

# PICTURE FUZZY LOGIC USING NODEJS IN

## UNICORN FREIGHT EXPRESS WEB APPLICATION

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**Abstract**— The shipping of parcels plays a major role in our daily routines both commercial and business purposes. It helps both the customer and business companies for the safe and secure, speed and high efficiency shipments of cargo within the security system, cannot access by the third-party service. The project Unicorn Freight Express is a web application that help various Airlines and associated companies for the importing and exporting the cargo in a efficient way. Here the customer can create and register their cargo details and trace the shipments details payment module. The daily transaction and checking done by the user. The mainly focused on the shipments and cargo management which help customers have q friendly door to door delivery service needed. Certain guidelines for their safe and secure cargo details for the weights, materials can be transferred.

**Keywords**—fuzzy neural network, RSN method ,last mile delivery ,Node Javascript

### ***I.Introduction***

Cargo management has been extremely enhanced throughout the years as technology evolved. It has solved many critical issues such as reducing shipping time periods and having more control over the shipment as lack of information about

the shipment and poor tracking methods have resulted in many lost, damaged and delayed shipments.

The project entitled with “unicorn freight express “ is done to build a user friendly and adaptable system for the efficient cargo managing functionality for both the commercial and business purposes. Air cargo is essential to many facets of modern life. Moving perishable goods from one side of the world. It is fully computerized system for creating, registering the cargoes details and tracing the shipment information. It provides the facilities for the users can create cargo ,trace the shipments and can adopt the option for the delivery service if needed. The admin manages all the details updated by the user and provides the notification of their orders done.

### ***II. Literature survey***

The word "air cargo" typically refers to a good that is transported on or through an flight. Cargo shipments are now typical daily activities for corporate and commercial objectives .In order for their clients to afford the products safely and securely, many businesses import and export their goods using airlines, which makes this a common challenge for the airlines.

#### **A.Air Cargo Demand Modeling and Prediction**

The indicated system's creators are Raghavendra Totamane, Amit Dasgupta, and Shrisha Rao. IEEE organisations published their work. This study put forth the idea that the air cargo transportation system is a large and intricate service system, and that demand forecasting is a crucial step in the process of master planning. Use the Potluck Problem approach to propose a multi solution for predicting the cargo demand of a specific airline in a given route, and the cargo load factor for a given flight schedule on that route. Demand forecasting is essential for evaluating existing cargo flight schedules and identifying future facility requirements of air cargo companies. In this approach, each airline is viewed as a producer, and those who utilize air cargo services are viewed as consumers.

### B. Air cargo operations: Literature review and comparison with practices

The writers of the suggested paper are in charge of air cargo operations, and it contrasts theoretical research with real-world issues faced by airlines, freight forwarders, and terminal service providers. In particular, we research that investigated the service processes in air cargo operations and identified the key characteristics of air cargo operations, such as the inherent distinctions from passenger operations. There is a summary of the typical models applied in earlier studies. The gaps between earlier studies and real-world situations are then shown, along with some interesting findings from an industrial interview.

### C. A Multipurpose Mobile Application for Air CARGO Management System for Saudi Airlines

The author of this suggested approach implementing a number of enhancements that call for highly secure systems that protect both the customer's information and the cargo itself, we hope to ship packages in this system with high speed and high quality. Therefore, every shipping company works hard to complete the shipping in a reliable and secure manner while giving the customer top priority. This paper describes the creation of an Android application (Airpress) that will aid Saudi Airlines and affiliated businesses in the import and export of the required goods. Customers may easily and rapidly create freight using the app. A customer can register, produce cargo at any moment and track the cargo with a single click. It's a mobile device with several uses.

### D. Picture Fuzzy Decision-Making Approach for Sustainable Last-Mile Delivery

They suggested an approach based on the growing significance of last-mile delivery (LMD) and its high prices, air pollution, and logistical difficulties. They also noted that research on sustainable LMD is extremely dynamic and trending. A new issue for decision-makers in the logistics sector is choosing a sustainable LMD method. The purpose of this research is to present an advanced decision-making strategy for sustainable LMD. First, 20 criteria for

evaluating the sustainable LMD mode are identified.

Second, image fuzzy sets (PFSs) are used to assist voters in more organically expressing their choices. Thirdly, a hybrid fuzzy picture weighing approach based on direct rating and R-norm entropy is created to calculate the importance of each picture.

### III. Related work

The core concept of air cargo tracking is the tracking and tracing of air cargo using either the airline, the freight forwarder, the transport operator, or GPS devices.

You may be confident that you're in control of your supply chain once you create and implement a system for accurately tracking your air freight. While waiting at airports for customs clearances and other formalities, it is generally preferred that air cargo be tracked throughout all stages, from the first mile to the last mile.

Businesses rely on cargo shipping companies in the age of globalization to deliver their shipments swiftly, effectively, and on schedule. To do this, they want a capable logistics partner who can provide integrative services.

### METHOD

#### A. Fuzzy logic method

Prior to being fuzzified into linguistic variables (fuzzy sets) in a fuzzy logic system, the inputs are membership function-fuzzified. The membership function converts the values passed in to a level of membership in a fuzzy set. After then, fuzzy rules—which specify the correlation between the input and output variables—are used to evaluate the fuzzy sets. Usually, the fuzzy rules are represented as "if-then" statements, such as "if input A is high and input B is low, then output C is medium.

#### B. Fuzzy Neural Network

A fuzzy neural network (FNN) is a type of artificial neural network (ANN) that uses fuzzy logic to represent uncertainty and imprecision in the input data. FNNs combine the pattern recognition and learning capabilities of ANNs with the fuzzy inference capabilities of fuzzy logic systems.

FNNs use fuzzy sets to represent the input data and the output data, as well as the connection weights between the nodes in the network. The fuzzy sets are defined by membership functions, which map the input data to a degree of membership in the fuzzy set. The connection weights between the nodes are also represented by fuzzy sets, which capture the uncertainty in the strength of the connection.

The structure of an FNN is similar to that of a traditional ANN, with multiple layers of nodes connected by weighted connections. However, in an FNN, the nodes in the hidden and output layers use fuzzy logic to compute their output values, instead of the traditional sigmoid or RELU functions used in traditional ANNs.

The training process for an FNN involves adjusting the connection weights between the nodes using a combination of backpropagation and fuzzy inference. The fuzzy inference

component helps to improve the robustness of the network to noise and uncertainty in the input data.

Fuzzy neural networks have been used in a variety of applications, such as pattern recognition, control systems, and decision making. They are particularly useful in situations where the input data is imprecise or uncertain, and traditional ANNs may not be able to effectively model the underlying relationships in the data.

*The mathematical formula for a fuzzy neural network (FNN) depends on the specific architecture*

*The basic building block of an FNN is the fuzzy neuron, which uses fuzzy logic to compute its output value. The output of a fuzzy neuron is determined by the following equation:*

$$\text{Output} = f(W * X)$$

where 'W' is a vector of connection weights between the input and output layers, 'X' is a vector of input values, and 'f' is a fuzzy inference function that computes the output value based on the input and connection weights.

- The fuzzy inference function typically involves the following steps
- *Fuzzification:* The input values are mapped to fuzzy sets using membership functions, which capture the degree of membership of the input values in the fuzzy sets.
- *Rule evaluation:* The fuzzy rules that define the relationship between the input and output variables are evaluated using the fuzzy sets. Each rule has an associated weight, which captures the strength of the relationship between the input and output variables.
- *Aggregation:* The outputs of the fuzzy rules are combined using a fuzzy aggregation method, such as the weighted average or maximum.
- *Defuzzification:* The aggregated output value is mapped back to a crisp value using a defuzzification method, such as the centroid or mean of maximum.

The training process for an FNN typically involves adjusting the connection weights between the neurons using a combination of backpropagation and fuzzy inference. The backpropagation algorithm is used to update the connection weights based on the error between the network's output and the desired output. The fuzzy inference component helps to improve the robustness of the network to noise and uncertainty in the input data.

Overall, the mathematics of FNNs involves a combination of linear algebra, fuzzy logic, and optimization algorithm

*Picture fuzzy cocoso method*

$$R_{ij} = \{z_{ij} = \langle m_{zij}, n_{ij}, v_{ij} \rangle \text{ if } c_j \text{ is benefit}$$

$$(z_{ij})_c = \langle v_{ij}, n_{ij}, m_{ij} \rangle \text{ if } c_j \text{ is cost criterion,}$$

$$I = 1, \dots, m; j = 1, \dots, n$$

*Decision approach*

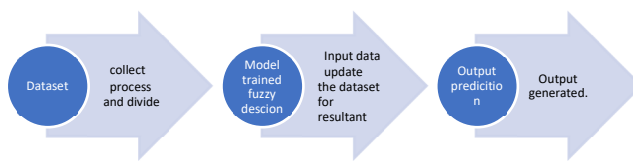
$$K_i = \{k_{imax} + (m - r_i)\}$$

- *The following actions are often included in a fuzzy decision-making algorithm:*
- *1. Clearly explain the issue at hand and list the variables that will be taken into consideration when making a decision.*
- *2. Identify the fuzzy sets: Discover the fuzzy sets for every variable that is relevant to the issue. A set of values having degrees of membership ranging from 0 to 1 is referred to as a fuzzy set. A degree of membership is given to each value in a fuzzy set, indicating how well the value fits the set.*
- *3. Produce a set of fuzzy rules to capture the logic of decision-making. "If-then" statements are used to define fuzzy rules, such as "if the temperature is high and the humidity is low, then the humidity is low."*

**IV. SYSTEM MODEL**

The buyers are given explicit information about the prohibited products by the unicorn freight express web application system. Customers can therefore avoid all the products that the cargo manager lists. The use of digital processes, such as air freight software, ULD measuring technology, applications for declaring dangerous goods, and web-based booking and tracking platforms to track the progress of shipments in real time, has already begun by a significant number of airlines around the world. With the use of Air Cargo software, manual involvement will be significantly minimized. Airports, integrators, and freight forwarders are all increasing their use of technology for air cargo management. More and more airports demand that ground handling and service providers reserve slots on with enhanced registration, accessible via the internet booking, and tracking techniques, cargo software has simplified cargo administration at many airports. With its sophisticated ticketing, web-based booking, and tracking techniques, cargo software has made managing cargo easier at many airports. The system now calculates the billing for storage and handling fees automatically. The samples categorized by cost criterion LMD modes of traditional delivery mode of the parcels over local area for the customer relationship and reduce the air pollution[1]

*ARCHITECTURE*



## V. RESULT

Companies need to import and transfer products and item on a daily basis. As a result, there is a high demand for cargo businesses, particularly those that transport air freight, between cities. The goal of this project is to fulfil this need, and because of the application's simplicity of use and easy access to client information, users can simply track their shipments.

## VI. CONCLUSION

The development of an air cargo management using Node.js and Fuzzy Logic has the potential to provide significant benefits to the cargo industry. By leveraging Node.js, the system can take advantage of its scalability, speed, and flexibility to handle large volumes of cargo data efficiently. Additionally, the use of Fuzzy Logic enables the system to analyze complex and uncertain cargo-related data, making it possible to generate accurate and useful insights to support decision-making.

The system could also provide real-time visibility into cargo movement, enabling cargo managers to track shipments and respond to issues quickly. Furthermore, the system could optimize routing and scheduling, reducing delays and improving efficiency in the air cargo supply chain. Overall, the use of Node.js and Fuzzy Logic in air cargo management has the potential to provide significant improvements in cargo tracking, optimization, and decision-making, leading to increased efficiency, reduced costs, and improved customer satisfaction.

## VII. REFERENCE

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