allocation.</p> <p>Evaluate the accuracy and reliability of the predictive models. This could be done by comparing the predictions of the models to the actual results of past campaigns.</p>	<p>Collect data from Apeksha Hospital blood donation center. This data could include information about the timing, content, and target audience of past campaigns, as well as the number of donors who responded to each campaign.</p> <p>Clean and prepare the data for analysis. This could involve removing duplicate data, correcting errors, and transforming the data into a format that is suitable for analysis.</p> <p>Analyze the data using predictive analytics techniques. This could involve using statistical models, machine learning algorithms, or other techniques to identify patterns in the data and to make predictions about the success of future campaigns.</p>	<p>The use of predictive analytics techniques to forecast the success of donation campaigns is a novel approach that has the potential to improve the effectiveness of these campaigns.</p> <p>The project will collect data from Apeksha Hospital blood donation center, which is a unique and valuable data source. The project will use a variety of data analysis techniques, including statistical modeling, machine learning, and natural language processing.</p>
Wijesooriya P. L. P. G. D. S	<p>provide the main factors to be considered in relation to hair donation arrangements.</p> <ol style="list-style-type: none"> 1. Permanently dyed 2. bleached/naturalness 3. Lice infestation 4. dryness 	<p>Collecting image data according to certain criteria</p> <p>Use machine learning algorithms to do a binary classification (CNN) based on identifying the key Quality factors</p>	<p>Implementation of a deep learning algorithm(CNN) to examine the key quality factors of hair to increase the efficiency and effectiveness of the hair donation process,</p>

	<p>Verify that the user input data matches the key factors requested by the system and verify that it is suitable for donation.</p> <p>After checking the condition of the hair, give the result to the user along with other relevant details.</p>	<p>Match the status check result with other donation details and notify the user</p>	<p>which currently only takes place physically.</p>
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8. Supervisor checklist (supervisors should fill sections from 8 to 10)

1. Is this research problem valid?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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2. Is the proposed research group, correct?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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3. Is the proposed research area, correct?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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4. Do the proposed sub-objectives match the students' specialization?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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5. Is the required domain expertise, knowledge, and the data available either through the supervisor or external supervisor?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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6. Is the scope of the solution practical?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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7. Do all sub-objectives have sufficient novelty?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
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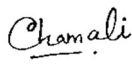
9. Your final decision:

Acceptable: Mark/Select as necessary

Topic Accepted	<input checked="" type="checkbox"/>
Topic Accepted with minor changes (should be followed up by the supervisor) *	<input type="checkbox"/>
Topic to be Resubmitted with major changes*	<input type="checkbox"/>
Topic Rejected. Topic must be changed	<input type="checkbox"/>

* Detailed comments given below

Comments**10. Supervisor details**

	Title	First Name	Last Name	Signature
Supervisor	Mrs.	Lokesh	Weerasinghe	
Co-Supervisor	Ms.	Chamali	Pabasara.	
External Supervisor				
Summary of external supervisor's (if any) experience and expertise				