[Slide 1]

Good afternoon, everyone. My name is Dobychin D.R., a student from group NPId-01-21. Today, I am here to present my project on creating an application for optimizing logistics operations.

[Slide 2: Objective]

The primary objective of this research is to develop an application that enables logistics companies to enhance the efficiency of their operations, reduce costs, and improve service quality.

[Slide 3: Tasks]

To achieve this objective, the following tasks were undertaken:

1. Study and select the most suitable algorithms for route planning.
2. Analyze IoT technologies for cargo monitoring.
3. Design the application architecture.

[Slide 4: Research Question]

The key research question guiding this project is: What technologies and methods can be employed to develop an application capable of optimizing logistics operations? This includes efficient route planning, inventory management, and cargo monitoring, considering modern requirements for transparency, security, and sustainability of logistics chains.

[Slide 5: Hypothesis]

Our hypothesis is that the application of modern information technologies, such as big data analytics, machine learning, and blockchain, in developing an application for logistics optimization, will significantly improve the efficiency and transparency of logistics processes.

[Slide 6: Route Selection Algorithm]

We explored various methods for finding optimal routes that account for multiple parameters. Two prominent algorithms in this area are Dijkstra's algorithm and the A* algorithm.

Dijkstra's Algorithm: Dijkstra's algorithm is a well-known method for finding the shortest path between nodes in a graph. It works by exploring all possible paths from the starting node to the destination, ensuring the shortest path is found. This algorithm guarantees finding the optimal route but can be computationally expensive as it considers all nodes.

*A Algorithm:** The A* algorithm, on the other hand, is an advanced pathfinding and graph traversal algorithm. It combines the benefits of Dijkstra's algorithm with a heuristic approach to focus the search. A* uses both the actual distance from the start node and an estimated distance to the goal, making it faster and more efficient for many practical applications. It can dynamically adjust to changing conditions and optimize paths more quickly than Dijkstra's algorithm.

Key Differences:

- **Efficiency:** A* is generally more efficient than Dijkstra's as it uses heuristics to guide its search, reducing the number of nodes it needs to evaluate.
- **Application:** Dijkstra's algorithm is best used when the exact shortest path is necessary without regard to computational expense, while A* is preferable when efficiency and speed are critical, such as in real-time applications.

By leveraging these algorithms, our application can dynamically adjust to changing conditions and optimize the paths taken by logistics fleets.

[Slide 7: IoT Integration]

The Internet of Things (IoT) plays a crucial role in this application. Data from street cameras, motion detectors, and transport users are used to manage traffic flow and provide real-time updates for better route planning and cargo monitoring.

[Slide 8: Application Architecture]

Selecting the appropriate architecture for the application is vital. The architecture must be scalable, flexible, secure, and performant. It should also facilitate easy development and integration with existing systems while meeting all requirements.

[Slide 9: Practical Implementation - Algorithm Selection and Optimization Methods]

In the practical part of this project, we focused on selecting and coding the algorithm suitable for our specific needs. We also identified and implemented optimization methods to enhance the performance of these algorithms.

[Slide 10: Practical Implementation - Application Architecture Development]

We developed the application architecture based on the budget, tasks to be accomplished, and potential future updates. This ensures the application is robust and adaptable to evolving logistics needs.

[Slide 11: Conclusion]

The results of this research can be utilized for further development in the field of logistics optimization. Understanding the impact of different optimization methods on route accuracy can aid in refining automatic route optimization processes, ultimately leading to more efficient logistics operations.

[Slide 12: References]

The research references include:

- "Introduction to Algorithms" by Cormen, Leiserson, Rivest, and Stein.
- "Local Search Methods in Combinatorial Optimization" by Arz and Lenstra.
- "Genetic Algorithms in Search, Optimization, and Machine Learning" by Goldberg.
- "Handbook of Metaheuristics" by Glover and Kochenberger.
- "Internet of Things for Smart Cities" by Sheng, Yang, and Gu.
- Official documentation for React Native, Swift, and Kotlin.

[Slide 13]

Thank you for your attention. If you have any questions, I would be happy to answer them now.