Case-Based Reasoning for Mobile Helpdesk System

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Abstract - *In the modern digital era, mobile users expect fast and dependable technical support. Traditional helpdesk systems based on FAQs and manual assistance are often slow and inefficient. This paper presents an intelligent mobile helpdesk system using Case-Based Reasoning (CBR), where user problems are solved by reusing solutions from previously resolved cases. When a relevant case is found, the system delivers an immediate solution; otherwise, the issue is forwarded to an administrator and stored for future learning. The proposed system reduces response time, decreases manual effort, and improves overall user satisfaction, making it an effective and practical helpdesk solution.*

Key Words: **Case-Based Reasoning (CBR), NLP, Mobile Helpdesk System, Intelligent Support System, Knowledge-Based System, Automated Problem Solving**

1.INTRODUCTION

The rapid growth of mobile technology has increased the demand for fast and reliable technical support. Mobile users frequently face issues related to applications, software updates, and network connectivity. Traditional helpdesk systems based on FAQs and manual assistance are often slow, inefficient, and unable to handle repeated or similar queries effectively. To overcome these limitations, intelligent helpdesk systems are required. Case-Based Reasoning (CBR) is an artificial intelligence technique that solves new problems by reusing solutions from previously solved cases. By learning from past experiences, CBR systems provide quick and consistent responses. This paper proposes an Intelligent Mobile Helpdesk System using Case-Based Reasoning. The system retrieves solutions from a case database and provides instant support to users. Unresolved queries are handled by an administrator and stored for future learning. The proposed approach reduces response time, minimizes manual effort, and improves overall helpdesk efficiency

2.LITERATURE SURVEY

Introduces a system that combines large language models (LLMs) with retrieval-augmented generation to improve case-based reasoning. It can handle fuzzy or imprecise descriptions of cases, making it more flexible. Useful for medical/healthcare and legal domains; could be adapted to helpdesk + healthcare. [1] This paper shows how you can use fuzzy logic plus adaptive similarity weighting in a diagnosis system with CBR. The methods here are good for retrieval & adaptation of past similar cases, which is exactly useful if your chat bot needs to pick a close matching previous case when no exact answer exists. [2] This one is directly about applying CBR in helpdesk systems. It studies processes by which helpdesk systems can retrieve past similar cases to resolve new tickets, reducing resolution time. Good match with your project idea. [3] This describes IHDF, a system used in a bank's helpdesk environment for network/computer fault management. It uses hybrid knowledge representation, fuzzy/neighbor similarity matching, indexing, etc. Very practical case of how to build and maintain a case base and perform retrieval and reuse. [4] Introduces a reasoning system that starts with a simple/coarse set of features, then refines to more detailed features if necessary. So when matching a new query, system tries simpler comparisons first, and if not good enough, goes deeper. This is helpful when performance matters (mobile environment) and helps reduce computation. [5] Classic foundational paper on what CBR is, how it works (storing cases, retrieving, adapting, retaining), memory/organization/indexing, etc. Good for theory/background in yourdocumentation. [6] Aamodt and Plaza presented the classical Case-Based Reasoning cycle consisting of retrieve, reuse, revise, and retain phases. Their work emphasizes continuous learning and knowledge reuse, which forms the foundation of modern CBR-based intelligent systems, including helpdesk applications. [7] Pal and Shiu proposed an adaptive Case-Based Reasoning system that dynamically updates similarity measures based on new cases. This approach improves long-term system accuracy and learning efficiency, making it suitable for intelligent support systems. [8] Lu et al. introduced a coarse-to-fine Case-Based Reasoning approach where the system initially uses simple features and gradually applies detailed features for accurate matching. This method improves performance and reduces computational cost, especially in mobile environments. [9] Watson discussed real-world industrial applications of Case-Based Reasoning in customer support and troubleshooting systems. The study highlights how CBR reduces resolution time and improves decision consistency in helpdesk environments. [10]

3. PROPOSED SYSTEM

The proposed system is an intelligent mobile helpdesk designed using Case-Based Reasoning (CBR) to provide fast and accurate technical support. Users submit their queries through a mobile application, which are first processed using Natural Language Processing (NLP) to clean and standardize the input. The processed query is then handled by the CBR engine, which retrieves similar previously solved cases from the case database. The most relevant solution is reused and delivered instantly to the user. If no suitable case is found, the query is forwarded to the administrator for resolution. Once resolved, the new problem and solution are stored in the database for future learning. The system also supports auto-suggestions and real-time notifications to enhance user experience. By continuously learning from new cases, the proposed system reduces response time, minimizes manual effort, and improves overall helpdesk efficiency.

Case-based reasoning (CBR)

- **Retrieve:** Search for similar past cases from the case database.
- **Reuse:** Apply and provide the best-matched solution to the user.
- **Revise:** If required, forward the query to the administrator for correction.
- **Retain:** Store the new case and its solution in the database for future use.

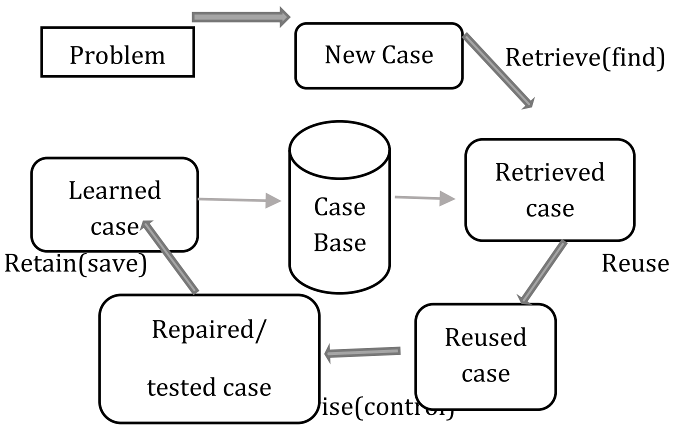

Fig: Case-Based Reasoning (CBR)

4. COMPARATIVE ANALYSIS

Parameter	Existing System	Proposed System
System Type	Traditional / Semi-automated helpdesk	Intelligent CBR-based mobile helpdesk
Query Handling	Keyword or manual based	NLP-based intelligent query processing
Response Time	Slow to moderate	Fast and real-time
Learning Capability	No self-learning	Self-learning using CBR cycle
Similar Case Handling	Limited	Efficient retrieval of similar cases
User Interaction	Web or manual interface	Mobile application interface
Accuracy	Moderate	High
Admin Effort	High	Low
Scalability	Limited	High
Automation Level	Partial	High

5.ADVANTAGES

•Provides faster response by reusing previously solved cases

•Reduces workload and dependency on human helpdesk staff

•Self-learning system that improves accuracy over time

•Ensures consistent and reliable solutions for similar queries

•Handles large numbers of user requests efficiently

•Scalable and suitable for mobile-based environments

•Improves overall user satisfaction and support quality

6.CONCLUSION

This paper presented an intelligent mobile helpdesk system based on Case-Based Reasoning (CBR) to address the limitations of traditional helpdesk solutions. Conventional systems relying on FAQs and manual support often suffer from slow response times, high operational costs, and limited adaptability. The proposed system overcomes these issues by reusing solutions from previously resolved cases, enabling fast and accurate problem resolution. By following the standard CBR cycle of retrieve, reuse, revise, and retain, the system continuously learns from new queries and improves its performance over time. The integration of Natural Language Processing further enhances query understanding and similarity matching. Administrative intervention ensures correctness for unresolved queries, while case retention strengthens the knowledge base. Overall, the proposed system reduces manual workload, improves response efficiency, and provides consistent and reliable support to users. Its scalable and self-learning nature makes it suitable for modern mobile-based helpdesk environments and lays a strong foundation for future enhancements using advanced artificial intelligence techniques.

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