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A SURVEY ON QUEUE MANAGEMENT SYSTEMS

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Abstract—**Recent advancements in technology and methodologies have significantly bettered the quality and effectiveness of systems in machine paraphrase, speech processing, healthcare, and wireless dispatches. This check examines innova- tive approaches, including deep knowledge models for paraphrase quality discovery, optimization fabrics for speech- centric processing, and queuing systems for managing case and staff satisfaction in healthcare. pivotal methodologies explored include intermittent neural networks for paraphrase quality estimation, common optimization ways for automatic speech recognition ASR), and queuing proposition operations to anatomize staying times and service quality.These methodologies offer benefits analogous as advanced real- time evaluation, robustness against crimes, and a comprehensive view of user satisfaction. still, challenges like resource intensity, performance complexity, and reliance on accurate data models are also mooted. also, the integration of virtual ranges in space- ground networks and line-alive resource operation in wireless dispatches highlights the severity of these systems to dynamic envi- ronments. This check emphasizes the significance of empirical evidence and user acceptance, furnishing perceptivity into the evo- lution of intelligent systems and their implicit to attack complex challenges across various fields. future disquisition directions are suggested to explore limitations and expand the connection of these innovative approaches.**

Index Terms—**Machine Translation, Speech Processing, Healthcare, Queuing Theory, Deep Learning, User Satisfaction**

I. Introduction

In an period characterized by rapid-fire- fire technological advancements and evolving consumer prospects, the operation of customer ranges has surfaced as a vital aspect of service delivery across various sectors. As digital transformation reshapes the terrain of customer service, businesses must adapt to meet the rising demands for convenience, speed, and substantiated exploits. Queue Management Systems(QMS) have come necessary tools for associations seeking to optimize customer exploits while enhancing functional effectiveness. Traditional styles of line operation, constantly involving physical lines and manual processes, have proven shy in addressing the complications of modern customer service surroundings. These outdated systems can lead to significant customer dissatisfaction, extended detention times, and inefficiencies that ultimately affect in a loss of business and a tarnished brand character. The need for farther sophisticated and responsive line operation results has driven the elaboration of QMS, integrating advanced technologies to meet contemporary service demands. modern QMS influence slice- edge technologies analogous as artificial intelligence AI), the Internet of goods(IoT), and data analytics. These technologies enable associations to gain real- time perceptivity into customer behavior and line dynamics, offering capabilities far beyond the compass of traditional systems. AI algorithms can predict stay times and optimize resource allocation, while IoT bias grease real- time monitoring and operation of ranges. Data analytics give practicable perceptivity that help associations make informed opinions to meliorate service delivery. The benefits of advanced QMS are particularly apparent in sectors where effective line operation is critical. For case, in healthcare settings, case flux operation is essential to ensure timely movables, reduce detention times, and enhance patient satisfaction and issues. also, in retail, effective line operation can meliorate the shopping experience by reducing detention times at checkouts and furnishing substantiated services. In banking and financial services, QMS can streamline operations by managing customer movables and reducing in- branch business, thus perfecting customer satisfaction and functional effectiveness. This literature review aims to give a comprehensive exploration of the various types of QMS available moment, including honorary- predicated systems, virtual queuing, appointment- predicated queuing, online marking, and crossbred systems. Each type of QMS serves unique business conditions and customer prospects, showcasing the versatility and severity of these systems in different service surroundings. By examining the functionalities, benefits, and limitations of each type, this review will illuminate how different QMS results can be adapted to specific functional surrounds. likewise, the review will claw into the technological advancements that have converted QMS, examining their impact on user experience and functional effectiveness. The integration of AI, IoT, and data analytics has not only enhanced the predictive and real- time capabilities of QMS but also opened new avenues for personalization and customer engagement. By relating current trends and implicit future developments in the field, this review seeks to emphasize the necessary part of QMS in delivering exceptional customer service and maintaining a competitive edge in an increasingly digital terrain. The ongoing digital transformation and the global shift towards farther customer- centric service models emphasize the need for businesses to invest in advanced line operation results. As associations strive to meet and exceed customer prospects, QMS will continue to play a critical part in optimizing service delivery, enhancing customer satisfaction, and driving functional excellence. This disquisition aims to give precious perceptivity into the elaboration, capabilities, and future prospects of QMS, offering a roadmap for businesses looking to enhance their line operation strategies in a dynamic and competitive request. By synthesizing findings from recent studies and practical prosecutions, this review will contribute to a deeper understanding of how advanced QMS can be abused to navigate the complications of modern service surroundings.

II. LITERATURE SURVEY

Significant progress has already been achieved in this field, serving as a reference point to understand the foundational ideas and grasp the essential concepts needed for this study.

Ning Wang et al.[1] explore queue-aware radio resource management and scheduling in wireless communications under quasi-static fading conditions. Their research highlights the limitations of traditional resource management strategies, which primarily focus on channel state information while often neglecting the intricacies of traffic and buffer dynamics. This oversight can lead to suboptimal performance in real-world scenarios where user demand and network conditions fluctuate significantly.To address these challenges, the authors reformulate the scheduling problem as a constrained nonlinear integer programming problem, which allows for a more holistic approach to resource allocation. They introduce two novel algorithms: the Integer Steepest-Descent Search with Sub-Sequential Interval Search (ISDS-SSI) and the Constrained Discrete Rosenbrock Search (CDRS). Both algorithms are designed to operate with low complexity while ensuring good convergence properties, thereby making them suitable for practical applications in dynamic network environments.The performance of these algorithms is evaluated across various traffic scenarios, demonstrating their superiority over conventional scheduling methods. Notably, the CDRS algorithm achieves performance levels comparable to more complex dynamic programming approaches but offers better scalability, making it a promising solution for modern wireless networks.This research underscores the critical importance of incorporating queue dynamics into radio resource management strategies to enhance the quality of service (QoS) in wireless networks. By integrating traffic and buffer dynamics into the scheduling process, the proposed algorithms not only optimize resource allocation but also ensure that user experiences are improved, thereby addressing the growing demands for efficient and reliable wireless communication. The findings from this study contribute to a deeper understanding of how advanced resource management techniques can be effectively implemented in the context of evolving wireless communication landscapes.

Alexander Komashie et al.[2] investigate the intricate relationships between patient satisfaction, waiting times, staff satisfaction, and service times in healthcare settings. By employing queuing theory, the authors create an integrated model that connects these critical elements, shedding light on how they interact and influence each other. Previous research has established patient satisfaction as a key quality indicator, particularly emphasizing the significant role that waiting times play in accessing care. However, the implementation of performance targets aimed at improving patient experiences has, at times, led to negative practices that inadvertently harm the quality of care provided.While existing models have predominantly focused on patient satisfaction, this study fills a notable gap by developing a model for staff satisfaction that is related to service time. This model is grounded in empirical data collected from healthcare professionals, thereby providing a more comprehensive understanding of the factors that contribute to overall satisfaction in healthcare environments. The proposed Effective Satisfaction Level (ESL) model offers practical implications for better resource allocation and capacity planning, ultimately aiming to enhance both patient and staff experiences.Despite its contributions, the study acknowledges certain limitations, such as the assumptions of a simplified single-server system. This approach may restrict the model's generalizability and applicability across diverse healthcare settings. Consequently, the authors indicate a need for further research to explore other influential factors that may affect healthcare satisfaction, which could provide a more nuanced understanding of the dynamics at play.Overall, this research underscores the importance of considering both patient and staff satisfaction in the quest for improved healthcare delivery. By integrating these elements into a cohesive model, the authors provide valuable insights that can inform future strategies aimed at optimizing service quality and operational efficiency in healthcare systems. As illustrated in Figure 1, the interconnectedness of these variables highlights the complexity of satisfaction dynamics in healthcare environments, emphasizing the need for a holistic approach to service improvement.

Ying Sun et al.[3] introduce a novel approach to managing tasks within space-ground integrated networks by utilizing the concept of virtual queues. This innovative method addresses the challenges posed by diverse access networks, including cellular, WiFi, satellite, and QUAVs, which generate tasks of varying priorities. By building upon existing queuing theory, the authors propose a method for splitting task queues into virtual queues based on these priorities, thereby

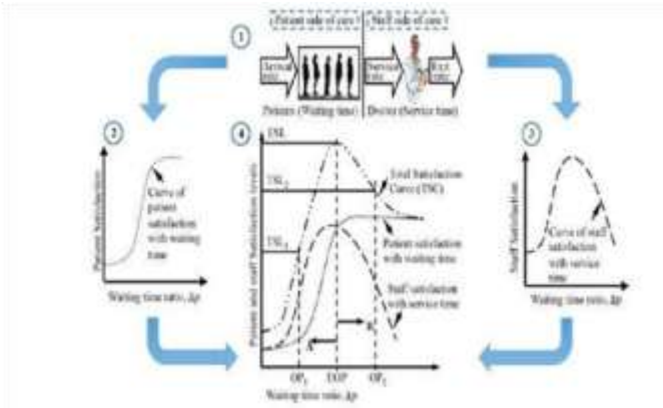

Fig. 1. Interconnectedness of patient and staff satisfaction dynamics in healthcare.[2]

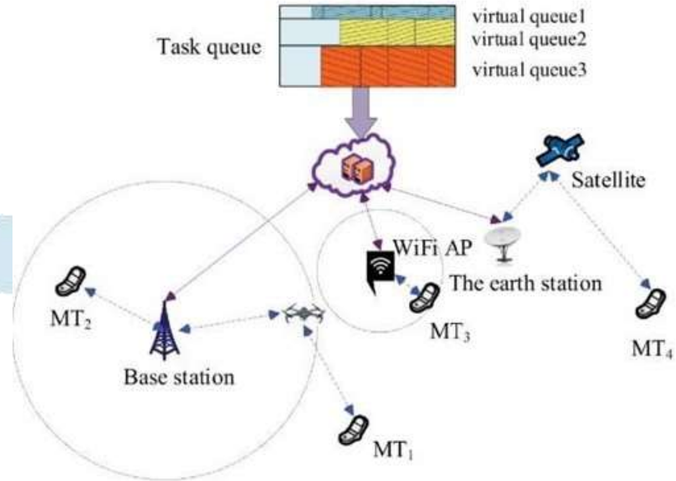

Fig. 2. System model of the space-ground integrated networks.[3]

enhancing task processing efficiency.Previous research has underscored the importance of effective queue management in telecommunications and data networks, with studies primarily focusing on task scheduling and resource allocation in heterogeneous environments. However, limited attention has been given to performance analysis specifically within space-ground integrated networks, making this paper a significant contribution to the field.The proposed virtual queue strategy is validated through simulations, demonstrating its potential to improve system performance by optimizing task handling based on priority and access network type. As illustrated in [Fig.2.System model of the space-ground integrated networks], the system model of the space-ground integrated networks highlights the integration of various access networks and the role of virtual queues in managing task priorities effectively.This study not only advances the theoretical understanding of queue management in integrated networks but also provides practical insights that can lead to more efficient task processing and resource utilization in real-world applications.

Jagadeesh Sai et al.[4] address the challenges of language detection and translation within the realm of natural language processing (NLP), highlighting the complexities involved in identifying languages from text and translating them securely. The authors emphasize the significance of language identification as a precursor to effective machine translation, which is crucial for applications such as sentiment analysis, information retrieval, and multilingual support.The paper discusses various methodologies for language identification, encompassing both non-computational and computational approaches, with a particular focus on statistical techniques like character n-gram models. Previous research has demonstrated the efficacy of n-gram models in recognizing European languages; however, many Asian and African languages remain underrepresented in these studies. This gap underscores the need for more inclusive methodologies that can effectively handle a broader range of languages.Furthermore, the authors explore the integration of encryption techniques, specifically the Advanced Encryption Standard (AES) algorithm, to ensure data security during the translation process. This aspect is particularly relevant in today's digital landscape, where data privacy and security are paramount.The literature review references various studies that have utilized NLP for sentiment analysis and language processing, showcasing the evolution of machine learning techniques in enhancing language recognition and translation capabilities. Overall, this work contributes to the ongoing discourse on improving language detection and translation systems, particularly in the context of less commonly spoken languages. By addressing these critical issues, the authors aim to advance the field of NLP and promote more effective communication across diverse linguistic landscapes.

Meijuan Chen et al.[5] address the critical aspect of machine translation quality assessment, a topic that has been largely overlooked despite the rapid advancements in machine translation technologies. While existing approaches primarily focus on the offline evaluation of written content, there remains a significant gap in real-time quality detection, especially in oral translation scenarios.Previous research has explored various machine translation methods, including neural networks and linguistic features; however, these studies often lack a robust framework for automatic quality evaluation. This limitation highlights the need for innovative solutions that can assess translation quality in real-time applications effectively.To address this challenge, the authors propose a novel sentence-level machine translation quality estimation method utilizing a Double-RNN architecture.

This architecture leverages parallel corpora to enhance the evaluation process, allowing for a more accurate assessment of translation outputs. By bridging the gap between machine translation outputs and human quality assessments, this approach provides a more nuanced understanding of translation quality, particularly in dynamic contexts where immediate feedback is essential.Overall, this work represents a significant contribution to the field of machine translation, offering a promising direction for future research and practical applications in real-time translation quality assessment. Through their innovative methodology, the authors aim to improve the reliability and effectiveness of machine translation systems, ultimately enhancing user experiences across various linguistic interactions.

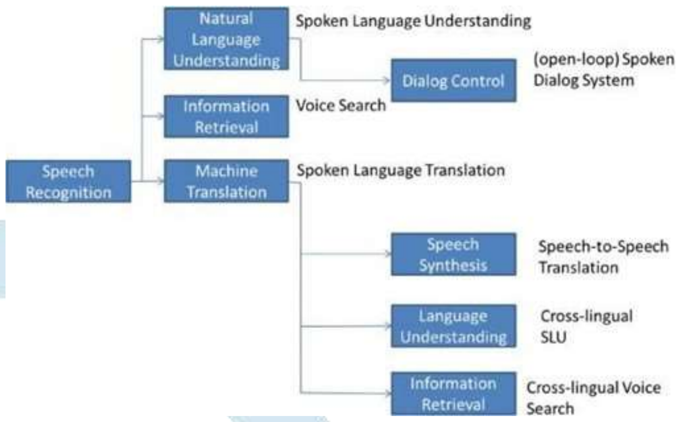

Fig. 3. General tandem architecture of common SCIP systems .[6]

Xiaodong He et al.[6] present an in-depth analysis of Automatic Speech Recognition (ASR) as a crucial component of Speech-Centric Information Processing (SCIP) systems, which encompass applications such as spoken language translation (SLT), spoken language understanding (SLU), and voice search. The paper highlights the challenges posed by the integration of ASR with downstream text-based systems, emphasizing the need for an optimization-oriented framework to address the inconsistencies that arise when subsystems operate independently.Previous studies have primarily focused on individual components of ASR and SCIP systems, often neglecting the interactions between ASR and subsequent processing tasks. This oversight can lead to suboptimal performance, as the effectiveness of ASR outputs directly impacts the efficiency and accuracy of downstream applications. The authors argue for a unified approach that incorporates the uncertainty inherent in ASR outputs, enabling better end-to-end system performance.To address these challenges, this paper builds upon existing literature by proposing a joint optimization framework that aligns the training objectives of ASR with the performance metrics of the entire SCIP system. This framework aims to enhance robustness and accuracy in real-world applications by ensuring that the ASR component is optimized in conjunction with the overall system goals.As illustrated in Figure[3], the proposed optimization framework demonstrates the interdependencies between ASR and other components of SCIP, highlighting the potential for improved system performance through integrated training strategies.Overall, this work contributes significantly to the ongoing discourse on enhancing ASR technologies and their integration into broader speech-centric applications, paving the way for more effective and reliable speech processing systems.

Ciro D'Apice et al.[7] address the complexities of Cognitive Radio Networks (CRNs) through the lens of a multiline queueing system, focusing specifically on the interaction between high-priority users (HPUs) and low-priority users (LPUs). As the demand for wireless communication continues to grow, understanding how to effectively manage user prioritization and service quality in CRNs has become increasingly critical. Previous research has explored various queueing models within the context of CRNs, particularly highlighting the challenges posed by user prioritization, service interruptions, and arrival processes. Traditional models, often based on Poisson processes, may not adequately capture the variability and correlation observed in user arrivals. To address this gap, the authors build upon earlier works that employed Markov Arrival Processes (MAPs), which provide a more nuanced representation of user behavior and arrival dynamics.One of the novel contributions of this paper is the introduction of a blocking mechanism for LPUs that occurs following the loss of an HPU. This mechanism aims to enhance service quality and user retention within the network, ensuring that LPUs are not unduly affected by the prioritization of HPUs. By synthesizing insights from existing literature on queueing theory, CRN modeling, and user behavior, the authors establish a comprehensive framework for analyzing the performance of priority-based service systems.Overall, this work contributes significantly to the understanding of how to optimize service delivery in CRNs, particularly in scenarios where user prioritization is essential. By integrating advanced queueing models and addressing the intricacies of user interactions, the authors provide valuable insights that can inform the design and implementation of more effective cognitive radio systems.

Andrzej Chydzin´ski [8] discusses a novel approach to queueing systems where job rejection probabilities are contingent on queue size. This work builds upon existing models that primarily focus on simple Poisson arrivals, which have traditionally dominated the literature on queueing theory. However, previous studies have largely overlooked the impact of autocorrelation in arrival processes, a factor that can lead to significant inaccuracies in performance predictions.Notably, while several works have addressed the characteristics of queue size distribution and response time, few have explored the implications of autocorrelation in probabilistic rejection scenarios. The literature indicates that incorporating autocorrelation is crucial for accurate modeling, as evidenced by studies on traffic behavior in networking and call center environments. These studies suggest that arrival processes are often more complex than what simple Poisson models can capture, highlighting the need for more sophisticated approaches.This paper fills a critical gap in the literature by providing a comprehensive analysis of mean waiting times under various rejection probability functions and arrival processes. By integrating the effects of autocorrelation, Chydzin´ski enhances the understanding of how queue dynamics can be influenced by the characteristics of incoming job streams. The findings have significant implications for designing more efficient queueing systems across various applications, including telecommunications, service industries, and computer networks.In summary, this work represents an important advancement in queueing theory, offering insights that can lead to improved performance predictions and better management of queueing systems in real-world scenarios. The incorporation of autocorrelation into the analysis not only enriches the theoretical framework but also enhances practical applications, making it a valuable contribution to the field.

Swapnali Patki et al.[9] provide a comprehensive literature review on existing queue management systems, emphasizing their functionalities, advantages, and limitations. They explore a variety of systems, including smart mobile applications for real-time tracking, facial recognition technologies utilized in airports, and GSM-based solutions for healthcare settings. These systems showcase significant potential to enhance customer satisfaction and productivity by minimizing waiting times and improving service delivery.However, the authors highlight several challenges faced by these systems, such as technological dependency, inaccuracies stemming from false positives in image recognition, high implementation costs, user acceptance issues, and environmental factors that may impact performance. Despite these drawbacks, the benefits of smart queue management systems are substantial; they facilitate data-driven decision-making, boost operational efficiency, provide real-time monitoring capabilities, and offer scalability to accommodate fluctuating demands. Ultimately, the proposed system aims to harness modern technologies, including Deep Neural Networks (DNN) and image processing, to create a more efficient and satisfying experience for both customers and organizations. This initiative addresses the ongoing need for innovation in queue management, paving the way for smarter and more responsive service solutions.

Md. Nasir Uddin et al.[10] provide a comprehensive examination of queue management systems, with a particular focus on their application in banking environments. The literature review highlights various existing queuing models, including both structured and unstructured queues, as well as techniques such as First Come First Serve (FCFS) and Shortest Processed First (SPF). These models are crucial for efficiently managing customer flow, especially in high-demand settings like banks, where lengthy queues can lead to significant customer dissatisfaction.The authors emphasize the advantages of automated systems over traditional manual methods, noting that automation can significantly enhance service delivery, reduce waiting times, and improve overall customer experiences. By implementing automated queue management systems, banks can streamline operations, ensuring that customers are served promptly and effectively, thereby fostering greater satisfaction and loyalty.

III. Conclusion

The comprehensive exploration of queue management systems presented in the studies by Ning Wang et al., Alexander Komashie et al., Ying Sun et al., Jagadeesh Sai et al., Meijuan Chen et al., Xiaodong He et al., Ciro D'Apice et al., Andrzej Chydzin´ski, Swapnali Patki et al., and Md. Nasir Uddin et al. reveals a rich tapestry of insights into the complexities and challenges of managing queues and resources across various sectors. Each research contribution sheds light on specific issues, methodologies, and innovations that collectively enhance our understanding of efficient queue management and its implications for user experience and operational effectiveness. Ning Wang et al. delve into queue-aware radio resource management in wireless communications, particularly under quasi-static fading conditions. They articulate the limitations of traditional resource management strategies, which often prioritize channel state information while neglecting the dynamics of user traffic and buffer states. By reformulating the scheduling problem into a constrained nonlinear integer programming framework, the authors introduce two novel algorithms: Integer Steepest-Descent Search with Sub-Sequential Interval Search (ISDS-SSI) and Constrained Discrete Rosenbrock Search (CDRS). These algorithms demonstrate low complexity and strong convergence properties, making them practical for dynamic network environments. Their evaluation across various traffic scenarios confirms the superiority of these methods over conventional scheduling techniques, highlighting the critical need to incorporate queue dynamics into resource management strategies to enhance the quality of service (QoS) in wireless networks.
In the healthcare domain, Alexander Komashie et al. investigate the intricate interplay between patient satisfaction, waiting times, staff satisfaction, and service times. They employ queuing theory to develop an integrated model that elucidates

these interconnections, thereby addressing a significant gap in existing research that has primarily focused on patient experiences. By introducing the Effective Satisfaction Level (ESL) model, which incorporates both patient and staff satisfaction metrics, the authors provide valuable insights for resource allocation and capacity planning. Their findings emphasize the importance of balancing patient and staff needs to improve overall healthcare delivery, illustrating how a holistic approach can lead to better service quality and operational efficiency.

Ying Sun et al. propose an innovative method for managing tasks within space-ground integrated networks using the concept of virtual queues. Their approach addresses the challenges posed by heterogeneous access networks, including cellular, WiFi, satellite, and QUAVs, which generate tasks with varying priorities. By utilizing queuing theory to split task queues based on priority levels, they enhance task processing efficiency and optimize resource utilization. The simulations conducted in this study demonstrate the potential of virtual queues to improve system performance, contributing significantly to the theoretical understanding of queue management in integrated telecommunications networks.

Jagadeesh Sai et al. tackle the complexities of language detection and translation in natural language processing (NLP), emphasizing the significance of robust language identification methods. They highlight the underrepresentation of many Asian and African languages in existing studies, advocating for more inclusive methodologies that can effectively handle a broader range of languages. Additionally, they explore the integration of encryption techniques, specifically the Advanced Encryption Standard (AES), to ensure data security during translation processes. This focus on security is particularly relevant in today's digital landscape, where data privacy is paramount.

Meijuan Chen et al. address a critical gap in machine translation quality assessment, particularly in real-time applications. They propose a novel sentence-level quality estimation method using a Double-RNN architecture, which leverages parallel corpora to enhance the evaluation process. This innovative approach bridges the gap between machine translation outputs and human quality assessments, providing a more nuanced understanding of translation quality in dynamic contexts. Their work represents a significant advancement in the field of machine translation, offering promising directions for future research and practical applications.

Xiaodong He et al. present an in-depth analysis of Automatic Speech Recognition (ASR) as a component of Speech-Centric Information Processing (SCIP) systems. They emphasize the need for an optimization-oriented framework that addresses the inconsistencies arising from the independent operation of ASR and downstream text-based systems. By proposing a joint optimization framework that aligns ASR training objectives with overall system performance metrics, the authors aim to enhance the robustness and accuracy of speech processing applications. Their work contributes significantly to the discourse on improving ASR technologies, paving the way for more effective and reliable speech-centric applications.

Ciro D'Apice et al. explore the complexities of Cognitive Radio Networks (CRNs) through a multiline queueing system, focusing on the interaction between high-priority users (HPUs) and low-priority users (LPUs). They introduce a blocking mechanism for LPUs in scenarios where HPUs are prioritized, aiming to enhance service quality and user retention. By synthesizing insights from existing literature on queueing theory and CRN modeling, the authors provide a comprehensive framework for analyzing priority-based service systems, thereby contributing to the optimization of service delivery in CRNs. Their findings underscore the importance of effectively managing user prioritization to ensure equitable access to resources, particularly as demand for wireless communication continues to escalate.

Andrzej Chydzin´ski address the impact of autocorrelation in arrival processes on queue dynamics, presenting a novel approach where job rejection probabilities are contingent on queue size. This work builds upon traditional models that often rely on simple Poisson arrivals, which may not accurately reflect the complexities of real-world scenarios. By incorporating autocorrelation into their analysis, the authors enhance the understanding of mean waiting times and rejection probabilities, providing insights that can lead to more accurate performance predictions in various applications, including telecommunications and service industries.

The literature review by Swapnali Patki et al. and Md. Nasir Uddin et al. emphasizes the significance of automated queue management systems in enhancing customer satisfaction and operational efficiency. They explore various technologies, including smart mobile applications, facial recognition, and GSM-based solutions, highlighting their potential to minimize waiting times and improve service delivery. Despite the challenges associated with these systems, such as technological dependency and user acceptance issues, the authors advocate for the integration of modern technologies like Deep Neural Networks to create more efficient and responsive queue management solutions. Their findings reinforce the necessity of innovation in queue management to meet the evolving demands of customers and organizations alike.

In summary, the collective insights from these studies underscore the necessity of adopting innovative and holistic approaches to queue management across diverse fields. By integrating advanced technologies and considering the interdependencies of various factors, these research efforts pave the way for more efficient, responsive, and user-centric systems that can effectively meet the challenges of modern service environments. The ongoing evolution in queue management strategies not only addresses current demands but also anticipates future needs, ultimately enhancing the quality of service and user experiences across multiple domains. Future research should continue to explore the integration of emerging technologies, the impact of user behavior on queue dynamics, and the development of adaptive systems that can respond to real-time changes in demand and resource availability.

IV. References

[1] Ning Wang, Chen He, T.Aaron Gulliver, Vijay K Bhargava, ”Generalized Queue-Aware Resource Management and Scheduling for Wireless Communications”,IEEE, Volume 3,2015.

[2] Alexander Komashie, Ali Mousavi, P. John Clarkson, TerryYoung, ”An Integrated Model of Patient and Staff Satisfaction Using Queuing Theory”,IEEE, Volume 3,2015.

[3] Ying Sun, Xujie Li, Jichang Shen, Buyankhishig Ulziinyam,and Xuedong Zheng,”The Performance Analysis of Virtual Queues for Space-Ground Integrated Networks”,IEEE, Volume 8, 2020.

[4] Jagadeesh Sai, Bhagyashree P Pujeri, ”An Anatomization of Language Detection and Transla- tion using NLP Techniques”,International Journal of Inno- vative Technology and Exploring Engineering,2020.

[5] Meijuan Chen, ”A Deep Learning-Based Intelligent Quality Detection Model for Machine Translation”,IEEE, Volume 11,2023

[6] Xiaodong He, Li Deng, ”Speech-Centric Information Processing: An Optimization-Oriented Approach”,2012 Microsoft Research, Redmond, WA 98052 USA.

[7] Ciro D’Apice, Maria Pia D’Arienzo, Alexander Dudin, and Rosanna Manzo, ”Admission Control in Priority Queueing System With Servers Reservation and Temporal Blocking Admission of Low Priority Users”,IEEE, Volume 11,2023.

[8] Andrzej Chydzinski, ”Waiting Time in a General Active Queue Management Scheme”,Department of Computer Networks and Systems, Silesian University of Technology, 44-100 Gliwice, Poland.

[9] Swapnali Patki,Dipti Pachpande,Prof.Sandeep Thite, ”Smart Queue Management System with Real-Time Tracking Using DNN”,Department of Information Technology,Bharati Vidyapeeth’s College of Engineering for Women,Pune,India,2020.

[10] Md. Nasir Ud- din, Mm Rashid, Mg Mostafa, Belayet H, Sm Salam, Na Nithe SZ Ahmed, ”Automated Queue Management Sys- tem”,International Islamic University, Malaysia,2016.