Role of Artificial Intelligence in Request Management: A Comprehensive Review

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***Abstract*- Service request management refers to the procedures and resources implemented by organizations to handle service requests originating from customers, employees, and vendors. Artificial intelligence (AI) has emerged as a transformative technology with the potential to revolutionize request management processes. This review paper provides a comprehensive analysis of the role of AI in request management, examining its applications, benefits, challenges, and future implications. The paper explores the use of AI techniques, including natural language processing, machine learning, and chatbots, in various stages of request management. Additionally, it discusses how AI enhances request capture and logging, categorization and prioritization algorithms. Also, the workflow and routing optimization with AI, resource allocation and scheduling are discussed in detail. The paper concludes with benefits of AI in RM.**

***Index Terms*—AI-based, Chatbots, Intelligent routing algorithms, Request management, Virtual assistants, Workflow automation**

I. INTRODUCTION

Request management is a critical process within organizations that involves capturing, categorizing, prioritizing, and resolving various types of requests. Efficient and effective request management is essential for ensuring timely responses, optimal resource allocation, and overall customer satisfaction. With the rapid advancements in artificial intelligence (AI), organizations have started integrating AI techniques and technologies into their request management processes. AI offers the potential to automate and enhance various aspects of request management, improving accuracy, efficiency and customer experience. This comprehensive review paper aims to provide an analysis of the role of AI in request management, exploring its applications, benefits, challenges, and future implications.

A. Overview of Request Management

Service Request management is a crucial business process that enables employees to submit work order and maintenance requests to the facilities management team. This process involves employees seeking various facilities-related assistance, such as requesting new office chairs or acquiring laptops for new hires. The facilities team serves as a service desk, responsible for reviewing and approving these requests. Given the diverse nature of requests received by facility managers, it is essential to have an efficient request management system capable of handling a large volume of requests while also assisting in prioritization.

These requests can include service tickets, customer inquiries, technical support issues, or any other form of information or assistance sought by individuals or entities. The objective of request management is to ensure timely and effective resolution of these requests, leading to improved customer satisfaction and organizational efficiency.

During the initial stage of request management, known as request capture and logging, incoming requests are captured and relevant information is recorded for further processing. This includes details such as the nature of the request, contact information of the requester, and a comprehensive description of the issue or query [1]. Accurate and thorough request capture is vital to ensure that all necessary information is obtained, enabling subsequent stages of request management to proceed smoothly.

Once requests are captured, they need to be categorized and prioritized to facilitate streamlined handling and effective resource allocation. Artificial intelligence (AI) techniques can be employed to automatically categorize requests based on their content, keywords, or patterns [2]. By using machine learning algorithms, requests can be classified into predefined categories, enabling efficient routing to the appropriate teams or individuals. Moreover, AI algorithms can assign priority levels to requests based on factors such as urgency, impact, or predefined service level agreements (SLAs) [3]. This prioritization ensures that critical or time-sensitive requests receive prompt attention and appropriate resources.

Workflow and routing optimization is another critical aspect of request management. AI algorithms can analyze the characteristics of requests, such as their complexity, required expertise, and available resources, to intelligently route them to the most suitable teams or individuals [3]. By considering factors such as skills, availability, and workload, AI can optimize the routing process, minimizing response times and maximizing resource utilization. Intelligent routing also allows for the equitable distribution of requests, preventing overloading of specific teams or individuals.

Resource allocation and scheduling play a vital role in efficient request management. AI can assist in predicting resource requirements based on historical data, workload patterns, and other relevant factors [3]. By analyzing data and employing optimization algorithms, AI can allocate resources effectively, taking into account factors such as availability, skills, and request priorities. Dynamic resource scheduling enables organizations to adapt to changing demand and ensure optimal resource utilization, leading to improved efficiency and customer satisfaction.

B. Motivation for AI Integration in Request Management

The integration of AI in request management brings numerous motivations and advantages. AI techniques, such as natural language processing (NLP) and machine learning (ML), enable automated request understanding and categorization, leading to improved response times and customer satisfaction. Additionally, AI-powered chatbots and virtual assistants facilitate conversational interactions, enhancing the overall customer experience. Although request management systems without AI exist and worked in past, the integration of AI can add benefits to the system. This paper discusses the impact of AI in RM.

II. LITERATURE REVIEW: TOOLS FOR AI BASED REQUEST MANAGEMENT

Request management is a critical aspect of efficient and timely customer service. With the advancements in artificial intelligence (AI) technologies, several tools have emerged to automate and optimize request management processes. This literature review explores the existing tools for AI-based request management, highlighting their features, capabilities, and contributions to improving request handling.

A. Spoke

Spoke is an AI-driven request management platform that utilizes natural language processing (NLP) and machine learning algorithms to automate ticket management. It offers features such as automated ticket categorization, intelligent routing, and self-service options for users [4]. Spoke's AI capabilities enable efficient handling of requests by accurately categorizing and routing tickets, streamlining the overall request management process.

B. Halp

Halp is a conversational ticketing solution built on the Slack platform. It leverages AI and machine learning to transform conversations into trackable tickets, facilitating efficient request handling within Slack. Halp's intelligent routing and automation capabilities enable teams to respond to requests promptly and provide a seamless user experience [5].

C. Kustomer

Kustomer is a customer service platform that incorporates AI features for request management. Its AI-driven algorithms automate ticket routing, prioritize requests, and provide agents with suggested responses based on historical data and customer context. Kustomer's AI capabilities contribute to

efficient and personalized request handling, enhancing the overall customer service experience [6].

D. Zira

Zira is an AI-powered project management and request management tool. It offers intelligent task allocation, automated resource allocation, and smart request routing features. Zira utilizes machine learning algorithms to optimize resource utilization and streamline request management, ensuring efficient handling and timely resolution of requests [7].

E. Talla

Talla is an intelligent knowledge base and request management platform. It leverages AI to automate responses, categorize and route requests, and provide self-service options to users. Talla's machine learning capabilities continuously improve its understanding of requests, enabling accurate and efficient ticket handling [8].

These tools demonstrate the application of AI in request management, providing organizations with efficient and automated solutions for handling customer requests. By leveraging NLP, machine learning, and intelligent automation, these tools streamline ticket categorization, routing, and response generation, resulting in improved response times and enhanced customer satisfaction.

III. AI TECHNIQUES FOR REQUEST CAPTURE AND LOGGING

A. Natural Language Processing for Automated Request Understanding

One of the key challenges in request management is accurately understanding and extracting relevant information from incoming requests. Natural Language Processing (NLP) techniques offer powerful tools to automate the understanding of natural language text [9]. AI models trained on large datasets can analyse and interpret the content of requests, enabling automated request understanding.[10]

NLP techniques, such as text classification, named entity recognition, and sentiment analysis, can be applied to requests to extract important information. Text classification algorithms categorize requests into predefined classes or labels based on their content or intent. This categorization helps in routing requests to the appropriate teams or departments for further processing. Named entity recognition algorithms identify specific entities mentioned in the requests, such as customer names, product names, or dates, facilitating accurate logging of the request details. Sentiment analysis algorithms analyse the emotional tone expressed in the requests, providing valuable insights into customer satisfaction or dissatisfaction [14][15].

B. Chatbots and Virtual Assistants for Conversational Request Capture

Chatbots and virtual assistants are AI-powered conversational agents that interact with users in a natural language interface [8]. These intelligent agents can be deployed on websites, messaging platforms, or mobile applications to facilitate request capture and logging through conversational interactions.

Chatbots use NLP techniques to understand user queries, ask clarifying questions, and collect the necessary information for request logging. They can guide users through a series of prompts to capture all relevant details of their requests. By leveraging AI, chatbots can provide real-time assistance and ensure accurate request logging, eliminating the need for users to navigate complex forms or interfaces [17][18].

Virtual assistants, similar to chatbots, engage in conversational interactions to capture requests [9]. However, virtual assistants often possess more advanced capabilities, such as contextual understanding, personalized responses, and integration with knowledge bases. These features enable virtual assistants to provide more sophisticated request logging services and deliver tailored experiences to users [19].

C. Intelligent Information Extraction and Entity Recognition

Automating the extraction of important information from requests is crucial for efficient request

management. AI techniques enable intelligent information extraction and entity recognition, allowing organizations to capture and log request details accurately. Information extraction algorithms can identify and extract specific pieces of information from requests, such as customer contact details, order numbers, or issue descriptions. By automating this process, organizations can minimize errors and ensure that all relevant information is captured [17].

Entity recognition algorithms focus on identifying and extracting named entities, such as customer names, product names, or locations, from the requests [12]. These algorithms use various techniques, including pattern matching, machine learning, or deep learning, to identify and classify named entities within the text. This enhances the accuracy and completeness of request logging, facilitating subsequent stages of request management [18][19].

The integration of NLP techniques, chatbots, and virtual assistants for conversational interactions, and intelligent information extraction and entity recognition significantly enhances the request capture and logging process [13]. These AI techniques improve accuracy, reduce manual effort, and streamline the overall request management workflow.

IV. AI-DRIVEN CATEGORIZATION AND PRIORITIZATION

A. Text Classification Algorithms for Automated Request Categorization

Automated request categorization plays a crucial role in request management, as it allows organizations to efficiently allocate resources and route requests to the appropriate teams or departments. AI-driven text classification algorithms enable automated categorization by analysing the content of requests and assigning them to predefined categories or labels.

Text classification algorithms employ various techniques, such as machine learning and deep learning, to learn patterns and relationships within the textual data. These algorithms are trained on labelled datasets, where human annotators manually assign categories to a set of requests. By leveraging this labelled data, text classification models can learn to identify key features and patterns in requests, allowing them to accurately categorize new incoming requests.

Commonly used text classification algorithms include Naive Bayes, Support Vector Machines (SVM), and deep learning models such as Convolutional Neural Networks (CNN) or Recurrent Neural Networks (RNN). These algorithms process the textual data, extract relevant features, and make predictions about the category or label of each request [20][21][22].

B. Machine Learning Models for Request Prioritization

Once requests are categorized, prioritizing them based on their urgency, impact, or customer priority is essential for efficient resource allocation and timely resolution. AI-driven machine learning models can analyse historical data and learn patterns to assign priority levels to incoming requests. Machine learning models for request prioritization use various features extracted from the requests, such as request type, customer details, or issue descriptions. These features are fed into the models, which learn from historical data where requests were manually prioritized based on specific criteria.

Supervised learning techniques, such as decision trees, random forests, or gradient boosting algorithms, are commonly employed for request prioritization. These models learn from labelled training data, where requests are associated with priority levels assigned by human experts. By analysing the features of new incoming requests, the models predict their priority levels, allowing organizations to efficiently allocate resources and address high-priority requests promptly [23][24][25].

C. Personalized and Context-Aware Request Categorization

To further enhance request management, AI techniques enable personalized and context-aware request categorization. Personalization involves tailoring the categorization process based on individual customer preferences or characteristics, improving the relevance and accuracy of request

routing.AI models can analyse customer profiles, historical interactions, or past preferences to customize the categorization of incoming requests. By considering individual preferences and characteristics, organizations can provide personalized experiences to customers, resulting in higher customer satisfaction and engagement [26][27].

Context-aware request categorization takes into account additional contextual information to optimize the routing process. Factors such as the customer's location, the current workload of teams or departments, or service level agreements (SLAs) can influence the categorization and routing decisions. AI algorithms can integrate these contextual factors into the categorization process, ensuring that requests are directed to the most appropriate personnel or departments, optimizing response times, and resource utilization [28][29].

The integration of AI-driven categorization and prioritization techniques enhances request management by automating the allocation of resources and improving response times. By leveraging text classification algorithms, machine learning models, and personalized/context-aware approaches, organizations can streamline their request management processes and deliver efficient and personalized customer service.

V. WORKFLOW AND ROUTING OPTIMIZATION WITH AI

A. Intelligent Routing Algorithms for Optimal Request Assignment

Efficiently directing requests to the appropriate teams or individuals is crucial for the timely and accurate management of requests. Advanced intelligent routing algorithms, powered by AI, utilize optimization techniques and machine learning to automate the routing process and optimize request assignment [30]. These sophisticated algorithms take into account multiple factors, including the nature of the request, required expertise, workload, and resource availability.

Intelligent routing algorithms carefully analyze historical data to identify patterns and gain insights for making informed decisions regarding the optimal assignment of requests. By considering workload balancing, skill matching, and predefined routing rules, these algorithms ensure that requests are directed to the most suitable team or individual capable of providing timely resolution.

To train routing models, various machine learning techniques such as decision trees, reinforcement learning, or genetic algorithms can be applied. These techniques enable the models to learn from historical routing patterns and outcomes [32]. Consequently, the models become adept at predicting the most effective routing decisions for new incoming requests, thereby facilitating efficient resource allocation and minimizing response times.

B. Workflow Automation and Orchestration with AI

AI techniques enable workflow automation and orchestration, streamlining the request management process and improving overall operational efficiency. By automating repetitive tasks, AI-driven workflow automation reduces manual effort, minimizes errors, and accelerates request resolution.

AI models can be trained to understand the different steps and stages involved in request management workflows. By analyzing historical data and observing patterns in how requests progress through the workflow, these models can automate the execution of routine tasks, such as data entry, status updates, or notifications.

Workflow orchestration involves coordinating the execution of multiple tasks across different systems or departments involved in request management [30]. AI algorithms can optimize the sequencing and scheduling of these tasks based on factors such as dependencies, resource availability, and SLAs. By intelligently orchestrating the workflow, organizations can ensure smooth and efficient request processing.

C. Contextual Routing based on Customer Profiles and SLAs

Contextual routing takes into account specific customer profiles and Service Level Agreements (SLAs) to optimize the assignment of requests. AI techniques enable organizations to consider individual

customer preferences, historical interactions, and SLA requirements when routing requests.

By analyzing customer profiles and historical data, AI models can identify patterns and preferences that help determine the most appropriate team or individual to handle a particular request. This personalized routing approach enhances customer satisfaction and improves the overall quality of service.

Additionally, SLAs define specific response times, resolution targets, or priority levels for different types of requests. AI algorithms can consider these SLA parameters and dynamically prioritize requests based on their urgency and importance. This ensures that requests are handled in accordance with the predefined SLAs, meeting customer expectations and contractual obligations [31].

By leveraging contextual information, including customer profiles and SLAs, AI-powered contextual routing enhances the efficiency and effectiveness of request management processes, resulting in improved customer experiences and optimized resource utilization.

V. BENEFITS AND CHALLENGES OF AI IN REQUEST MANAGEMENT

The integration of AI in request management brings significant benefits in terms of speed and efficiency. AI-powered algorithms can automate various tasks, such as request categorization and routing, leading to faster response times and streamlined request handling processes.

The implementation of AI techniques in request management resulted in a significant reduction in response times, enabling organizations to handle a higher volume of requests with improved efficiency [33].

AI technologies contribute to improved accuracy and consistency in request management processes. Machine learning models trained on historical data can make precise predictions and decisions, minimizing errors and ensuring consistent handling of requests.

In their study, Li et al. (2018) highlighted that AI-driven request management systems achieved higher accuracy rates in categorizing and prioritizing requests compared to manual methods. The models demonstrated improved consistency in assigning request categories and priorities, leading to more reliable and standardized request management [34].

AI enables personalized customer experiences in request management. By analyzing customer profiles, past interactions, and preferences, AI algorithms can tailor the categorization, prioritization, and routing of requests to meet individual customer needs.

Research by Wang et al. (2019) emphasized the role of AI in delivering personalized customer experiences in request management. Their study demonstrated that AI-based systems enhanced customer satisfaction by providing customized support and ensuring that requests were routed to the most suitable teams or individuals based on individual preferences and characteristics [35].

The successful adoption of AI in request management faces various challenges, including technological readiness, data quality, and organizational readiness. Organizations need to develop the necessary infrastructure, data governance practices, and change management strategies to fully leverage the benefits of AI in request management.

According to Singh et al. (2020), the adoption of AI in request management requires organizational commitment and readiness. Their study emphasized the importance of establishing a supportive organizational culture, providing adequate training to employees, and addressing potential resistance to change for successful implementation [36].

VI. CONCLUSION

In this comprehensive review, we have explored the role of Artificial Intelligence (AI) in request management. We discussed various aspects of AI integration in request management, including request capture and logging, request categorization and prioritization, intelligent routing, resource allocation, and workflow automation. By leveraging AI techniques such as Natural Language Processing (NLP), machine learning, and deep learning, organizations can enhance the efficiency, accuracy, and personalization of their request management processes.

The use of NLP techniques enables automated request understanding, extracting important information from natural language text. Chatbots and virtual assistants facilitate conversational request capture, providing a user-friendly interface for capturing request details. Intelligent information extraction and entity recognition algorithms ensure accurate and complete request logging.

AI techniques also play a significant role in request categorization and prioritization. Text classification algorithms automate the categorization of requests into predefined classes, while machine learning models predict request priority levels based on historical data. Personalized and context-aware categorization further enhances the accuracy and relevance of request routing decisions.

Intelligent routing algorithms optimize the assignment of requests to the most suitable teams or individuals, considering factors such as expertise, workload, and resource availability. Workflow automation and orchestration streamline request management processes, reducing manual effort and accelerating request resolution. Contextual routing based on customer profiles and Service Level Agreements (SLAs) ensures requests are handled in accordance with individual preferences and contractual obligations.

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