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AGENTIC AI-BASED AUTONOMOUS IT SUPPORT AND TROUBLE SHOOTING SYSTEM

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Abstract

Modern organizations depend heavily on IT infrastructure, applications, networks, cloud services, and employee devices for their daily operations. When technical problems occur, employees generally contact IT support teams through tickets, emails, chats, or phone calls. As the number of users and IT services increases, support teams may receive a large volume of repetitive requests involving password issues, software errors, network connectivity, system configuration, and access problems. The Agentic AI-Based Autonomous IT Support and Troubleshooting System is proposed as an intelligent solution that can understand IT issues, investigate their causes, and perform authorized troubleshooting actions with minimal human intervention.

The proposed system uses Agentic AI to go beyond simple question answering. An AI agent can understand a user's problem, collect relevant information, reason about possible causes, select appropriate tools, execute approved troubleshooting actions, and verify whether the issue has been resolved. Natural Language Processing enables users to describe technical problems using ordinary language instead of following complex support procedures. The system can also use organizational knowledge bases, troubleshooting guides, system documentation, and historical support information to improve its responses.

The platform can perform different categories of IT support activities, including diagnosing network connectivity problems, identifying application errors, checking system configurations, assisting with account-access issues, monitoring service availability, and recommending appropriate corrective actions. Where permitted, the agent can interact with IT tools and execute predefined remediation workflows. Each action can be governed by authentication, authorization, approval policies, and audit logging to reduce the risk of unauthorized changes.

A centralized support dashboard can provide information about active incidents, ticket status, detected problems, troubleshooting actions, system health, and resolution history. The AI agent can automatically create and update support tickets, communicate with users, escalate complex issues to human technicians, and maintain a detailed record of actions performed. This creates a continuous support workflow from issue reporting to diagnosis, remediation, verification, and closure.

Overall, the proposed system aims to make IT support faster, more scalable, and more proactive. By combining Agentic AI, knowledge retrieval, tool integration, automated workflows, monitoring, and human oversight, the system can reduce repetitive workload for IT teams while improving user support.

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I. Introduction

Information technology has become an essential part of almost every modern organization. Employees depend on computers, applications, networks, databases, cloud services, and communication platforms to perform their daily responsibilities. When these services experience problems, productivity can be affected immediately. IT support teams are therefore responsible for responding to incidents, diagnosing technical problems, assisting users, and maintaining the availability of organizational systems.

Traditional IT support commonly uses help-desk ticketing systems, email, telephone calls, chat support, and knowledge-base articles. Users submit a problem, after which a support technician investigates the issue and provides a solution. While this approach is effective for complex problems, a large percentage of IT support requests can involve repetitive issues with known solutions. Handling these requests manually consumes valuable technician time and can increase response and resolution times.

Artificial Intelligence has increasingly been used in IT service management to automate support activities. Chatbots and virtual assistants can understand user questions and provide answers based on predefined knowledge. Machine-learning systems can also identify patterns in system logs and detect anomalies. However, conventional AI support tools often stop at recommending a solution or providing instructions, leaving users or technicians responsible for executing the actual troubleshooting steps.

Agentic AI introduces a more autonomous approach. An AI agent can perceive information, reason about a problem, plan a sequence of actions, use external tools, observe the results, and adapt its next step accordingly. In an IT-support environment, this means an agent can potentially diagnose an issue, execute approved remediation actions, verify the outcome, and escalate the problem when autonomous resolution is not appropriate.

The proposed Agentic AI-Based Autonomous IT Support and Troubleshooting System combines these capabilities into an integrated platform. Users can report problems through a conversational interface, while the AI agent analyzes the issue and retrieves relevant information from trusted organizational knowledge sources. Based on predefined policies and permissions, the agent can perform safe troubleshooting workflows and communicate the results to the user.

The main objective of the proposed system is to transform IT support from a primarily reactive and manual process into an intelligent, automated, and proactive support system. By reducing repetitive tasks, improving response speed, and providing structured escalation for complex incidents, the system can help IT teams focus on higher-value technical problems while maintaining appropriate human control over sensitive operations.

II. Literature Survey

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Early IT support systems primarily relied on manual help desks, ticketing platforms, telephone support, and knowledge-base documentation. Users reported problems through tickets or direct communication, and technicians manually investigated the reported incidents. Ticketing systems improved incident tracking and prioritization, but the diagnosis and resolution processes often remained dependent on human expertise.

The introduction of rule-based expert systems provided an early form of automated technical troubleshooting. These systems used predefined rules such as "if condition A occurs, perform action B." They could successfully handle common and well-defined problems but were difficult to maintain as IT environments became more complex. Rule-based systems also had limited ability to understand natural-language descriptions and unexpected combinations of problems.

AI-powered chatbots and virtual assistants later improved the user interaction experience. Natural Language Processing enabled systems to understand common user questions and retrieve relevant answers from knowledge bases. These systems can reduce the workload associated with simple support requests, but many conventional chatbots primarily provide instructions rather than independently performing troubleshooting actions.

Machine-learning techniques have also been applied to IT operations through areas such as anomaly detection, log analysis, incident classification, and predictive maintenance. Machine-learning models can identify unusual system behavior and assist technicians in prioritizing incidents. However, detection alone does not necessarily provide an automated resolution mechanism. Integration with operational tools and controlled remediation workflows is therefore important for autonomous IT support.

Large Language Models have introduced stronger capabilities for understanding technical documentation, summarizing incidents, generating troubleshooting instructions, and interacting conversationally with users. Retrieval-Augmented Generation can connect language models with organizational knowledge sources to provide responses grounded in relevant documentation. Nevertheless, unrestricted language-model-generated actions can introduce operational and security risks, making tool permissions, validation, monitoring, and human approval important components of autonomous IT systems.

Recent Agentic AI approaches extend language-model capabilities by enabling agents to plan tasks, use tools, observe results, and perform multi-step workflows. In IT operations, agentic systems can potentially connect with ticketing platforms, monitoring systems, log repositories, cloud services, and approved administrative tools. The proposed system builds upon these developments by combining conversational support, knowledge retrieval, autonomous troubleshooting, controlled tool execution, verification, escalation, and audit logging into a unified IT-support platform.

III. System Analysis

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The proposed system provides an intelligent platform for automatically analyzing and resolving common IT support incidents. The process begins when a user submits an issue through a conversational interface, web portal, email, or integrated support channel. The system analyzes the user's description using Natural Language Processing and identifies the type and priority of the incident. The Agentic AI controller retrieves relevant information from approved knowledge bases, technical documentation, historical tickets, and system-monitoring sources. The reasoning component generates possible causes and creates a step-by-step troubleshooting plan. The agent determines which tools and actions are permitted according to predefined security and authorization policies. Safe diagnostic operations can be executed automatically, while sensitive actions can require human approval. The agent observes tool outputs and uses the results to update its troubleshooting plan. If a remediation action is performed, the system verifies whether the original problem has been resolved. The system communicates progress and results to the user through the support interface. Successful incidents can be automatically documented and closed according to organizational policies. Complex or unresolved incidents are escalated to human IT technicians with a complete diagnostic summary. All interactions, decisions, tool calls, and remediation activities can be recorded for auditing and future analysis.

Existing System

Existing IT support environments generally depend on help-desk ticketing systems, manual troubleshooting, chat support, knowledge bases, and IT technicians. Users submit tickets describing their problems and wait for support personnel to investigate them. Technicians manually review the issue, collect additional information, examine logs, and determine an appropriate solution. Basic chatbot systems may answer frequently asked questions but usually cannot independently diagnose complex technical problems. Knowledge-base systems provide troubleshooting instructions, but users or technicians must manually execute the recommended steps. Monitoring platforms can detect service failures or abnormal system conditions but often require human intervention to determine the appropriate remediation. Different IT tools may operate independently, creating fragmented troubleshooting workflows. Repetitive incidents can consume significant technician time even when standardized solutions already exist. Ticket queues may grow during periods of high demand, increasing response and resolution times. Existing systems may also provide limited continuous interaction with users during troubleshooting. Manual documentation of troubleshooting actions can be incomplete or inconsistent. There is often a clear separation between issue detection, diagnosis, remediation, and ticket closure. These limitations create a need for an integrated AI-based system capable of performing controlled multi-step troubleshooting while maintaining human oversight for sensitive operations.

Disadvantages of Existing System

- Heavy dependence on human IT technicians.
- High workload for repetitive support requests.
- Long response times during peak support periods.
- Manual diagnosis can be time-consuming.

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- Basic chatbots often provide only predefined responses.
- Knowledge-base instructions require manual execution.
- Limited autonomous problem resolution.
- IT tools may operate as separate systems.
- Manual ticket updates can be repetitive.
- Difficult to provide continuous 24/7 troubleshooting.
- Limited automated verification after remediation.
- Complex incidents may require multiple support interactions.
- Manual documentation can be inconsistent.
- Limited proactive detection and remediation capabilities.

Proposed System

The proposed system introduces an Agentic AI-based platform capable of understanding, diagnosing, troubleshooting, and managing common IT support incidents. Users can describe technical problems through a conversational interface using natural language. The AI agent analyzes the request, determines the incident category, and retrieves relevant information from trusted knowledge sources. A reasoning and planning component develops a troubleshooting workflow based on the available evidence. The agent can interact with approved IT tools such as monitoring platforms, ticketing systems, diagnostic utilities, log repositories, and other authorized services. Diagnostic actions are performed first to gather information without unnecessarily changing system state. Based on the results, the agent can select approved remediation actions according to organizational policies. High-impact or sensitive operations can be paused until an authorized human provides approval. After performing a remediation step, the agent verifies the system condition to determine whether the issue has been resolved. The system communicates troubleshooting progress and outcomes to the user in understandable language. Resolved incidents can be documented and updated automatically in the ticketing system. If the agent cannot safely resolve an issue, it escalates the incident to a human technician with diagnostic evidence and recommended next steps. All agent decisions and tool interactions can be logged for auditing and system improvement.

Advantages of Proposed System

- Provides intelligent conversational IT support.
- Automates common troubleshooting tasks.
- Reduces repetitive workload for IT teams.
- Supports multi-step autonomous troubleshooting.
- Uses organizational knowledge and documentation.
- Can integrate with existing IT tools.
- Provides faster initial incident response.
- Supports 24/7 automated assistance.
- Verifies whether remediation actually resolved the issue.
- Automatically documents troubleshooting activities.
- Escalates complex incidents to human technicians.
- Provides complete diagnostic context during escalation.
- Supports controlled and permission-based tool execution.

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- Maintains audit logs of agent actions.
- Can improve operational efficiency and scalability.

IV. Methodology

The methodology of the proposed system consists of several stages beginning with issue submission and ending with resolution or human escalation. The first stage is **incident collection**, where users report IT problems through a chatbot, web application, email, or integrated support channel. The Natural Language Processing module analyzes the request and identifies the problem category, affected service, urgency, and relevant entities. The Agentic AI controller retrieves supporting information from approved documentation, knowledge bases, monitoring systems, and historical incidents. The reasoning module evaluates possible causes and generates a troubleshooting plan. Before taking action, the policy engine verifies the agent's permissions and determines whether each proposed operation is allowed automatically or requires human approval. Diagnostic tools are then executed to collect system information, logs, configuration details, or service-status information. The agent analyzes the returned results and dynamically adjusts its troubleshooting plan when necessary. Approved remediation actions are executed through controlled tool integrations with appropriate authentication and authorization. After remediation, the verification module checks system status and relevant indicators to determine whether the problem has been resolved. The system communicates the result to the user and updates the associated support ticket. Unresolved or high-risk incidents are escalated to human technicians with a summary of symptoms, evidence, actions performed, and recommended next steps. Finally, system performance is evaluated using measures such as resolution rate, response time, escalation rate, tool-action success rate, and user satisfaction.

System Architecture

The system architecture consists of several interconnected components including the User Interaction Layer, Incident Management Layer, Agentic AI Orchestrator, Knowledge Retrieval Layer, Reasoning and Planning Engine, Policy and Authorization Layer, IT Tool Integration Layer, Verification Module, Ticketing System, Database, and Monitoring Dashboard.

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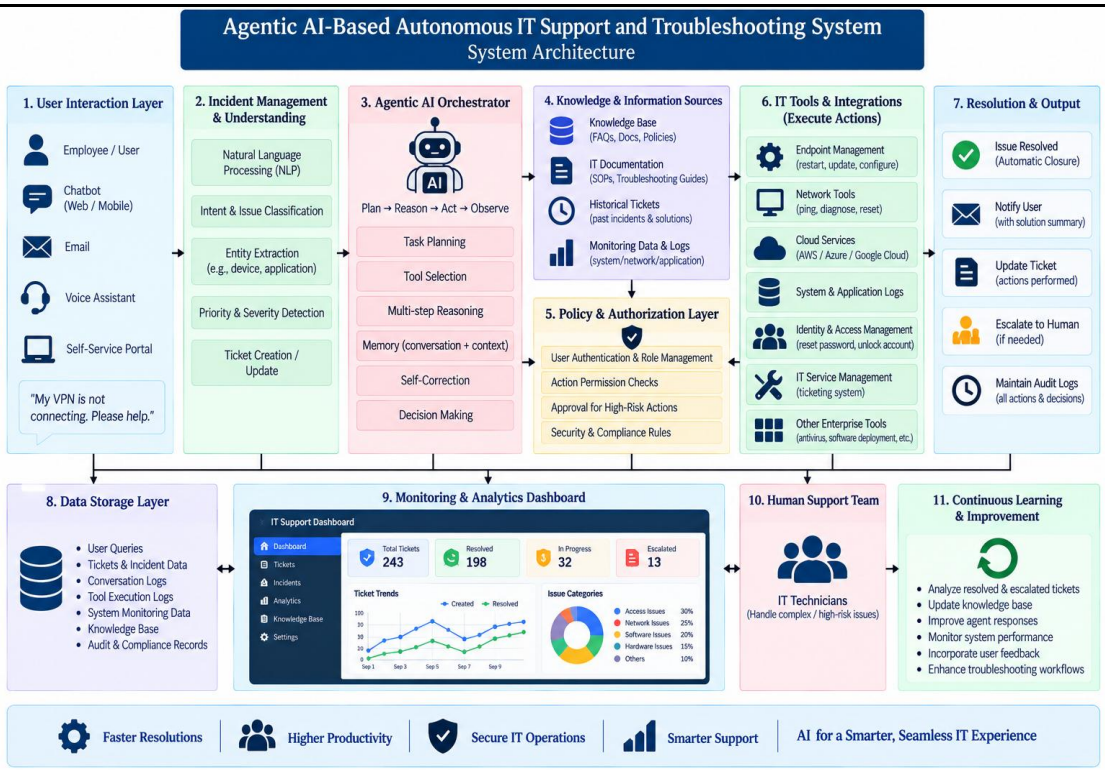

The process begins when a user submits an IT issue through the chatbot, web application, email, or another integrated support channel. The incident-management layer creates and categorizes the support request before passing it to the Agentic AI orchestrator. The orchestrator retrieves relevant information from organizational knowledge bases, documentation, historical tickets, system logs, and monitoring services. The reasoning and planning engine analyzes the available information and creates a multi-step troubleshooting plan. The policy and authorization layer evaluates every proposed tool action according to predefined permissions and safety policies. Approved diagnostic and remediation actions are executed through secure IT-tool integrations such as monitoring systems, ticketing platforms, endpoint-management tools, and cloud services. The agent observes the results of each action and uses them to determine the next appropriate step. The verification module checks whether the original issue has been resolved after remediation. Successful resolutions are documented and the support ticket is updated automatically. Complex, uncertain, or high-impact incidents are escalated to authorized human technicians. All conversations, tool actions, decisions, results, and approvals can be stored in an audit database. The monitoring dashboard provides information about active incidents, resolution rates, agent activities, system health, escalations, and historical performance.

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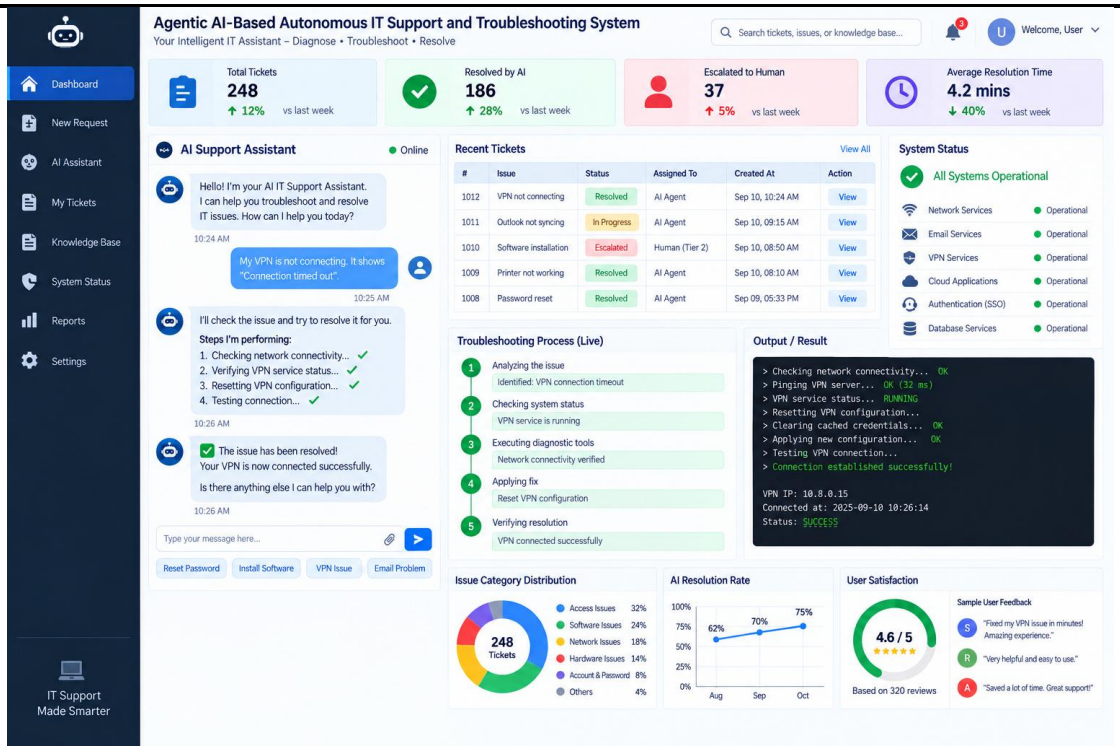

VI. Conclusion

The Agentic AI-Based Autonomous IT Support and Troubleshooting System provides an intelligent and automated approach to handling common IT support problems. By combining Agentic AI, Natural Language Processing, Machine Learning, knowledge retrieval, and automated tool execution, the system can understand user issues, investigate possible causes, perform approved troubleshooting actions, and verify whether the problem has been resolved.

The proposed system reduces the workload of IT support teams by automatically handling repetitive incidents such as network connectivity problems, software issues, password-related requests, and service failures. The AI agent can perform multi-step troubleshooting instead of simply providing instructions, which can significantly improve response and resolution times.

The system also provides a centralized dashboard for monitoring tickets, AI-resolved incidents, escalated issues, system health, troubleshooting activities, and performance statistics. When an issue is too complex or involves a sensitive operation, the system can escalate it to a human technician with the relevant diagnostic information and actions already performed.

Overall, the project demonstrates how Agentic AI can transform traditional IT support into a proactive, autonomous, and intelligent service. With appropriate authorization, security controls, audit logging, and human oversight, the system can provide scalable 24/7 support while maintaining operational safety. Future enhancements can include predictive incident detection, autonomous infrastructure monitoring, advanced root-

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cause analysis, multi-agent collaboration, automated cloud troubleshooting, and integration with enterprise IT service-management platforms.

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