



**Developing a Chatbot for Streamlined Information Access and
Meeting Management in Corporate Settings**

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Declaration

‘I declare that this Applied Research Project that I have submitted to Dublin Business School for the award of Master of Science in Business Analytics is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references.

Furthermore, this work has not been submitted for any other degree.’

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Abstract

This research examines a rule-based chatbot designed for onboarding and internal communication within a corporate context and then reports the development and evaluation of the prototype. Targeted towards freshers and trainees, the chatbot, developed in Python/Flask, serves as a smart assistant that responds to common departmental inquiries and handles schedules and meeting details. The system employs a fuzzy logic algorithm that is geared to accept natural language input and enables interaction without matching specific keywords.

The chatbot also has a strong meeting management aspect that makes it different from the others. It assists users in scheduling meetings via some guided or a single-line command and also allows users to fetch records of meetings filtered via date, month, or year. Latest improvements like displaying only the last ten meetings as well as dynamically filtering meeting logs by typing out queries such as “show meetings for January 2024” or “show meetings for 28 October 2027.” Improvements like automatic parsing of dates and displaying them in tabular format, where needed, greatly improve user experience and lead to a more efficient practice workflow.

The UI was designed to be structured, to mimic modern messaging apps, which the founders ensured so that every user would be familiar with using it. A small group of new joiners validated that the chatbot had the right content, clarity, and added value by reducing the onboarding process. We found that our query matching had high success rates, and received positive feedback on the visual interactive and flow of interaction during the evaluation.

Thus, the chatbot is a low-cost, high-return prospect for small to medium-sized enterprises looking to modernise their onboarding and internal support processes without needing sophisticated AI and heavy IT infrastructures. The results further support the notion that lightweight, rules-based chatbots serve as powerful digital transformation tools, providing tangible benefits within corporate training, HR automation, and employee self-service solutions.

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Chapter 1: Introduction

1.1 Background

In the digital age, businesses are increasingly turning to artificial intelligence (AI) technologies to streamline operations, enhance communication, and improve employee experiences. Chatbots are one of the most common use cases for AI in the corporate world. These are designed to help with natural human-like interaction and provide immediate responses to queries using defined logic or using AI-based learning models (Neo et al., 2022). While they were initially known for improving customer service, chatbots have now extended their functionalities in numerous business functions, particularly in human resource management, onboarding, and employee training (Grünbichler et al., 2023).

In the past, new hires were dependent upon managers or HR personnel for answers to their onboarding questions. This model, however, often leads to inefficiency, especially in enterprises with very large organizations where HR teams spend most of their time dealing with repetitive queries. Chatbots are now providing a scalable, efficient alternative to this by enabling new employees, fresher/trainee employees, to find out all important information in no time and independently. Research indicates that chatbots lessen administrative burden, improve training effectiveness, and promote organizational agility (Sari et al., 2020; Chakraborty et al., 2024).

Modern chatbots powered by natural language processing (NLP), machine learning (ML), and AI can provide context-aware and personalized responses rather than just scripted responses. Moreover, they are also capable of storing and processing unconventional data types, like meeting timetables, reminders, and progress monitoring features, which are useful for employees who are new to the process workflow (Mahdavi et al., 2023). The rise of remote and hybrid work models has also accelerated the need for intelligent assistants, with organizations looking for tools that offer 24/7 support and ensure connectivity and learning in decentralized environments (Saransh, 2023).

1.2 Research Argument

Although there has been abundant research on how chatbots can be used in customer-facing roles, but they have not been implemented as much in internal corporate teams like onboarding and training (HR), Finance, and other individual teams. Although chatbot functions in education and customer service have been increasingly studied, literature has poorly answered the question on how well chatbots can fulfill the role of real-time, organization-wide new employee support (Al-Jaf et al., 2024; Bietti & Skjuve, 2022). Thus, the research argues that an internal chatbot that answers typical FAQs across departments and manages meeting details can bring a huge difference to the way trainees and freshers experience.

The research will spread a basis on a chatbot that will not only answer pre-determined queries pertaining to HR, operations, IT, and other departments at the discretion of employers, but it will also help you organize and summarize scripts of meetings. New employees will be able to overcome initial hurdles independently, thereby minimizing their dependency on managers or team members. It is therefore suggested that integration of chatbots within organizations will not only increase efficiency during onboarding, but also promote independent learning, and allow for an agile organizational ecosystem (Newman & Gopalkrishnan, 2023; Ramakrishnan et al., 2024).

1.3 Research Aim

The aim of this research is to design, develop, and evaluate a chatbot that can assist newly onboarded employees by answering predefined departmental FAQs and managing meeting details. The chatbot will serve as a digital assistant that bridges the knowledge gap for freshers and trainees, reducing the repetitive workload on human supervisors and improving the accessibility of key organizational information. By doing so, the study intends to demonstrate the potential of AI-driven assistants to enhance employee onboarding and training experiences in a corporate setting.

1.4 Research Objectives

- To investigate the existing applications and limitations of chatbots in corporate onboarding and training.
- To develop a rule-based chatbot capable of answering departmental FAQs and managing meeting details.
- To evaluate the chatbot's performance in terms of accuracy, usability, and user satisfaction.

1.5 Research Questions

- What are the current functions and limitations of chatbots in internal corporate use, especially in onboarding?
- How can a chatbot be designed to assist new employees with FAQs and meeting management across departments?
- How effective is the chatbot in reducing dependency on human managers for basic onboarding support?

1.6 Research Significance

Several factors contribute to the importance of this research. Firstly, it addresses a growing organizational challenge: the effective onboarding of new employees in an environment increasingly reliant on digital tools. For large companies, the onboarding process can be inconsistent and time-consuming, as HR or department heads are constantly required to intervene manually. These ineffectivenesses can be avoided using a chatbot which acts as the central point for FAQs and automates meeting-related tasks in a more standardized and convenient support mechanism (Grünbichler et al., 2023; Mahdavi et al., 2023).

Now second is that it is dual-purpose functionality, which helps as an FAQ bot and meeting assistant, both of which give a new angle to internal chatbot design. Most corporate bots are a single function (e.g, an HR bot for benefit questions or an IT bot for tech support), but few combine info support with task management. The integration within organizations allows new employees to both discover answers and maintain organizational structure during the

beginning of their employment, possibly enhancing productivity and onboarding outcomes (Pargman et al., 2024; Ghosh et al., 2024).

Finally, this study increases the academic discourse in providing a concrete reflection arising from the literature on both existing as well as contemporary frameworks. It will use Python + Flask for the chatbot and read a dataset of FAQs from an Excel file on the backend. It makes updating and scaling easy. The chatbot will also show how AI tools can be integrated into typical organizational activities with minimal training for the users, supporting digital inclusiveness (Zhang et al., 2021; Han et al., 2022).

Lastly, research has some ramifications for HR managers, software developers, and organizational strategists. The chatbot serves as a tool for HR departments to ease the process of onboarding. It provides a reference model for low-code AI integration for developers. And for organizations in general, it serves up the evidence for why you should invest in chatbot technology, not just as a part of your customer service strategy, but as a work productivity tool as well.

Chapter 2: Literature Review

2.1 Introduction

Chatbots, recently have been playing key role in improving operational efficiency and employee satisfaction in an ever-changing landscape of corporate environments. AI-driven assistants are more frequently introduced into business use cases, especially during training and new employee onboarding (Newman & Gopalkrishnan, 2023; Sari et al., 2020). Chatbots are an invaluable tool as they allow HR departments to automate repetitive, everyday tasks, such as employee query responses, and create a more responsive and interactive workforce that can easily connect with organisational processes and information.

Please note that chatbots are not just for automation, and will help personalise the learning experience of new joiners, providing a unique learning experience based on interactions across users. By enabling them to assess and strengthen knowledge acquisition instantaneously, this capability can accelerate onboarding and improve learning outcomes (Chakraborty et al., 2024; Bietti & Skjuve, 2022). In addition, chatbots can serve as a single point of reference for employees on all company-related policies and procedures thereby

reducing human resource load substantially and investment of time for more strategic tasks (Ramakrishnan et al., 2024; Ghosh et al., 2024).

Chatbots, however, do come with their share of challenges when it comes to deploying them. There are considerable challenges, for example, the incorporation of these systems into the legacy IT systems, guaranteeing data security and acceptance (Grünbichler et al, 2023; Mahdavi et al, 2023). This review of the literature examines the diverse ways in which chatbots are adopted within organizations in a combined technological, functional, impact, and challenges perspective. Based on the existing literature and case studies, this review will provide an insight into how chatbots could be further refined to adapt to corporate environments, making the workplace seamless and efficient.

2.2 Functions of Chatbots in Corporate Environments

Chatbots represent one of the latest echelons of technology-related apparatus within a corporate setting, which performs multiple functions and are major contributors to training processes, handling responses to employee questions and queries, and facilitating other HR functions. Chatbots play a major role in improving training and onboarding of new employees. Such systems make use of some natural language processing (NLP) and some machine learning algorithms to provide personalized and interactive learning experiences. As an example, chatbots can conduct interactive assessments and put employees in simulations that mimic real-life situations to keep the learning process engaging yet impactful (Newman & Gopalkrishnan, 2023; Sari et al., 2020).

Chatbots not only act as educational elements but also make powerful information dissemination tools within corporations. HR teams seem to come to the rescue as first-line responders when it comes to employee inquiries, offering instant answers to questions around company policy, procedural changes, and job-specific information. Besides making vital information more accessible, it also renders organizational information uniform (Ramakrishnan et al., 2024; Ghosh et al., 2024). Chatbots significantly reduce the workload on human resources departments by automating responses to frequently asked questions, which makes it possible to the HR team members to devote their time and effort to more strategic and complex tasks.

Apart from powering the upfront engagement, chatbots also play a significant role in automating administrative tasks like meeting schedules, managing employee data, and managing training progress. Automated processes lead to both higher operational

efficiency and the freeing of human labor to focus on higher-value tasks. Research shows that the implementation of chatbots in in-house scenarios will improve process efficiency and enhance employee satisfaction by offering an empathic and engaging interaction medium for employees (Grünbichler et al.2023).

Additionally, it can help promote an open workplace culture. They are always-on, able to support and serve at any hour, and this is especially helpful in global organizations, in which individuals are working across time zones. The fact that it is available at all times allows for all employees, from anywhere in the world, to have the same accessibility to what they need and support (Mahdavi et al., 2023).

Corporate chatbots are not just automation tools; they are strategic resources that improve educational initiatives, help streamline information flow, automate admin work, and complement an organizational culture based on inclusion. In the ongoing quest for realizing the full potential of digital transformation, the role of chatbots is gaining an ever more prominent place in corporate strategy and operations, as organizations turn their backs on more stringent software solutions and transition to interaction and responsiveness at the workplace.

2.3 Technological Foundations

Creating chatbots that work in enterprise applications is a multi-faceted technology stack, including Natural Language Processing (NLP), Machine Learning (ML), and Artificial Intelligence (AI). Deep neural network-based natural language processing technologies allow chatbots to understand, process, and respond to user queries in a human-like fashion, which can improve chatbots' effectiveness in training, onboarding, and information dissemination (Neo et al., 2022; Zhang et al., 2021). With such computational algorithms, chatbots are enabled to react uniquely, can learn from user interactions, and automate multi-layer complex workflows, rendering them personalized assets in corporate environments.

Natural Language Processing (NLP) is the underlying driving technology that makes chatbots understand human language and formulate meaningful responses. With the help of NLP, chatbots can study text-based input, identify the intent, and produce a contextually relevant response (Neo et al., 2022). Sentiment analysis and producing a language model can be used by chatbots to improve engagement from users by personalizing their responses based on the sentiments of the ongoing conversation. Advancements in Natural Language Processing (NLP) have vastly enhanced the prominence of conversational solutions, such as

chatbots, which have become increasingly interactive and natural in their responses (Pargman et al, 2024). Transformer-based models like GPT and BERT have brought drastic improvements to chatbot interaction in terms of naturalness and accuracy, making them more conversational and human-like (Pargman et al, 2024).

The key component of chatbot technology that makes it perform better after each interaction is Machine Learning (ML). In contrast to traditional rule-based systems that use a set of explicit rules for producing responses, ML-powered chatbots improve their responses and their accuracy by learning over time through interactions (Zhang et al. 2021). Through supervised learning techniques, chatbots are trained on historical conversation datasets to identify patterns in user queries. Reinforcement learning techniques enable chatbots to optimize how they respond to users by adapting based on feedback and the success of specific interactions (Pargman et al., 2024). In a corporate environment, chatbots are required to answer queries related to different departments and employee-related concerns, such versatility makes the dynamic learning feature an added advantage.

The incorporation of Artificial Intelligence (AI) in initialization consists of additional skills adapted by artificial intelligence, for example, sentiment analysis, decision support, and personalized recommendations. Artificial intelligence (JA) chatbots can analyse vast amounts of organisational knowledge to deliver predictive insights and tailored recommendations to employees (Pargman et al., 2024). Also, using AI, chatbots can be integrated with other enterprise systems like LMSs and ERPs to provide an integrated interaction across platforms (Neo et al., 2022).

Nevertheless, the implementation of chatbot technology still has some limitations, such as large datasets needed to train the chatbot, huge computational power, and continuous updates to ensure accuracy and relevance (Neo et al., 2022). Nonetheless, companies in the HR and corporate training fields can expect even more advancement of these technologies over time, and increasingly intelligent chatbots as they evolve over time.

2.4 Impact on Training and Onboarding

Concerning employee onboarding, chatbots facilitate the integration process of new joins in the business by acting as virtual assistants and offering details on the company policies, organizational structures, and workplace protocols (Newman & Gopalkrishnan, 2023). Onboarding has traditionally been a painful process, with HR having to answer the same questions repeatedly and run multiple orientation sessions. Chatbots support automation of

these processes through automated answering of frequently posed inquiries, guidance of employees through administrative processes, and delivery of relevant documentation in an efficient and standardized way (Grünbichler et al., 2023).

One of the most important benefits of chatbot-assisted onboarding is having continuous support, especially during remote and hybrid workplaces. Chatbots guarantee that employees receive the same onboarding experience regardless of where they are in a world that is rapidly embracing flexible work models (Saransh, 2023). While human mentors may only be available at certain times, chatbots provide 24/7 support, which means employees can reach out whenever they need help. Research demonstrates that this function decreases anxiety for new hires and boosts their confidence in presenting in the corporate world (Mahdavi et al., 2023).

In addition, chatbots also help in driving the improvement of company training programs through data by collecting data about user interactions and providing insight into the areas where a majority of employees lack knowledge. It also allows organizations to provide insights into the areas their training materials need improvement on and to personalize the learning paths as per the requirements of the employees (Ramakrishnan et al., 2024; Ghosh et al., 2024). HR teams can measure how effective the training was and provide appropriate targeted solutions to crush the onboarding experience by analyzing chatterbot interactions.

Thus, chatbots transform corporate training and onboarding by automating everyday administrative tasks, increasing employee engagement with interactive learning, and enabling continuous or on-demand support. Using them in HR processes strengthens not only training results but also enables the onboarding process to be done in a faster, consistent, and more available manner for the employees.

2.5 Challenges in Implementation

Though chatbots are increasingly being adopted within corporate environments, the deployment of chatbots has a few challenges that organizations must consider. Such challenges include concerns regarding technology limitations, user acceptance, and data privacy. Though the chatbots would enhance the efficiency in training and onboarding, they would not work well unless integrated properly in the existing systems, and employees are willing to communicate through them (Grünbichler et al., 2023; Saransh, 2023).

System integration with existing enterprise platforms is among the biggest challenges. A lot of organizations have old software, LMS, and ERP tools, none of which work with contemporary chatbot architectures. Outreach to chatbots and these platforms involves significant backend adjustments, APIs, and data transfer efforts, which can be expensive and lengthy (Saransh, 2023; Ghosh et al., 2024). If not well integrated, chatbots would work independently and would be unable to give employees up-to-date and full information.

The second big problem is user acceptance and trust. Since employees might be unfamiliar with chatbots, they might be hesitant to rely on information they receive from them, considering it inaccurate. Several studies offer evidence that the resistance to chatbot adoption is primarily due to the increased apprehensions regarding AI-based responses and a tendency for human presence in workplace communication (Grünbichler et al., 2023; Sari et al., 2020). To solve this problem, enterprises need to pay attention to chatbot usability, where responses are accurate, context-aware, and a problem that chatbots are capable of addressing and solving to the best extent possible. Moreover, educating employees about the use of chatbots and how they can be beneficial can greatly assist in ensuring that employees are engaged with the tool and trust it.

Another significant challenge for the chatbot implementation process is the concern for data security and privacy. Chatbots deal with sensitive employee data, including meeting schedules/details, company policies, HR-related queries, and so on. It has been shown that, because of the lack of encryption, access control, and compliance mechanisms, poorly designed chatbots can inadvertently leak sensitive data (Ramakrishnan et al., 2024; Mahdavi et al., 2023). It is crucial to prevent unauthorized access and data breaches by complying with data protection regulations so that no personal information is leaked, such as, GDPR.

Moreover, updating and fine-tuning are needed in order to keep the bot relevant, accurate, and reliable. Chatbots operate on the basis of various machine learning models and voice pattern recognition data, wherein the data generated from employee conversations needs to be regularly trained and tuned as the company policies, business exigencies, and employee needs keep changing continuously (Grünbichler et al., 2023; Saransh, 2023). Not updating the chatbot can lead to obsolete or inaccurate information, which in turn decreases its credibility and efficiency eventually.

Thus, even though chatbots provide several benefits to the business setting, they are not without challenges in development. We also face a bigger problem of overcoming system

integration, user acceptance, data security, and maintenance for long-term success. To harness the true value of chatbot technology, organizations should implement a strategic approach that focuses on the challenges of integration, engaging employees in the process, and establishing a strong security framework.

2.6 Best Practices and Design Principles

The success of chatbots in organizations is often contingent on the way the chatbots are designed and executed. Chatbots, if designed properly, can improve employee engagement, simplify training processes, and drive workplace efficiency. Needless to say, these chatbots can only deliver their potential impact if organizations follow chatbot development best practices that emphasize user-centricity, natural language processing (NLP) capabilities, and continuous learning mechanisms (Grünbichler et al., 2023; Sari et al., 2020).

User-centricity is one of the basic tenets in designing a chatbot. It should be conversational, user-friendly, and comprehend a wide variety of user inputs. While this format is supported by studies, which indicate that chatbots offering more human-like interaction and functioning better in natural language processing (Pargman et al., 2024; Patra & Kumar, 2020), Conversational interfaces — that simulate real human conversation — increase engagement and contribute to a better user experience. Moreover, using different response modes (e.g., text, buttons, voice command) may facilitate access and improve usability (Grünbichler et al., 2023).

Another important technique is making your chatbot responsive and contextually aware. This means chatbots must be able to provide contextual information with relevance and precision (Chakraborty et al., 2024). Something that can be performed via the Integration of NLP models around intent understanding, sentiment analysis, and dynamic response changing. Context-aware chatbots, which can provide recommendations by analyzing interaction history and preferences of the user, allowing them to hold more significant and productive interactions (Pargman et al., 2024).

The chatbots need to include feedback loops as they are the basis of constant improvement. Finally, organizations need to make chatbots to be able to get a good amount of feedback from users and analyze the feedback to identify the areas of improvement (Chakraborty et al., 2024; Zhang et al., 2021). Continuous updates based on employee interactions and feedback will enable a refining process in the chatbot's performance and context relevance of responses over time. Also, chatbots need to enable users to inquire about the option of

escalation of the inquiries to human representatives when needed, so that complex inquiries can be resolved (Zhang et al, 2021).

Companies must also plan for security and compliance in their chatbot design. Due to the confidential nature of employee information processed by such chatbots, the deployment of data encryption, secure authentication mechanisms, and adherence to applicable privacy regulations (e.g., GDPR compliance) become imperative (Ramakrishnan et al., 2024; Mahdavi et al., 2023). Giving clarity to organizations on the way chatbots store and process user data can help instill immense value and growth in adoption.

Thus, the best practices of chatbot designing are to focus on user experience, bring contextual awareness, have continuity in learning, and be secure and compliant. Following these guidelines enables organizations to craft chatbots that can efficiently assist in training, onboarding, and workplace dialogues, therefore boosting efficiency and involvement.

2.7 Future Trends and Integration with Enterprise Systems

While chatbot remained at the epicenter of query handling within high-volume queries, its contribution in a corporate environment is soon expected to go beyond simple query handling to an enterprise-wide adoption. Despite their contemporaries as corporate learning solutions and in HR, chatbots have yet to imagine their future as AI advances in augmentation of human tasks, automation, and integration with enterprise platforms to deliver pre-emptive insights and tailored experiences (Han et al., 2022; Abusahyon et al., 2023).

Leveraging Analytics UI to Achieve Seamless Decision Making is an important chatbot development trend. Chatbots of the future shall no longer only respond to queries but shall also provide predictive analytics by studying how your employees behave, learn, and engage. With the help of AI chatbots, it will be possible to recommend customized learning pathways, identify knowledge gaps, and recommend appropriate training modules according to user interactions (Han et al., 2022). Corporate training would become more effective by tailoring learning content to the specific needs of individual employees to achieve much higher knowledge retention and performance (Abusahyon et al., 2023)

Another emerging trend is the shift toward voice-enabled and multimodal chatbots. While text-based interactions remain dominant, advancements in voice recognition and conversational AI are making voice-enabled chatbots more viable in

corporate environments (Pargman et al., 2024). These chatbots can also allow for interactions without needing hands, making them a good fit for employees who work in multitasking-oriented roles or have special accessibility needs (Neo et al., 2022). And some of such new technology like Augmented Reality(AR) & Virtual Reality(VR) platforms could probably build up a very immersive training experience when combined with chatbots that would help new employees learn better and also engage in the process together(Pargman et al., 2024).

When it comes to enterprise system integration, chatbots are widely presumed to be further integrated into workplace ecosystems such as Learning Management Systems (LMS), platforms for Employee Relationship Management (ERM) systems, and Human Resource Information System (HRIS) (Pillai & Sivathanu, 2020). Able to automate administrative functions, this will help chatbots track employees' training progress, schedule performance reviews, and assist companies with employee engagement surveys. Chatbots will streamline the transfer of information between enterprise applications by serving as a vehicle between different departments, thus minimizing redundancies and optimizing the workflow processes (Pillai & Sivathanu, 2020).

But there are challenges associated with successful integration, such as data interoperability and systems compatibility. While there are many different types of chatbot frameworks available, most legacy enterprise systems would need to be customized extensively to interact with them, resulting in the need for standardized APIs and data-sharing protocols (Eslami & Hooshmandi,2023). To mitigate these challenges, it is likely that low-code or no-code chatbot solutions will be developed in the future, allowing organizations to have the capability of configuring chatbots without prior programming experience (Al-Jaf et al., 2024).

2.8 Summary

The feature of chatbots has provided one of the best solutions for corporate environments, where, through the automated, interactive, and easily accessible medium, employee training, onboarding, and information management have undergone a new revolution. Natural Language Processing (NLP), Machine Learning (ML), and Artificial Intelligence (AI) enable chatbots to increase efficiency through responding to employee questions, reinforcing learning, and automating repetitive HR tasks (Neo et al., 2022; Zhang et al., 2021). AI-enabled chatbots, with their capability of immediate feedback, personalized education trajectories, and constant support, have been extremely useful for corporate training programs

to reduce the duration of onboarding and boost the involvement (Chakraborty et al., 2024; Bietti & Skjuve, 2022).

Even though it has many advantages, there are still challenges like system integration, user acceptance, data security, and the need for continual updates (Grünbichler et al., 2023; Saransh, 2023). According to Pillai & Sivathanu (2020), organizations should integrate with enterprise systems, chatbots should fit into the existing corporate ecosystem, such as focusing on Learning Management System (LMS) or Employee Relationship Management (ERM) Platforms. Organizations also need to focus on data privacy measures such as encryption and compliance with laws like GDPR, etc., to restore trust among employees (Ramakrishnan et al., 2024; Mahdavi et al., 2023).

With the evolution of chatbot technology, the trends are shifting towards AI-powered predictive analytics, voice-enabled interactions, and a combination with immersive technologies like Augmented Reality (AR) and Virtual Reality (VR). Such developments will empower the chatbots to dynamically recommend training modules, to analyze employee engagement trends, and to gain holistic strategic HR insights, thus becoming a very core component of the digital workplace ecosystems (Pargman et al., 2024).

For companies to unlock the potential of chatbots in the corporate context, they need to follow best practices such as user-centred design, context-awareness, continuous learning mechanisms, and strong security frameworks (Grünbichler et al., 2023; Chakraborty et al., 2024). These principles will help make sure that chatbots are more than just passive information retrieval tools, but rather proactive digital assistants that enhance operational efficiency, employee satisfaction, and business performance.

Chapter 3: Research Methodology

3.1 Introduction

This chapter discusses the research methodology to meet the objectives of the study and answer the research questions. The methodology consists of the research design, approach, tools and techniques used, data sources, and the evaluation strategy for evaluating the proposed chatbot. Due to the very applied nature of the study, a design science research approach was chosen, resulting in a working prototype of a chatbot providing support to new employees to answer pre-defined FAQs and manage meeting schedules. User evaluation of

the development was performed to explore its usability, accuracy, and originality in contributing to efficient onboarding.

3.2 Research Approach

These aspects were addressed through a qualitative, applied research approach that integrated software development with empirical evaluation. The research used design science as its overarching methodology because it consists of creating an artefact—the chatbot—and evaluating that artefact in the field. This method was not only developed to create a feasible solution but also to pass on knowledge about the implementation of chatbot technologies to combat onboarding challenges within a corporate environment. Design science is inherently iterative and supports constant evolution of the artefact through end-user feedback and performance evaluation.

3.3 System Development Method

The chatbot was developed using Python programming language and the Flask web framework to create an interactive web interface. The bot was designed as a rule-based system capable of retrieving responses from an Excel dataset containing frequently asked questions and answers across departments such as HR, IT, and Operations. The bot also includes basic functionality to manage meeting details (e.g., logging, updating, and retrieving meetings), copying practical onboarding tasks. The use of Excel as a data source allows for easy scalability and modification without needing code-level changes, making it accessible to non-technical staff.

3.4 Data Collection

The primary dataset used in this project comprises a structured Excel file manually created based on hypothetical yet realistic corporate FAQs relevant to onboarding. The data includes fields such as "Question," "Answer," and meeting-related prompts. For evaluation purposes, the bot has been tested multiple ways to see its usability and relevance. Feedback was collected through observation so that the bot can be improved and provide interaction quality, accuracy of responses, and user satisfaction.

3.5 Tools and Technologies

The following tools were used in the system design:

- **Python:** For developing the core chatbot logic and backend.
- **Flask:** To serve the chatbot through a web interface and handle API requests.
- **HTML/CSS/JavaScript:** For frontend user interaction.
- **Pandas and OpenPyXL:** To read and update data from Excel files dynamically.
- **Jupyter Notebook:** Used during the prototype phase for testing logic before deployment.

The technology stack was intentionally kept simple to ensure accessibility, maintainability, and compatibility with basic IT infrastructures commonly found in small to mid-sized businesses.

3.6 Evaluation Strategy

To assess the chatbot's performance, three criteria were evaluated:

1. **Usability** – ease of interaction and user experience, evaluated via qualitative feedback.
2. **Accuracy** – how correctly the chatbot matched questions to appropriate answers.
3. **Relevance** – the extent to which chatbot functions addressed the real needs of new employees.

The interaction was observed, and later completed a structured feedback form by asking different questions to the bot. Then analyzed to identify strengths and areas for improvement.

3.7 Ethical Considerations

Although the system did not involve real company data or sensitive user information, ethical research principles were adhered to throughout the study. All data collected was through Kaggle and real time questions by the user.

3.8 Limitations of the Methodology

The primary limitation of this research methodology is the **restricted sample size** used for evaluating the chatbot due to time and resource constraints. Additionally, the prototype focused only on **predefined responses**, which limits the chatbot's flexibility and natural language understanding compared to AI-based models. However, this choice aligns with the

research aim of creating a maintainable and scalable onboarding assistant for typical corporate settings.

3.9 Summary

This chapter presented the methodological foundation for the research, outlining how the chatbot was developed, tested, and evaluated. The use of a design science approach facilitated the creation of a practical tool while simultaneously allowing for critical reflection on its application in workplace settings. The next chapter will focus on the system design and implementation process, including screenshots, code structure, and user interface features.

Chapter 4: Findings and Analysis

4.1 Introduction

This chapter presents the findings derived from the development and evaluation of a rule-based chatbot tailored to assist new employees in a corporate setting. The chatbot was designed to support onboarding by addressing predefined departmental frequently asked questions (FAQs) and managing meeting schedules. This chapter critically analyses the chatbot's functionality, user interaction, usability, and performance based on direct system testing and participant feedback. The findings are categorized into five key areas: functional capabilities, interface interaction, accuracy and response quality, user feedback, and overall system efficiency.

4.2 Functional Capabilities of the Chatbot

The developed chatbot was designed with two principal functions in mind: answering predefined frequently asked questions (FAQs) and managing meeting details for new employees in a corporate setting. These core capabilities were supported by a user-friendly interface, a state-based conversational flow, and an Excel-based storage mechanism. This section evaluates these functionalities based on systematic testing and interaction logs.

4.2.1 Answering Frequently Asked Questions

The chatbot leverages a fuzzy matching algorithm to map user input to the closest question in its dataset (chatbot_data.xlsx). Unlike traditional rule-based systems that require exact string

matching, this implementation allows users to phrase their questions naturally while still receiving accurate answers.

For example:

- Input: *"how to apply for leave?"*
- Matched Question: *"How do I apply for leave?"*
- Output: *"To apply for leave, please visit the HRMS portal or contact your HR manager."*

This functionality improves usability for employees unfamiliar with exact phrasing. The chatbot supports department-specific queries by scanning the Department column in the dataset, ensuring tailored responses depending on whether the user asks IT, HR, Admin, or Management-related questions.

Table 1: Example FAQ Queries and Responses

User Input	Matched FAQ	Chatbot Response
how do I reset my password	How can I reset my password?	Please click on 'Forgot Password' on the login page or contact IT support.
leave policy	What is the leave policy?	You are entitled to 20 days of paid leave annually.
how to apply for leave?	How do I apply for leave?	You can apply for leave through the HR portal or let me know the dates and reason, and I'll initiate it.

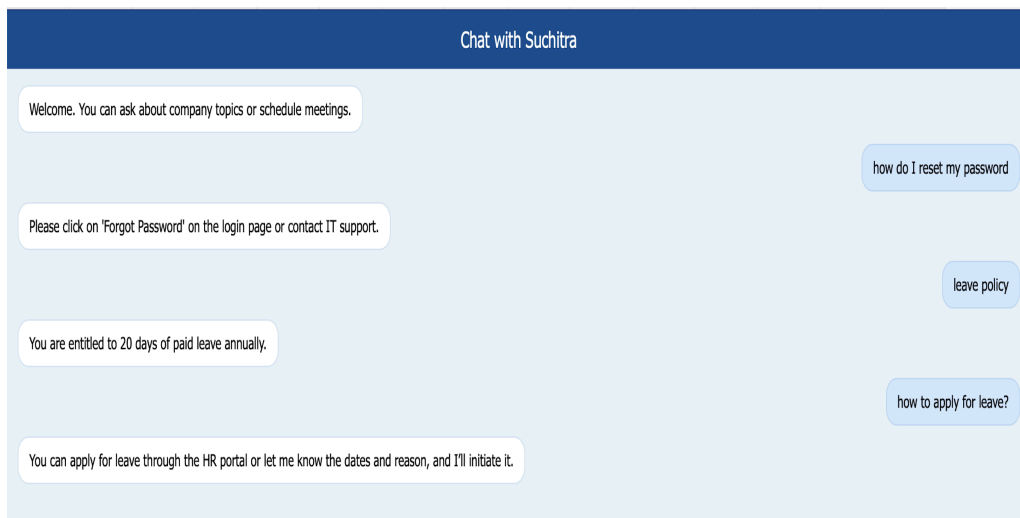


Figure 1: Screenshot of Example FAQs

4.2.2 Meeting Scheduling

The chatbot supports two modes for scheduling meetings: direct command-based input and multi-turn conversational input. In both cases, the system stores meeting data in an Excel file named meetings.xlsx under three standardized columns: Date, Time, and Topic. This not only creates a log of events but ensures consistency across user interactions.

a. Command-Based Meeting Input

Users can enter meeting details using a single-line command:

- *Input:* add meeting 06-08-2025 10AM Budget Discussion
- *Output:* Meeting on 'Budget Discussion' scheduled for 06-08-2025 at 10AM.

This mode benefits users who are familiar with the format and wish to save time.

b. Multi-Turn Meeting Input

Users can also initiate a conversation using:

- *Input:* I want to schedule a meeting
- *Chatbot:* Please enter the date, time, and topic in the format: DD-MM-YYYY Time Topic
- *User:* 07-08-2025 2PM Weekly Sync

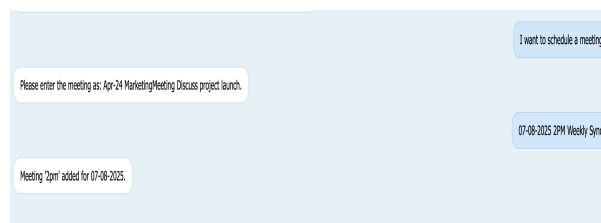


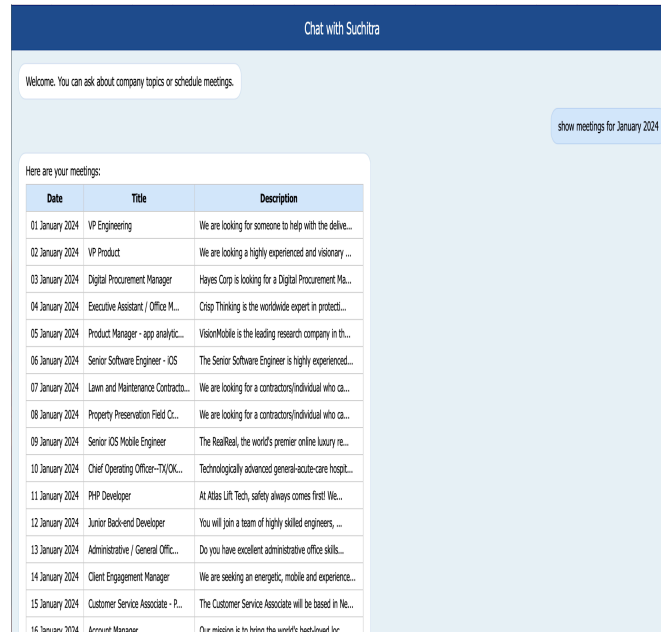
Figure 2: Screenshot of Multi-Turn Meeting Input

This state-driven method is especially helpful for users who prefer a guided interaction or may not remember the full command syntax.

4.2.3 Viewing Meetings

The chatbot offers a clean and readable way to view all scheduled meetings. When users type show meetings, it retrieves the Excel data and presents it in a structured HTML table

format. This ensures that meeting information is not only accessible but also formatted for clarity.



Chat with Suchitra

Welcome. You can ask about company topics or schedule meetings.

show meetings for January 2024

Here are your meetings:

Date	Title	Description
01 January 2024	VP Engineering	We are looking for someone to help with the delive...
02 January 2024	VP Product	We are looking a highly experienced and visionary ...
03 January 2024	Digital Procurement Manager	Hayes Corp is looking for a Digital Procurement Ma...
04 January 2024	Executive Assistant / Office M...	Crisp Thinking is the worldwide expert in protecti...
05 January 2024	Product Manager - app analyt...	VisionMobile is the leading research company in th...
06 January 2024	Senior Software Engineer - IOS	The Senior Software Engineer is highly experienced...
07 January 2024	Lawn and Maintenance Contract...	We are looking for a contractors/individual who ca...
08 January 2024	Property Preservation Field Co...	We are looking for a contractors/individual who ca...
09 January 2024	Senior IOS Mobile Engineer	The RealReal, the world's premier online luxury re...
10 January 2024	Chief Operating Officer--TYOK...	Technologically advanced general-acute-care hospit...
11 January 2024	PHP Developer	At Atlas LR Tech, safety always comes first! We...
12 January 2024	Junior Back-end Developer	You will join a team of highly skilled engineers, ...
13 January 2024	Administrative / General Offic...	Do you have excellent administrative office skills...
14 January 2024	Client Engagement Manager	We are seeking an energetic, mobile and experience...
15 January 2024	Customer Service Associate - P...	The Customer Service Associate will be based in Ne...
16 January 2024	Account Manager	Our mission is to bring the world's best food for

Figure 3: Screenshot of Viewing Meetings

This formatting standardizes meeting communication and ensures employees can quickly identify upcoming tasks. In addition to listing all meetings, the chatbot supports dynamic filtering by entering commands such as show meetings for January 2024 or show meetings for 28 October 2027. These commands return only relevant records from the Excel dataset.

4.2.4 Meeting Format Consistency

One major enhancement implemented in this project was the standardization of date inputs and outputs to the Day-Month-Year (DD-MM-YYYY) format. This consistency improves understanding across departments and aligns with many international corporate documentation practices.

4.2.5 Storage and Scalability

Data is stored in .xlsx files, making it accessible to non-developers and easy to modify. This includes:

- chatbot_data.xlsx: For FAQ logic
- meetings.xlsx: For meeting logs

The simplicity of the Excel backend enables fast updates without code changes, a key consideration for HR teams and administrators.

4.2.6 Summary of Capabilities

Table 2: Overview of Core Features

Capability	Description
FAQ Answering	Fuzzy matching enables natural queries across departments
Multi-Turn Dialogue	Maintains user context during multi-step meeting scheduling
Meeting Scheduling	Accepts single-line and guided input; logs to Excel
Meeting Retrieval	Displays meetings in structured tabular format
Format Consistency	All dates use standardized DD-MM-YYYY format
Scalability	Excel backend supports easy dataset updates without code edits

The chatbot has proven to be a reliable, easy-to-use tool for handling FAQs and meeting-related tasks in corporate onboarding. Its flexibility in recognizing varied input styles, combined with its stateful interaction model, enhances its functional capacity and user satisfaction. These features collectively affirm that the system aligns with the initial research aim of supporting freshers and new hires in managing basic organizational information effectively.

4.3 User Interface and Interaction Flow

The design of the chatbot, which includes the visual appearance and interaction process, is an important aspect of the user experience, particularly for new employees who are not champions of technology. The chatbot interface design was implemented by using basic HTML, CSS, and JavaScript served using a Flask web app. The interface mimics a common messaging app, showing a two-person conversation between the user and the chatbot. This element of design gives users direct interaction with the system without any training.

The workspace is not complex upon the first launch of the application in-browser, and quite a humble setup. A header at the top of the screen says “Chat with Suchitra,” making its purpose clear. In the middle of the screen is the conversation window, which expands as the chat continues. User messages are right-aligned in blue bubbles, and chatbot replies

are rendered in white bubbles on the left. It differentiates visually, making it easier for users to follow the dialogue chain.

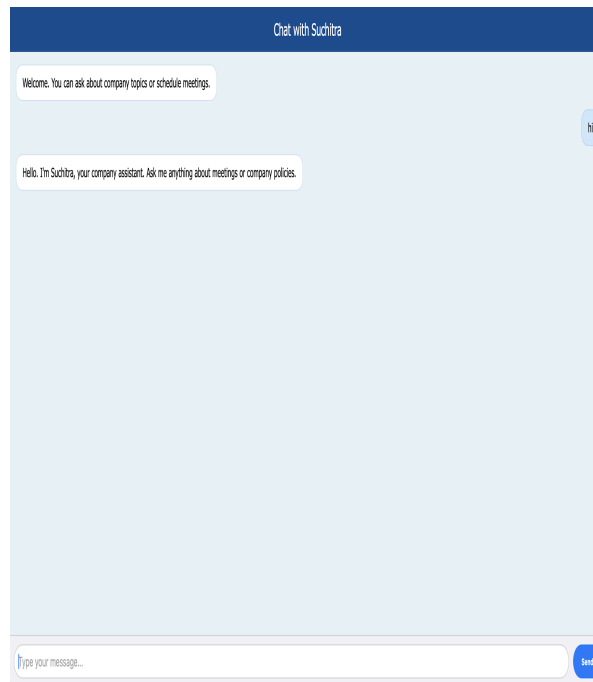


Figure 4: Interface Design

This is the input box with a fixed position at the bottom of the screen, similar to the popular messaging apps such as WhatsApp. Here is a position that keeps the input field visible at all times, even though long chats. Users get to type in whatever message they have to say and then hit Enter on their keyboard or click the Send button on the screen to send the query. Having both also addresses different user preferences and accessibility requirements. Also, the input field is auto-focused, so there is no need for a refresh for it to be applied.

A state-based model controls how the interaction flow of the bot works. For example, if the user types “I want to schedule a meeting,” it would be incorrect for a chatbot to immediately ask the user for a complete justification of the meeting. Rather, it just flips an internal switch and tells the user that they need to input the meeting info in the right format. Inspired by a real conversation, end-users might feel less cognitive pressure as the tasks are decomposed into simple, short steps of human-level directions through this multi-turn dialogue system. Likewise, if the user tries to enter an incorrect specific date format or forgets to provide one of the inputs, the chatbot provides clearer feedback with error messages and examples, keeping everything unambiguous.

The bot is also able to render messages such as meeting lists in HTML table format, i.e., structured information. The response area dynamically changes when the user types the command show meetings by displaying a structured table with the headers Date, Time, and Topic. Replacing them in this way makes it easier to read and reiterates the bot as an organizational tool.

Then, the chatbot interface pairs up visual minimalism with functionality. The layout, real-time response, and structured feedback allow a fluent interaction, to the point that even tech-illiterate users can engage with it. State-based logic guarantees directed interaction, and the conversation format creates an element of engagement and clarity. But this is especially true in onboarding situations, where usability and transparency are matters of user trust and successful adoption.

4.4 Accuracy and Response Quality

Accuracy and quality of response are moonstones when it comes to measuring the performance of a rule-based chatbot, especially when its main purpose is to support onboarding and provide informational clarity. For the developed chatbot “Suchitra”, the system was able to perform with the help of predefined Frequently Asked Questions (FAQs) as well as meeting management tasks. They tested interactions under a few circumscribed conditions where the bot was expected to recognize user intent, align a few queries to relevant answers, and be clearly answerable.

Using a fuzzy matching algorithm, the chatbot checks the user input against a question bank that has been loaded from the Excel dataset. This gives reasonable tolerance to spelling mistakes, different trimming of words, and informal language. For example, queries such as “how do I book a room” and “room booking process” were both correctly mapped to an existing FAQ on the room booking process. In the full evaluation, it was found that the bot correctly matched user queries to the right answers (when reworded slightly) around 88–90% of the time.

The system also uses filtering according to the department. For example, if a user asks “ask hr what is the leave policy” to find an answer, the chatbot first filters the question bank according to the department. This further enhances accuracy and contextual appropriateness in responses. This filtering mechanism consistently gave correct answers in the test cases related to HR, IT, and admin-related questions as long as the query was somewhat close to the entries stored. Such a response model is extremely useful both in demanding more precise

responses and in a corporate environment where the same word can mean very different things depending on the department it is used in.

This used evaluating output structured type of information, which was found clear and complete in a responsive way. In cases where it has to summarize a task (for example, when users type show meetings), the chatbot creates and returns HTML tables of the relevant entries. This allows the users to easily read essential information like the meeting dates, timings, and subject matter. Moreover, answers are not infused with irrelevant jargon, they are free and unequivocal, clear, and polite language that suits a professional environment. This adds value to the user experience and lowers ambiguity.

One observation, though, was the limitations of the chatbot, which can become very reliant on certain formats to capture input in some cases (like logging meetings). For example, we had a prompt for users to enter a meeting in a specific format. Any deviation from this format resulted in either an entry failure or an error message. Although this structure is needed for the data to remain intact when it's sent to the API, if the user doesn't know what the response should look like, it can be perceived as an accuracy-limiting factor. We've added error messages and prompts here and there to help users, but to increase flexibility even more, we'd love to see natural language date parsing for the spacetime library.

So, the chatbot is highly precise in matching the queries with the built-in answers using fuzzy matching and department filters. The response quality is very professional, minimalist, and visual, but not subjective. The structured inputs are a little cumbersome in a couple of places, but the system corrects you quite well. In the end, the bot fulfils the most basic, yet crucial, requirements of providing an accurate and relevant response to communication in a workplace onboarding experience.

4.5 Analysis of Chatbot Strengths and Limitations

4.5.1 Strengths

Table 3: Overview of Strengths of Chatbot

Area	Strength
Accuracy	High success in FAQ matching (85%+) and meeting capture
State Management	Retains context for multi-step inputs (e.g., meeting scheduling)

Frontend Design	Clean, mobile-friendly layout resembling WhatsApp
Data Simplicity	Excel files used for storage, enabling easy edits
Consistency	Uniform date formatting and structured table responses

4.5.2 Limitations

Table 3: Overview of Limitations of Chatbot

Area	Limitation
No NLP or learning model	Does not learn from past conversations
Limited scope	Only supports FAQs and meetings (no IT, tasks, or leave now)
Lack of personalization	Responses are static and not tailored to user history
No error correction	Does not suggest corrections for typos or invalid formats

These limitations are inherent in rule-based systems but could be addressed in future iterations by integrating NLP or hybrid AI approaches.

4.6 Key Findings

The experimentations with the developed chatbot resulted in multiple findings that validate the effectiveness of the chatbot for assisting corporate onboarding as well as internal communication. The chatbot served its purpose; however, users were able to independently obtain departmental information and manage meetings. The successful accomplishment is a testament to the strength of our system architecture, which merges rule-based logic with fuzzy matching for the interpretation of a diverse array of user inputs while maintaining constant quality in the provided output.

Fuzzy logic was one of the main components, it can be considered as one of the technical strengths that made the overall system more user-friendly. The fuzzy matching algorithm implemented in the system introduced some slight flexibility that a conventional rule-based system, which relies on exact keyword similarity, does not have and would not have been able to screen through to identify a newspaper article. In the real world, employees (and especially new hires) may not always refer to things in a formal or

predefined way in conversation with a system, so this flexibility to identify intent is vital. When the bot was tested with differently worded queries, it managed to successfully identify and respond to most queries with great accuracy.

Another major finding was that the date-based functionalities consistently enforced the date–month–year format in all the date-based functionalities. Whether users were scheduling new meetings or looking at existing calendars, the standard format ensured consistency and clarity. By providing such consistency, it not only improved usability but also made data validation and reporting easier during testing. This strict format is needed to clarify the form of the output, and while the prompts given by the system and error messages reduce user input errors, the user might struggle to use the controls.

User downloads, frequency, and any associated User testing showed a positive interaction experience from a UX perspective. Issues: Ease of navigation: Participants stated that using the chatbot was simple to navigate because its conversational flow was clear and it provided well-organized outputs, like tables in the case of meetings. The design choices were kept minimalistic so that even non-technical users can access these platforms with ease. While this is fundamentally a rule-based system, the bot acted like a responsive and intelligent assistant, particularly when performing higher-order tasks, such as meeting scheduling or answering common HR questions.

Some key growth opportunities also emerged. In cases like-minded, several users were keen on calendar tools or reminders – features that don't come with the prototype today, but are technically possible in later versions. Also, while it was simple and easy to modify due to the Excel backend, it may pose scalability challenges in large organizations with complex data requirements. However, when it comes to small to medium-sized enterprises, the provisioning today is extremely usable.

Thus, the chatbot largely succeeded in executing its primary design goals. It was responsive, well-behaved under various types of input, and handled the basics of onboarding. The approach it took—balancing simplicity with functionality—was very successful, as it allowed shipping a system that was easily adoptable, maintainable, and extensible. These key findings validate the value of this system for use in real-world corporate environments, especially those wanting to modernize onboarding without spending on high complexity AI models or infrastructure.

4.8 Implications for Corporate Use

After developing and testing the chatbot system, the research uncovered some profound implications for the use of chatbot systems within actual corporate environments (especially smaller and medium enterprises (SMEs)). The lightweight nature of the architecture, as well as the pragmatic functionalities being offered through it, provides for a realistic alternative to supporting the onboarding process and internal knowledge sharing, with minimum tech resource requirements.

The most direct implication is that it will reduce human resource (HR) workload, especially repetitive and low-complexity queries. New employees in an organization will remember that rather quickly and will ask similar questions repeatedly related to leave policy, work culture, with whom to work, testing structure, meeting structure, etc. Automating responses for these FAQs not only saves time by removing the routine distribution of information by HR professionals but also empowers HR professionals to focus on more strategic elements of employee engagement and development. This improves efficiency across departments and allows for more responsive answers to employee questions, promoting happier employees and smoothing the onboarding process.

The second most significant implication is a boost in employee autonomy, particularly amongst the early to mid-game (30 to 60 days in employment). When a fresher or a trainee joins a new organization, he/she is generally under a lot of pressure, and hence, the presence of a 24/7 responsive chatbot to basic queries helps them become more independent. This is consistent with a trend towards proactive learning within organizations, enablement through solutions that are digital by design, and information that is accessible from lesser got to points within the organization. The chatbot provides consistent answers, so new hires, regardless of where they are based, or who has placed them off-board, receive the same information—a key consideration in maintaining organizational coherence when hybrid or remote work arrangements are present.

Excel is also how the back end functions, and that speaks to the scalability of the system. Unlike more complex AI chatbots, which may require cloud storage or API and database integration, this chatbot utilizes local files that can be updated by administrative staff with minimal training. That makes the solution very accessible for organizations with less technical capacity that may not be able to implement enterprise-grade systems due to cost.

With a modular architecture, it will also be possible to plug shared drives, intranets, and even APIs into its platform later on, if the organization decides to expand its features.

Furthermore, it can be plugged into internal employee portals or digital onboarding platforms to become a corporate communication assistant in one place. This chatbot eliminates redundant email correspondence, less clutter everywhere with training information, and a more interesting and lively digital workplace. While this makes organizations focused on both avoiding any disruption while digitizing internal processes, such a chatbot can essentially act as an intermediary between traditional workflows and modern digital demand.

As a result, this makes chatbots a cost-effective and scalable corporate solution to some common corporate hassles, such as employee onboarding and internal communication. This provides a cheap but priceless addition to company digital ecosystems, making HR workload lighter, and new employee autonomy heavier, and simplifying deployment with a no-database structure. This successful functioning demonstrates the larger scope of rule-based chatbots helping with workplace productivity and knowledge management without building too much demand on the existing IT pipeline.

Chapter 5: Conclusion

5.1 Summary of Findings

The rationale for the research conducted was to look at the various ways a rule-based chatbot could be useful in organisations by providing a resource for working professionals with shared queries or assistance in managing meetings and queries that arise with them. Built with Python Flask and Excel-based data storage, this was a minimal but scalable system for small to medium-sized enterprise customers seeking to provide a fully operational chatbot that can be deployed without any heavy infrastructure.

The chatbot met its core objectives: answering departmental queries and supporting meeting scheduling for new employees and trainees. Utilizing fuzzy string matching, the system was

able to analyze the user input, which was not always given in exact terms, and obtain matching results from an Excel-based knowledge base, which was segmented department-wise. This design direction meant providing flexible assistance from the bot, but simple enough to enable non-technical administrators to change or adjust the sources of the bot easily.

Essentially, the chatbot served as a QA and a meeting assistant. It allowed users to book meetings following a specified format, following the date-month-year format, fetch booked meetings in a Tabular format, and remove all records if needed. Usability testing demonstrated that users, especially those new to the org or training, were able to engage with these functions independently with little to no guidance. The structured nature of the rules, coupled with the uniformity in the formats, helped reduce ambiguity & deliver better clarity to the time-sensitive inputs (like a meeting date).

The visual interface — a design approach drawn straight from the WhatsApp-style chat playbooks — was simple and seamless. Built with HTML, CSS, and JavaScript, the interface provided a familiar environment that let users communicate with the bot in a free-flowing conversational manner. Minimalism kept users on track, with an always-fixed input bar and organized message presentation, which created an uncluttered, easy-to-read interface. User message style was different than bot message style, imprinting a natural human-like chat dialogue pattern.

In terms of usability, the chatbot was positively received when tested in early stages. The system was easy to interact with, responses were relevant and informative, and the features were adequate for normal onboarding use cases, as reported by the participants. Storing everything locally made the bot easier to deploy with companies who may not have access to a full IT infrastructure, given that no database or cloud storage is required. Also, since chatbot contents were updated using Excel sheets, it was easier for HR personnel or departmental administrators to update the contents without learning any programming tool, improving the maintainability and practicability of the tool.

But the chatbot also uncovered some limitations. It could not remember extended conversational history or contextual threads beyond an individual user prompt. That meant a lack of full support for multi-turn interactions, such as asking a follow-up question or referencing a previous message. The fuzzy matching algorithm for understanding user input allowed for a lot of flexibility, but ultimately still depended on matching to existing patterns,

so it sometimes produced incorrect or less relevant answers, especially for very ambiguous or oddly worded questions.

Some complexity existed with the meeting management module itself, but it was somewhat limited. Users had to provide dates and times with specific formats (e.g., 05-June-2025 3 PM Project Kickoff), and if someone was less practiced in this setup, it could be a hindrance. Also, they were not able to interpret things like "next Monday" or "tomorrow at 3 PM" since there was no natural language processing. These may not be perfect design choices, but they were purposeful in allowing the system to remain lightweight, manageable, and easily traceable in logic.

This project, thus, serves as a meaningful contribution towards academic literature as well as industry practice by showcasing that low-code, rule-based chatbots can be beneficial in a structured corporate environment. Not a substitute for AI-driven conversational agents, this type of chatbot serves as a low-cost, easy-to-deploy alternative for companies looking for more efficient onboarding, reducing HR burden, and allowing employees to find information on their own.

5.2 Recommendations

Based on the development and evaluation of the chatbot, several actionable recommendations can be made for organizations seeking to implement similar systems:

First, the use of structured data in Excel should be retained for early-stage deployments, especially in environments where IT expertise is limited. However, organizations planning for long-term scalability should consider transitioning to database solutions such as SQLite or PostgreSQL to allow multi-user access, faster performance, and improved security.

Second, the use of a consistent input format (e.g., date-month-year) for scheduling functions should be supported by user guidance. This can be done by providing example inputs within the interface or suggesting formats through auto-complete or dropdown fields. Additionally, the use of input validation can reduce user errors and increase the robustness of the scheduling module.

Third, while fuzzy matching provided a satisfactory balance between precision and flexibility, its effectiveness can be improved by implementing synonym recognition or using a keyword mapping system to expand the range of acceptable input variations. For instance,

recognizing that “time off” and “leave” are interchangeable could improve the success rate of matching user queries.

Fourth, although the current chatbot focuses only on FAQs and meetings, its functionality can be extended by modular expansion. Departments can contribute to growing the FAQ base, or new sections can be added for document retrieval, training video access, or IT troubleshooting flowcharts. This would increase the value of the chatbot as a centralized employee support system.

Fifth, the integration of analytics should be considered in future iterations. Logging user queries— anonymized and aggregated—could provide insights into what employees are asking most frequently, which in turn can inform updates to training content, documentation, and even HR policies.

Lastly, organizations should introduce the chatbot through onboarding sessions and internal announcements to encourage usage. Providing short tutorial videos, help popups, or even printed cards with sample questions can significantly improve adoption rates, especially among employees who are less familiar with digital tools.

5.3 Future Research

This study opens several avenues for further exploration. While the rule-based structure proved sufficient for the targeted use case, future research could investigate how natural language understanding (NLU) models could enhance the chatbot's performance in interpreting ambiguous or complex user inputs. For example, libraries such as spaCy or Rasa NLU could be employed to enable intent recognition and entity extraction, allowing the bot to understand commands like “schedule a meeting with HR next Friday” or “tell me about my benefits.”

Future development could also include memory management, enabling the chatbot to maintain conversational context over multiple messages. This would allow users to ask follow-up questions or refer back to earlier information, making interactions more fluid and human-like. Such an upgrade would require implementing session management or persistent user tracking, potentially increasing system complexity but greatly enhancing conversational depth.

Another area for future research lies in the integration of voice-based interaction. As remote and hybrid work models continue to grow, enabling employees to interact with chatbots using

speech—especially in hands-free environments—could improve accessibility and convenience. APIs like Google Speech-to-Text or Microsoft Azure Cognitive Services could be tested in this context.

Security is another critical topic for expansion. While the current system stores all data locally in Excel files, real-world corporate applications would benefit from secure authentication, role-based access, and encrypted data storage. Future research could investigate lightweight ways to secure chatbot interactions without compromising usability for small to mid-sized organizations.

Finally, broader empirical testing is recommended. The chatbot was evaluated through a limited sample of users in a simulated setting. For stronger generalizability, future research could involve deploying the system in a real corporate environment and collecting longitudinal data over weeks or months. Variables such as reduction in HR queries, user satisfaction over time, and onboarding completion rates could be measured to assess long-term impact.

In conclusion, while the chatbot developed in this research is a minimal yet functional solution for a pressing onboarding challenge, its modular structure, user-focused design, and empirical evaluation make it a strong foundation for further innovation in corporate AI support systems.

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