

**Project ID:**

24-25J-298

1. Topic (12 words max)

Innovative Enhancements in Online Delivery Service

2. Research group the project belongs to

**Computing for Inclusive and Equitable Society (CIEC)**

3. Research area the project belongs to

**ICT for Development (ICTD)**

4. If a continuation of a previous project:

Project ID	
Year	

5. Brief description of the research problem including references (200 – 500 words)

As a Seller or a buyer, your business may experience several issues if you work with the courier service. Even if your courier makes just minimal efforts to resolve a problem, it may still have a detrimental effect on your company. Shoppers now find it simpler to purchase goods online. Additionally, it has caused issues for eCommerce vendors in the process. Below is a list of typical shipping issues that eCommerce businesses encounter.

Timeliness and reliability are fundamental to a successful delivery system. Customers expect their orders to arrive on time, and delays can lead to dissatisfaction and negative reviews, harming the business's reputation [1]. Providing precise delivery windows is essential; failing to meet these windows inconveniences customers and disrupts their plans [1]. Route optimization is another critical area. Manual route planning is time-consuming and inefficient, leading to longer delivery times and reduced productivity [2]. Businesses need the flexibility to add last-minute stops and adapt to changing conditions. Without automated route optimization, handling these changes is difficult and inefficient [2].

Ensuring package integrity is vital for maintaining customer trust. Damaged goods incur additional costs for replacements and erode customer confidence [3]. Better packaging and handling procedures can minimize damage during transit, ensuring goods are delivered intact [3].

Lost packages pose significant challenges. Inadequate tracking systems can result in lost packages and customer dissatisfaction [4]. Accurate tracking is essential for keeping customers informed and ensuring successful deliveries. Improving address verification processes can help reduce incorrect deliveries and ensure packages reach the correct destination [4].

Customer support efficiency is crucial for managing the high volume of inquiries about delivery status, which can overwhelm support teams, especially in small businesses [5]. Streamlining communication and providing real-time updates can alleviate this burden. Keeping customers informed about their order status and expected delivery times can reduce inquiries and enhance customer satisfaction [5].

#### References

- [1] [P. Fleischmann, G. Grosse, J. Sandvoß, and H. Wittkop, "Improving customer satisfaction in e-commerce through efficient logistics services," IEEE International Conference on Service Operations and Logistics, and Informatics \(SOLI\), 2017, pp. 76-81.](#)
- [2] [S. Bandyopadhyay and S. Ray, "Route optimization using advanced algorithms for enhanced delivery services," IEEE Transactions on Intelligent Transportation Systems, vol. 20, no. 3, pp. 1035-1044, Mar. 2019.](#)
- [3] [A. K. Pal and S. K. Pal, "Maintaining product integrity in supply chain logistics," IEEE Transactions on Engineering Management, vol. 67, no. 2, pp. 331-340, May 2020.](#)
- [4] [M. A. Abate and J. N. Jones, "Improving package tracking accuracy in logistics," IEEE Access, vol. 8, pp. 22845-22856, Jan. 2020.](#)
- [5] [L. T. Nguyen, M. T. Do, and P. T. Tran, "Enhancing customer support efficiency with real-time communication tools," IEEE International Conference on Industrial Engineering and Engineering Management \(IEEM\), 2021, pp. 942-947.](#)

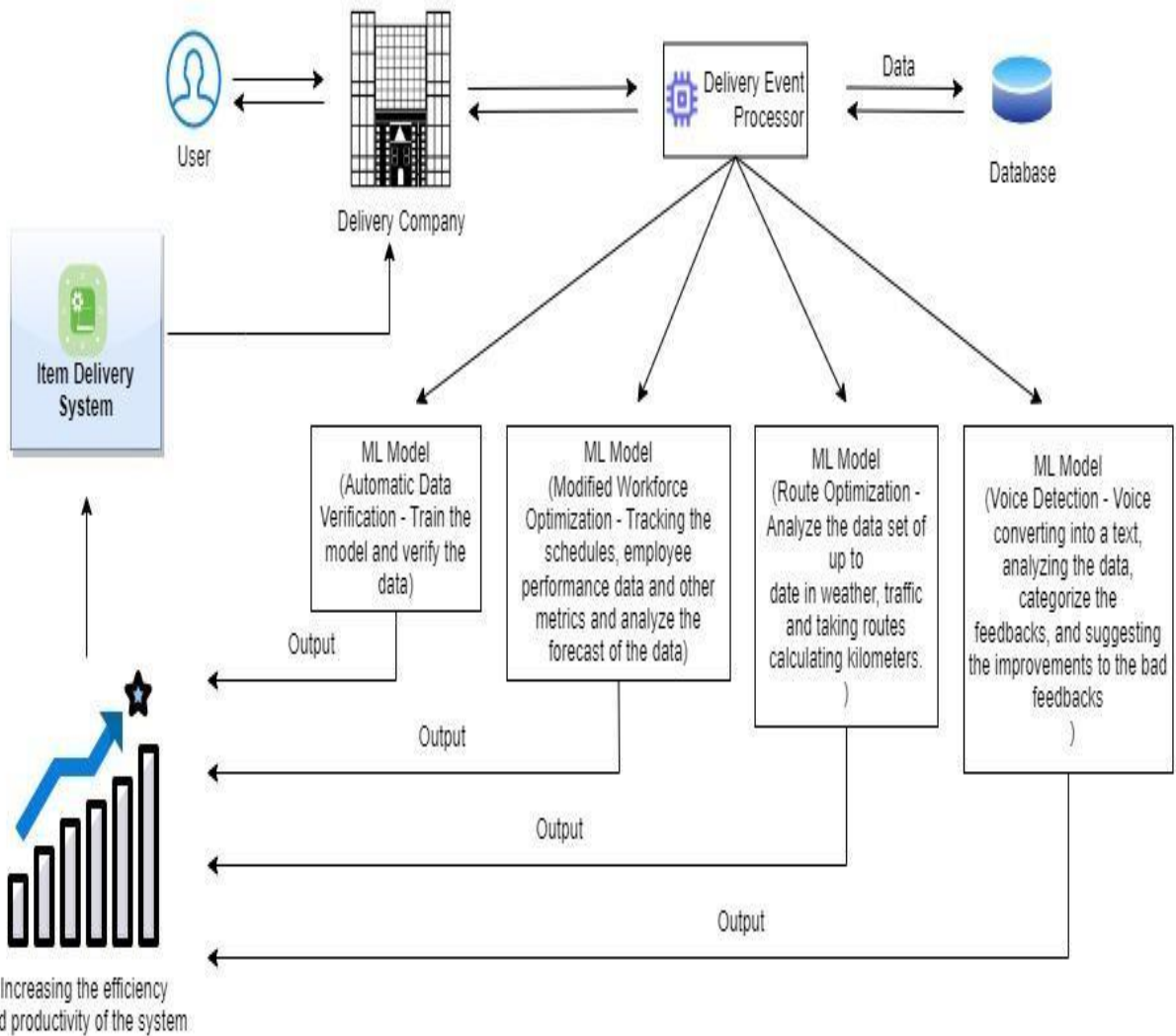
#### 6. Brief description of the nature of the solution including a conceptual diagram (250 words max)

When planning the most effective routes, using a route optimization tool can save you hours of time. Bookings might take hours to schedule without a smart system, which significantly reduces the efficiency of your company. With automated route planning, you can choose a group of jobs, assign a driver, and then automate the best path to finish the duties as rapidly as possible. Not hours, but only a few minutes are needed to do this, saving you time both in the workplace and while traveling.

Location monitoring will help you increase team accountability and keep your fleet on the correct track. Access route replay to see a timeline of your drivers' movements. This feature is particularly useful in the event that a vehicle is misplaced or if there are any errors with the delivery. By being aware of the exact location of your driver, you can improve the accuracy of your Estimated Time of Arrivals (ETAs). By doing this, you'll be able to provide the customer a reliable prediction of when their delivery will arrive.

Proof of delivery gives your business and consumers peace of mind knowing that their product has arrived safely. This is achieved through digital images and e-signatures. If a customer has any inquiries or issues with the delivery, you can easily retrieve the details about the trip. Photo confirmation ensures you know who was responsible for the delivery and the state it was left in, reducing the likelihood of a drawn-out investigation to a fast phone call.

Maintaining the ideal staffing level is another key component. Workforce Optimization (WFO) software provides businesses with a comprehensive view of employee time and attendance, enabling them to efficiently address customer needs. This software helps determine if additional temporary workers are required during peak seasons or if new technologies should be implemented to handle increased workloads. WFO also provides real-time guidance and valuable insights for revenue opportunities, helping businesses better understand customer preferences and how well their needs are being met. By reacting swiftly to customer concerns and enhancing customer satisfaction (CSAT), the likelihood of repeat purchases increases. Additionally, fostering internal career movement through the development of new opportunities and products allows employees to operate at their highest capacity, potentially leading to promotions. As employee satisfaction increases, so does customer satisfaction, creating a positive feedback loop that benefits the company.



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

The specialized domain expertise required for this research project spans multiple advanced areas, particularly within the realms of Machine Learning (ML), Artificial Intelligence (AI), and data science. Leveraging ML and AI technologies is essential to optimize various processes within the product delivery system, such as route planning and workforce management. These technologies rely heavily on algorithm development, predictive modeling, and extensive data analysis to create efficient and responsive delivery operations. Additionally, expertise in logistics and supply chain management is critical, as it involves a comprehensive understanding of the intricacies of route optimization, fleet management, and operational cost analysis. This knowledge ensures that the delivery system not only meets customer demands but also operates in a cost-effective manner.

Further, the project demands a profound understanding of data science and analytics. Processing large datasets, which include customer delivery details, employee performance metrics, and real-time operational data, is pivotal. Handling these large volumes of data requires proficiency in big data technologies, such as Hadoop and Apache Spark, along with knowledge of data storage solutions like NoSQL databases. Moreover, since the project involves collecting and analyzing voice-based feedback from customers, expertise in Natural Language Processing (NLP) is necessary. NLP techniques will be employed to accurately convert voice data into text, which can then be analyzed for insights into customer satisfaction and service improvement.

Finally, the project requires access to and analysis of various data types, including detailed customer delivery information, employee performance records, and geospatial data, which are essential for achieving real-time optimization and enhancing the overall effectiveness of the product delivery system.

**8. Objectives and Novelty**

<b>Main Objective</b>  Implement a system to increase the effectiveness and efficiency in item delivery process.			
Member Name	Sub Objective	Tasks	Novelty
Ellewela A.V.H IT21361272	Implementation of an automated voice activation system for the courier service to enhance delivery time prediction.	<ul style="list-style-type: none"> <li>Automatically identify the scheduled delivery date for each parcel.</li> <li>Generate an automated call to the customer's contact number, notifying them of the upcoming delivery.</li> <li>Integrate a system that continuously monitors delivery schedules and updates the call timings based on any changes.</li> <li>Ensure the automated system confirms the delivery details with the customer before dispatch.</li> </ul>	The implementation of an automated voice-based system that sends a confirmation call to the customer before the package is due to be received. This system verifies the customer's information, ensuring the accuracy of the delivery details and enhancing overall customer satisfaction and delivery efficiency.

Rathnayaka K.P.Y.N. IT21031748	Recognized the employee behavior and identify the improvements as a percentage.	<ul style="list-style-type: none"> <li>• Gathering the employee performance data and the employee work schedules by tacking the attendance, performance data and other metrics put together.</li> <li>• Analyzing the data and ensuring that if they are covered for all times or not, across all business hours, peak hours, and public holidays/weekends.</li> <li>• Also analyzing if the company need to actually hire additional staff and by analyzing the workflow and determine the workload.</li> <li>• Get the final output results and displayed the forecast of the upcoming years schedules, performance criteria and needed to be increased to the administrators.</li> </ul>	The implementation of machine learning algorithms to predict future staffing needs and employee performance introduces a cutting-edge approach to workforce management. Using historical data analysis, this sophisticated forecasting model considers variables including peak hours, seasonality, and individual employee behaviour patterns. The system uses these insights to produce precise and useful forecasts, which improve personnel decisions and performance planning. This creative method improves overall productivity and resource allocation by increasing operational efficiency and enabling proactive workforce level modifications.
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<p>D.T.D.Dissanayake IT21165948</p>	<p>Implement a fleet management system with delivery path optimization and delivery time prediction.</p>	<ul style="list-style-type: none"> <li>• Gathering and processing data of weather live forecast, tracking the live traffic in delivery destinations, analysis the shortest delivery destination to optimize the delivery route.</li> <li>• Taking the sum of deliveries done by delivery person, how long takes to deliver the item, feedback reactions gathering and analysis the data.</li> <li>• Predict delivery times by considering historical delivery data, traffic, and weather factors.</li> <li>• Then we can analysis the data for improve to delivery process looking the annual and monthly reports.</li> </ul>	<p>Implementing system will continuously learn from real-time delivery outcomes, live traffic patterns, and weather data, dynamically updating routes and predicting delivery times to avoid delays and optimize efficiency. The predictive component will improve accuracy with each delivery cycle, enhancing the overall delivery experience.</p>
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<p>Silva K.H.L.D. IT21374838</p>	<p>Analyzing customer satisfaction (CSAT) regarding the item delivery through voice-based feedback.</p>	<ul style="list-style-type: none"> <li>• Getting the voice recording from the receiver.</li> <li>• Convert voice to text.</li> <li>• Analyzing data and categorizing bad feedback.</li> <li>• Giving suggestions for those bad feedback and displaying a summary for all feedback.</li> </ul>	<p>Converting voice feedback to text and enables detailed categorization, allowing for more accurate analysis. By using classification algorithms, negative feedback can be filtered and addressed more effectively. This process helps provide automated, actionable suggestions for improvement, ultimately enhancing customer satisfaction.</p>
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**9. Supervisor checklist**

- a) Does the chosen research topic possess a comprehensive scope suitable for a final-year project?

Yes		No	
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- b) Does the proposed topic exhibit novelty?

Yes		No	
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- c) Do you believe they have the capability to successfully execute the proposed project?

Yes		No	
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- d) Do the proposed sub-objectives reflect the students' areas of specialization?

Yes		No	
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- e) Supervisor's Evaluation and Recommendation for the Research topic:

Approve this proposal with minor changes. Need to improve the sub objectives delivery paths clearly.

**10. Supervisor details**

	Title	First Name	Last Name	Signature
Supervisor	Mr	Uditha	Dharmakeerthi	
Co-Supervisor				
External Supervisor				
Summary of external supervisor's (if any) experience and expertise				

**This part is to be filled by the Topic Screening Panel members.**

Acceptable: Mark/Select as necessary

Topic Assessment Accepted	
Topic Assessment Accepted with minor changes (should be followed up by the supervisor)*	
Topic Assessment to be Resubmitted with major changes*	
Topic Assessment Rejected. Topic must be changed	

\* Detailed comments given below

Comments

The Review Panel Details

Member's Name	Signature

**\*Important:**

1. According to the comments given by the panel, make the necessary modifications and get the approval by the **Supervisor** or the **Same Panel**.
2. If the project topic is rejected, identify a new topic, and follow the same procedure until the topic is approved by the assessment panel.