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Troubleshooting Website for Technical Devices Using Community-Based Interaction and AI Integration

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Abstract
In the rapidly advancing digital world, users face a wide range of technical challenges involving devices such as smartphones, laptops and computers. While numerous online platforms exist for problem resolution, most of which are either too complex, generalized, or unverified. This study proposes the design and development of a community-based troubleshooting website dedicated to resolving technical issues for beginners. The platform enables users to post queries and receive peer-generated solutions, thereby ensuring clarity, reliability, and user engagement. The proposed system, built with React (JSX + Vite) for the front end and Node.js for the back end, focuses on simplicity and accessibility. In future iterations, the integration of Artificial Intelligence (AI) and Machine Learning (ML) will enable flowchart-based problem-solving and automated diagnostic recommendations. This project aims to reduce the confusion caused by unstructured online data and create a specialized environment for structured technical support.

Keywords — **Troubleshooting, Community Website, React, Node.js, Artificial Intelligence, Machine Learning, Technical Devices**

I. INTRODUCTION

Technology has become indispensable in our daily lives. However, users, especially beginners, often face difficulties when dealing with hardware and software issues on personal devices. Despite the availability of numerous online resources, the lack of structured, reliable, and simplified guidance makes problem solving difficult. Platforms such as Reddit and Quora provide general discussions but fail to offer focused, step-by-step troubleshooting for device-related issues.

The proposed system introduces a dedicated web-based troubleshooting community for resolving technical issues related to mobile phones, laptops, and other digital devices. Users can post queries, receive community-driven responses, and upvote the most effective solutions. Unlike existing forums, this platform emphasizes clarity, ease of understanding, and structured solutions for beginners. In the future, AI-based flowchart generation will guide users through a systematic problem-solving process to ensure faster and more accurate resolutions.

II. RELATED WORK

Several online forums provide technical assistance, but they lack a beginner-friendly, domain-focused environment.

1. **Quora and Reddit** Offer wide-ranging discussions but lack dedicated technical categorization and structured responses.
2. **Stack Overflow** primarily focuses on programming-related problems rather than general hardware/software troubleshooting.
3. **Manufacturer-Specific Forums** (e.g., Apple Support, Dell Community) – Restricted to brand-specific issues and inaccessible to multi-device users.

Studies on **AI-driven troubleshooting systems** have shown that **decision trees**, **flowcharts**, and **natural language understanding** enhance the accuracy and speed of problem resolution. Integrating these intelligent systems within a collaborative platform can significantly improve the user experience and reduce confusion. Thus, our proposed solution combines **community knowledge** with **AI automation** to achieve efficient troubleshooting in the future.

III. METHODOLOGY

The system was designed using a modular architecture divided into the following key components:

A. System Overview

The troubleshooting platform operates as a community-driven web application that integrates both manual and automated support. The workflow begins when a user registers and posts a query related to a specific device or an issue. Other users can provide suggestions or verified solutions to these problems. Over time, the system learns from previous responses and patterns, which will help future **AI modules** to categorize and suggest flowchart-based fixes.

B. System Architecture

The architecture comprises the following:

1. **Frontend (Client Side):**
   - The application was developed using **React (JSX + Vite)** for efficient rendering of the user interface.
   - It implements **a responsive UI** and modular design for easy navigation.

- Provides sections for "Ask Question", "Browse by Category", and "Solution Threads".

2. **Backend (Server-Side):**
   - It was implemented using **Node.js** and **Express.js** for efficient API management.
   - It manages **user authentication**, **post creation**, and **data retrieval**.
   - Data are stored in **MongoDB/MySQL** for scalability and reliability.
3. **Database Schema:** Stores user details, posts, comments, and upvotes in a structured format. Data indexing ensures the faster retrieval of similar queries.
4. **AI and ML Integration (Future Scope):** The ML model analyzes query keywords, matches them with previously solved cases, and suggests possible flowchart paths for troubleshooting.

C. Tools and Technologies

Layer	Technology Used
Frontend	React (JSX + Vite)
Backend	Node.js, Express.js
Database	MongoDB / MySQL
Styling	Tailwind CSS / Material UI
Future Integration	TensorFlow / Scikit-learn for ML models

IV. SYSTEM IMPLEMENTATION

The system prototype currently consists of three major modules.

1. **Authentication Module:** Handles user login and sign-up with secure password management.
2. **Community Module:** It allows users to post questions, respond with solutions, upvote helpful answers, and track reputation scores.
3. **Categorization Module:** It enables users to browse issues based on device type or error keywords, thereby enhancing navigability.

Planned AI Module:
A flowchart generator that dynamically maps user problems into stepwise solutions using NLP and rule-based ML algorithms. For example, if a user types "Laptop overheating," the AI can guide them through a flowchart as follows:
Check fan → Clean vents → Verify thermal paste → Update BIOS.
This structured approach reduces the dependency on reading lengthy discussions and provides direct visual guidance.

V. RESULTS AND DISCUSSION

The proposed system aims to simplify technical problem-solving by focusing on community collaboration and structured information delivery.
The expected benefits include:

- Improved accessibility for non-technical users.
- Solutions from community feedback were organized and verified.
- Reduction in the spread of misinformation.
- This study provides a foundation for scalable AI-driven troubleshooting in the future.

A prototype evaluation demonstrated that structured responses significantly reduced the average time to solution compared to unorganized discussion threads. Once the AI-based model is integrated, prediction accuracy and flowchart efficiency will be the key evaluation metrics.

VI. CONCLUSION AND FUTURE WORK

This study presents a **dedicated troubleshooting platform** designed to assist users in resolving device-related issues through a collaborative and intelligent interface. The website merges the simplicity of community-based interactions with the power of AI-driven diagnostics.
Future enhancements include the following:

- Implementation of **machine learning classification** for issue prediction.
- Integration of **visual flowcharts** and **voice-guided troubleshooting**.
- Development of a **mobile app** for wider accessibility.
- Use of **data analytics** to identify common device issues and generate insights.

By combining **crowdsourced knowledge** with **intelligent automation**, this platform aims to become a universal hub for beginner-friendly technical support.

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