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Gas Transport and Distribution System Based on Web Application

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ABSTRACT:

The gas transport and distribution industry continually seeks innovative solutions to streamline operations, improve customer experience, and ensure safety and compliance. In response to these demands, this study presents the development of a web-based gas transport and distribution system aimed at enhancing efficiency and accessibility across the supply chain.The system is designed to facilitate seamless interactions between stakeholders including administrators, distributors, and customers. Leveraging modern web technologies, the user interface offers intuitive navigation and robust functionalities tailored to the diverse needs of each user role. Key features include order placement, real-time tracking, billing management, and comprehensive reporting capabilities.

Keywords: Distribution network, Web application, Requirement gathering, System design, Architecture.

I. INTRODUCTION:

As an abstract model that approximates, among other things, the physics of constant water flow or lossless direct current (DC) power flow in gas networks. More generally, gas transportation and naming feasibility studies have been investigated from several different optimization perspectives [1].

On the other hand, purely continuous and highly accurate nonlinear optimization models (NLP) are considered. The combination of both worlds leads to complex mixed integer models. See also the recent survey for a comprehensive overview of gas network optimization problems [2].

A value is assigned to the set of reserve- matched (or b-matched) names. Next we introduce the concept of feasibility of offers and reservations. We model steady gas flows using an abstract physical model based on the Weymouth pressure drop equation and potential flows [3].

Networks consisting of pipes alone, the characterization of the charges to be realized is given in clause 25 with the conditions in

the names, where the possible difference of the network is greatest. Using a linear potential-based flow model, these names can be efficiently calculated using linear programming. In the non-linear case, the authors give polynomial time dynamic programming [4].

For gas, a tree-shaped hydrogen network, a sustainable discrete arc-dimensional problem, was discussed. The uncertainty of the physical parameters is taken into account. On the other hand, the structural properties of possible naming and charge sets, such as non-convexity and star similarity, are discussed [5].

II. LITERATURE SURVEY:

According to **K Negarajalakshmi**. et al., 2017 liquefied petroleum gas (LPG) leakage to prevent fire accidents and a home safety feature where safety was an important issue. The system detects an LPG leak with a gas sensor and warns the consumer about the gas leak through a text message. It also closes the solenoid valve regulator and also turns on the trigger [6].

According to **Martin Schmidt**. et al., 2020 Reservations are special capacity rights contracts that guarantee that a certain amount of gas can be delivered or withdrawn at certain network entry or exit nodes. These deliveries and withdrawals are scheduled for the following day. The special feature of reservations is that they must be realizable, ie. any name corresponding to the given reservation can be transported [7].

According to **Johannes Thurauf**. et al., 2022 The feasibility of charging can be characterized by a polynomial solution of several nonlinear potential-based flow models, so-called. calculate load scenarios that maximize the potential difference. Thus, we analyze the structure of these models and utilize both the cyclic graph structure and the special properties of potential-based flows [8].

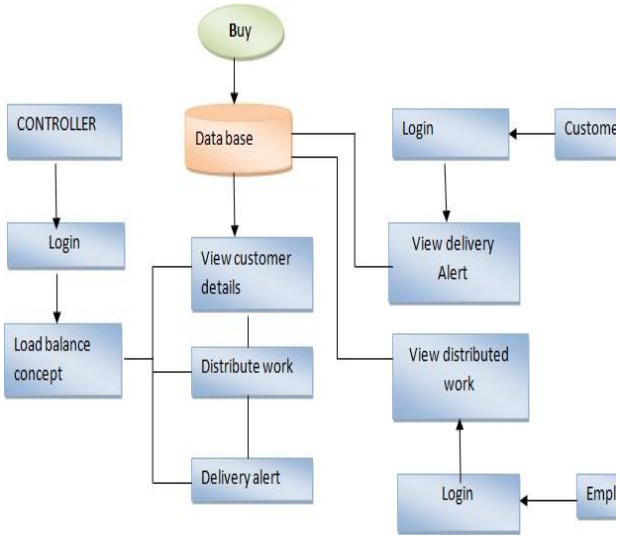
According to **Aishwarya Jain**. et al., 2022 The Internet of Things helps people live and work smarter and gain full control over their lives. One such application is LPG automatic charging and maintenance. LPG is the most common household fuel in every family. Physically ordering a new gas bottle is tedious. In this rapidly developing innovation [9].

According to **Yuwei Chen**. et al., 2020 As the demand for multi-purpose energy increases, smart multi-energy systems have become a trend in urban development. In such an intelligent environment, it is possible and necessary to consider regulating the traffic of electric and non- electric vehicles in the city's transport network [10].

III. PROPOSED SYSTEM:

When surrounded by noisy data. It saves time since it is a fast computation tool with good performance. It is successfully implemented when tested around different structures and different tasks. However, very few research has been conducted for a long- term traffic state prediction using deep learning architecture. Also, previous research focuses on only one or two traffic parameters to develop the model. A deep learning system is chosen because it can detect increasingly subtle features of the input data (e.g., combinations of the on- ramp and mainline traffic flows, geometric bottlenecks and weather conditions) which together might produce unique traffic situations on the freeway.

ARCHITECTURE DIAGRAM:



Explanation:

1. **Presentation Layer**:The presentation layer handles the logic for rendering UI components and handling user interactions. It utilizes technologies such as HTML, CSS, and JavaScript frameworks.
2. **Logic Components**: Within the application layer, various business logic components are implemented to manage different aspects of the gas transport and distribution system. This includes functionalities such as managing customer accounts, handling gas orders and deliveries, scheduling transport routes, and monitoring gas flow and pressure.
3. **Monitoring and Logging**: Monitoring and logging mechanisms are implemented throughout the architecture to track the performance, health, and usage of the system. Logging frameworks (e.g., ELK stack - Elasticsearch, Logstash, Kibana) and monitoring tools(e.g.,Prometheus, Grafana) are used to capture and analyze system logs, metrics, and events.
4. **iew customer**: Customer registration and login, Profile management (view, edit, update), Viewing customer order history, Managing billing and payment information.
5. **Delivery Details:**Order placement by customersAssigning delivery personnel to orders Tracking order status (pending, in transit, delivered) Providing delivery updates to customers (e.g., estimated delivery time).
6. **Distributed works:** Routing and optimizing delivery routes based on order locations and delivery schedules Assigning orders to delivery personnel based on proximity and workload Monitoring delivery progress and resolving any issues or delays.

IV. RESULT AND DISCUSSION:

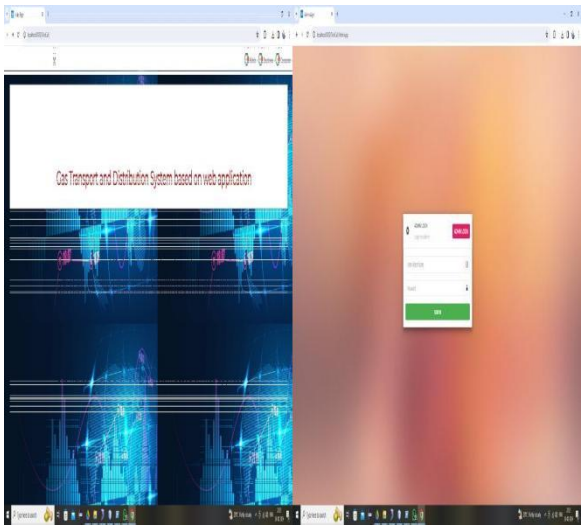


Figure1 . Home PageAdmin Login Page

a) **Home Page :**The Home Page provides users with easy access to essential information and features, ensuring an intuitive and engaging experience.

b) **Admin Login Page** :The Admin Login Page guarantees secure access for administrators through robust authentication measures and a Forgot Password feature.

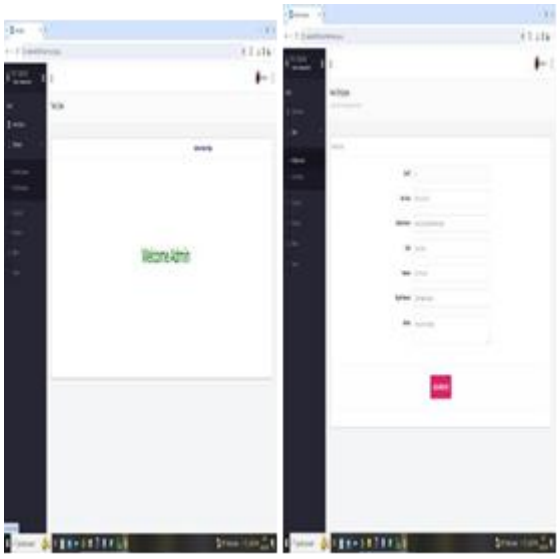


Figure2.Admin Home Page Add New Employee

a) **Admin Home Page** :The Admin Home Page empowers administrators with real-time insights and administrative tools for efficient system management. Together, these components contribute to an enhanced user experience, secure access control, and streamlined system administration for the Gas Transport and Distribution System.

b) **Add New Employee:**Facilitates seamless addition of new team members by inputting details, assigning credentials, defining permissions, and confirming the addition.

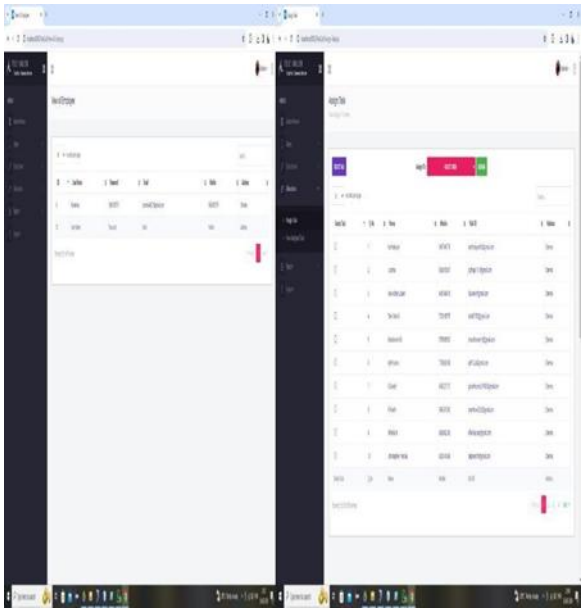


Fig3.ViewallEmployee Assign Task to

Employee

a) **View all Employee:** Provides administrators with a comprehensive overview of the organization's workforce, including filtering options, search functionality, and detailed employee profiles.

b) **Assign Task to Employee:** Empowers administrators to delegate responsibilities effectively by selecting employees, defining task details, setting notifications, and confirming task assignments.

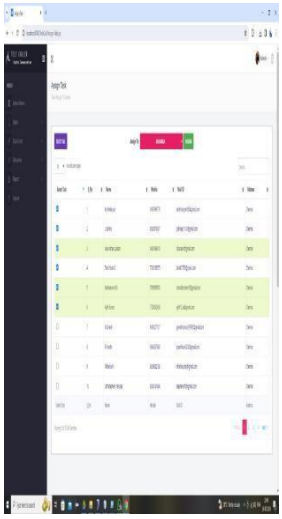


Fig 4. Assigned Task **Employee Login**

a) **Assigned Task:**Facilitates task assignment to employees with notifications, task tracking, and collaboration features.

b) **Employee Login:**Provides secure access for employees to the system using unique login credentials, ensuring data security.

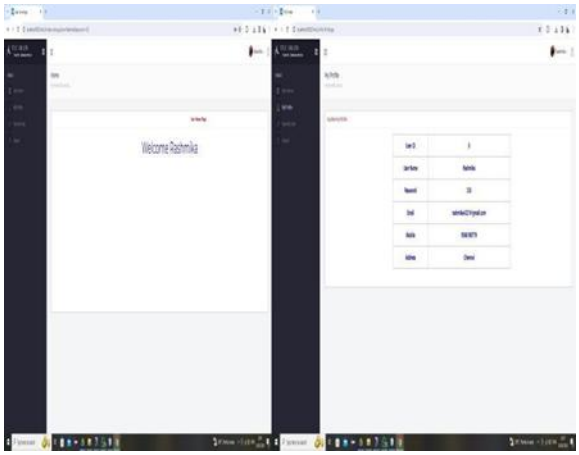


Fig 5. Home Page Profile Page

a) **Employee Home Page:**Central dashboard for employees to view assigned tasks, access task details, manage tasks, and access relevant resources.

b) **Employee Profile Page:**Central hub for employees to manage personal details, preferences, skills, and performance metrics within the system.

V. CONCLUSION:

In conclusion, developing a gas transport and distribution system based on a web application requires meticulous planning, design, and implementation to meet the diverse needs of stakeholders while adhering to industry regulations and standards. By following a systematic approach encompassing requirement gathering, system design, backend and frontend development, integration, testing, security implementation, and deployment, a robust and efficient system can be created. Continuous maintenance, user training, and documentation ensure the system remains reliable and user-friendly. Collaboration with stakeholders and responsiveness to feedback are essential for driving ongoing improvement and innovation in the gas transport and distribution process. Ultimately, such a system plays a crucial role in optimizing operations, enhancing safety, and ensuring the efficient delivery of gas resources to consumers.

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