

## STREAMLINING VISITOR APPOINTMENTS: AUTOMATED SCHEDULING SYSTEM FOR BGC TRUST UNIVERSITY BANGLADESH

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### ABSTRACT

Appointment scheduling is a critical aspect of administrative responsibilities in office environments. Traditional paper-based methods, however, have contributed to a notable increase in missed appointments. The resulting inefficiency and unreliability demand a more effective solution. Despite the longstanding practice of appointment scheduling, enduring limitations such as visitor presence for bookings, extended wait times, and potential data loss persistently hinder effectiveness. This paper introduces "Streamlining Visitor Appointments: Automated Scheduling System for BGC Trust University Bangladesh," a pioneering project aimed at redefining appointment scheduling for the Vice Chancellor's office. Embracing automation, the initiative addresses shortcomings inherent in traditional scheduling practices. The primary objective is to mitigate missed appointments, a challenge linked to paper-based scheduling. The project aims to enhance reliability and significantly reduce missed appointments. By implementing an automated system, it strives to overcome these obstacles and enhance engagement. The project's focus centers on BGC Trust University Bangladesh's Vice Chancellor's office. It endeavors to introduce an automated scheduling system tailored to the university's specific needs. This approach has the potential to optimize operations, elevate visitor satisfaction, and mitigate inefficiencies. This endeavor showcases technology's transformative power, revitalizing administrative practices for a more dynamic and effective office environment.

**Keywords:** Appointment Scheduling, Visitor, Automation, University, Vice-Chancellor.

### I. INTRODUCTION

Efficient appointment scheduling stands as a cornerstone of effective administrative management within office environments. This crucial task is commonly divided into two primary categories: Static and Dynamic scheduling. In static scheduling, decisions are made well before a session starts, a prevalent approach in healthcare. In contrast, dynamic scheduling involves real-time adjustments to accommodate the ever-evolving state of the system (Cayirli, Veral).

Historically, individuals visiting medical offices were accustomed to enduring lengthy waiting times, often an hour or more, as physicians aimed to maintain a full waiting room. However, with changing lifestyles and a growing demand for convenience, waiting in an office has become increasingly unacceptable. People now prioritize their time and seek appointments that align with their busy lives. Accurate and efficient appointment scheduling is integral to the seamless functioning of medical offices. Factors such as patient satisfaction, physician workflow, and timely access for urgent cases all hinge on effective scheduling practices.

Schedulers encounter a multitude of challenges. For instance, manual processing of appointment requests on paper poses difficulties in retrieval and querying, requiring them to sift through each request (An Li, 2004).

In recent years, high rates of missed appointments have stemmed from the unreliable and disorganized nature of paper-based scheduling. Although appointment scheduling has existed for years, limitations such as visitor presence, waiting times, and data loss have persisted. The advent of technology, however, has ushered in a new era, enabling visitors to conveniently schedule appointments online through mobile devices or computers. This shift promises improved time management, efficient use of resources, and enhanced data accuracy.

This project, titled "Streamlining Visitor Appointments: Automated Scheduling System for BGC Trust University Bangladesh," aims to revolutionize the appointment scheduling process for the Vice Chancellor's Office. By designing and implementing an automated visitor's appointment scheduling system, the project aims to achieve the following objectives:

- Investigate the current appointment scheduling system at BGC Trust University Bangladesh's Vice Chancellor's Office.
- Develop a sophisticated appointment scheduling system tailored to the university's needs.
- Execute the implementation of the newly designed scheduling system.
- Evaluate the effectiveness and impact of the automated system.
- Resolve conflicts between appointments by suggesting alternative times or notifying users of the conflict and asking them to reschedule.
- This system will be able to notify users and visitors by text, g-mail, or call.
- This system will be able to track visitor data like name, contact info, and purpose for visit. This data tracking, will improve the schedule process and provide better services to users.

This project seeks to replicate the existing organizational workflow and mode of operation between the Vice Chancellor's Office and the visitor's logbook entry. The outcome is an automated model that seamlessly integrates with the technical workflow, resulting in a web-based visitor scheduling application. The project employs a waterfall approach, complemented by object-oriented programming skills in PHP and a dynamic Twitter Bootstrap user interface.

The proposed visitor scheduling appointment system is poised to transform how official appointments are managed at BGC Trust University Bangladesh. By automating the process, the system aims to provide easy access, accurate time management, and consistent appointment scheduling. Ultimately, this initiative underscores the potential of technology to redefine and enhance administrative practices, ensuring a more efficient and effective office environment.

## II. LITERATURE REVIEW

Appointment scheduling is a crucial administrative task in various settings, notably in healthcare. This review explores two primary categories of scheduling: static, where decisions are pre-established, and dynamic, which involves real-time adjustments. Modern expectations prioritize prompt service due to evolving lifestyles [9]. Efficient and accurate appointment scheduling is vital for seamless operations but faces challenges such as paper-based requests and organizational issues. This literature review explores the existing body of knowledge surrounding the implementation of automated scheduling systems, with a specific focus on the case of BGC Trust University Bangladesh.

Nidhra S. et al addresses scheduling challenges faced by travelers and salespersons, akin to the Travelling Salesman Problem. It has garnered attention for its complexity and practical significance [1]. This issue often likened to the Travelling Salesman Problem, has garnered attention from researchers, industry professionals, and academics due to its complexity and practical significance.

Ehrler F. et al focus on managing hospital access during the COVID-19 pandemic. It presents the ExpectingU app, which facilitates patient authorization and visitor access. However, its long-term viability beyond the pandemic remains unexplored [2]. The pandemic necessitated stringent measures to minimize the risk of infection, leading to restricted access to hospitals for both patients and visitors, with only essential visits and medical appointments being permitted. In reaction to this challenge, the authors created the ExpectingU app, which served as a solution to streamline patient authorization for medical appointments and empower authorized visitors to access the hospital. The paper focuses on the pandemic period, which was characterized by exceptional circumstances. The long-term viability and sustainability of the ExpectingU app beyond the pandemic have not been explored. The paper does not address how the app might need to be adapted as the pandemic situation evolves.

Frederick M. H. et al discuss the Automated Internal Medicine Scheduler (AIMS) and its impact on medical resident schedules. It improves various metrics but lacks discussion on potential development and implementation costs [3]. Achieving a balance between individual preferences, regulatory compliance, and institutional staffing needs is a complex task. To address this challenge, the authors developed the Automated Internal Medicine Scheduler (AIMS), an innovative tool, and assessed its impact on schedule quality, resident satisfaction, and perceptions of fairness. While the AIMS system improved various metrics, the paper does not discuss potential costs associated with developing and implementing the automated tool, which could impact its feasibility in other contexts.

Jennifer P. T. et al explore stochastic appointment scheduling in outpatient clinics, aiming to enhance service quality and resource utilization. However, it may introduce complexity, requiring sophisticated software or algorithms for practical use [4]. The research aims to develop a stochastic overbooking model to enhance service quality and resource utilization in outpatient settings, considering dynamic call-in sequences of patients. While the stochastic model offers a nuanced approach to appointment scheduling, it might also introduce complexity into the scheduling process, potentially requiring sophisticated software or algorithms for practical implementation.

Abramo G. et al evaluate Italy's academic recruitment reforms. It uncovers complexities and potential issues within the system, offering insights but lacking concrete explanations for certain patterns [5]. This evaluation sheds light on whether these reforms have effectively curbed favoritism and discrimination in academic appointments. The study uncovers intriguing insights that underscore both the complexity and potential issues within the new system. The paper suggests possible interpretations, but it does not offer concrete explanations for why certain patterns of favoritism or discrimination emerge.

In summary, the literature reviewed here underscores the growing importance of automated scheduling systems in educational institutions. While these systems offer numerous benefits, including increased efficiency and user satisfaction, challenges related to data security and user training must be addressed. As technological advancements continue to shape the landscape of educational administration, institutions like BGC Trust University Bangladesh serve as examples of how automation can streamline visitor appointments and enhance overall campus operations. Further research in this area will contribute to ongoing improvements and innovations in educational scheduling systems.

### III. METHODOLOGY

Current Appointment Scheduling Scenario at BGC Trust University Bangladesh Vice Chancellor's Office:

**Visitor's Arrival:** A visitor arrives at the Vice Chancellor's Office to schedule an appointment to meet with the Vice-Chancellor. They approach the reception desk to inquire about the process.

**Manual Form Distribution:** The receptionist provides the visitor with a physical visitor's form, which contains fields for the visitor's name, address, phone number, purpose of visit, preferred date and time of the appointment, and signature. The form also includes sections for the Vice Chancellor's comments and signature.

**Form Completion:** The visitor fills out the form, providing the required information. They select a date and time slot based on their availability and preferences.

**Submission to Secretary:** After completing the form, the visitor submits it back to the receptionist. The receptionist then forwards the form to the secretary responsible for managing appointments for the Vice Chancellor.

**Manual Review and Scheduling:** The secretary reviews the submitted forms and manually enters the appointment details into a logbook or scheduling system. The secretary takes into account the Vice Chancellor's availability and other commitments when assigning appointment slots.

**Waiting Period:** The visitor is informed that they will receive a call or message to confirm their appointment date and time. They are requested to wait until they receive communication from the office.

**Communication of Appointment:** The secretary contacts the visitor via phone or message to confirm the scheduled appointment date and time. Sometimes, the appointment might be rescheduled due to the Vice Chancellor's busy schedule.

**Security Risks and Manual Changes:** The manual system allows the secretary to make changes to the schedule, potentially leading to unauthorized alterations or favoritism. There's a lack of transparency in tracking these changes.

**Visitor Priority:** Even if a visitor has a scheduled appointment, individuals with higher priority or urgent matters might be given precedence, causing delays and frustration.

**Crowded Reception:** On the appointment day, visitors gather in the reception area, waiting for their turn to meet the Vice Chancellor. This can lead to a congested and chaotic environment.

**Paper-Based Documentation:** The completed visitor’s forms, along with appointment records, are stored in physical files, logbooks, or other manual records. This introduces the risk of data loss, damage, or misplacement.

**Inefficiencies:** The manual system is time-consuming, error-prone, and cannot efficiently manage a large number of appointments simultaneously.

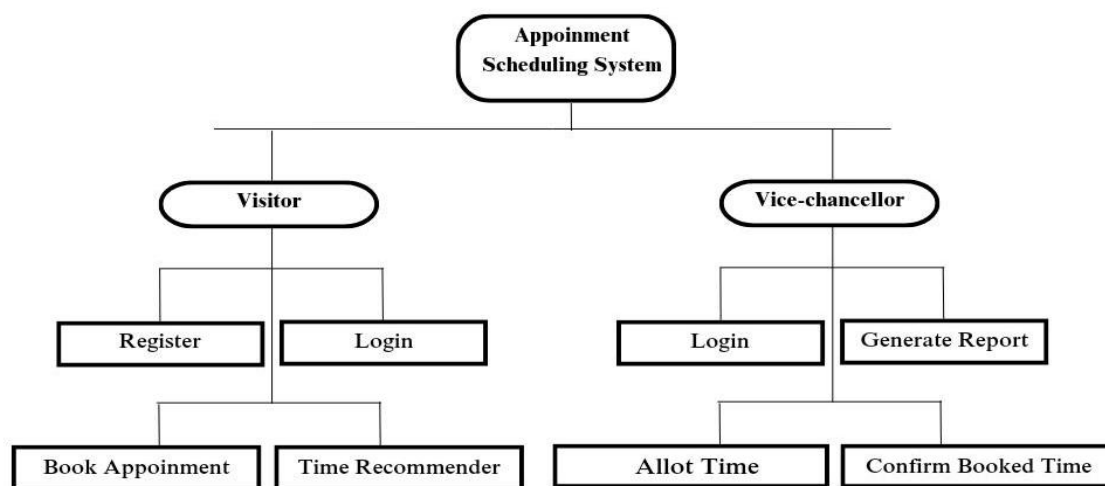
**Costs and Staffing:** The paper-based system incurs stationery, storage, and administrative labor costs. Skilled staff are required to manage the scheduling process.

**Lack of Flexibility:** Last-minute changes, rescheduling requests, or cancellations are difficult to accommodate, leading to inconvenience for both visitors and staff.

**Data Vulnerability:** Physical documents containing sensitive visitor information are at risk of being lost or accessed by unauthorized individuals, potentially harming the university’s reputation.

The current manual appointment scheduling system at BGC Trust University Bangladesh Vice Chancellor’s Office poses various challenges, including inefficiencies, lack of transparency, security risks, and limited flexibility. Transitioning to an automated scheduling system would address these issues and significantly improve the appointment management process.

### 3.1 Architecture of the System



**Figure 1:** Proposed System Architecture.

In Figure 1, the proposed system architecture provides a comprehensive and secure framework for managing appointments within a university context. It streamlines the user experience for Visitors and empowers the Vice Chancellor with efficient tools, all while maintaining robust security, data integrity, and scalability for future growth.

### 3.2 Functional Modules of the Proposed System

In this structure, the steps within the algorithm are represented as actions that occur within the function `Manage Visitor Appointment()`. The function’s purpose is to guide the visitor through the appointment booking process, from verifying their account status to selecting and confirming an appointment time and eventually logging out.

- **Visitor**

Function: `Manage Visitor Appointment()`

Step 1: Start the process.

Step 2: Display the system page for the user (assumed).

Step 3: Identify the user as a Visitor.

Step 4: Check if the Visitor has an account.

If the Visitor doesn’t have an account:

Step 5: Register the Visitor and then log in.

Step 6: Allow the Visitor to book an appointment.

Step 7: Use the system to recommend available appointment times.

Step 8: Ask the Visitor if they agree with the recommended time.

If the Visitor agrees:

Step 9: Confirm the appointment.

If the Visitor doesn't agree:

Step 10: Allow them to choose a different time.

Step 11: Confirm the appointment regardless of the chosen time.

Step 12: Allow the Visitor to log out.

Step 13: End the process.

End Function

- **Vice-Chancellor**

Function: Manage Vice Chancellor Appointments()

Step 1: Start the process.

Step 2: Display the system page for the user (assumed).

Step 3: Identify the user as a Vice-Chancellor.

Step 4: Allow the Vice Chancellor to log into the system.

Step 5: Provide an option to generate reports on appointment bookings.

Step 6: Enable the Vice Chancellor to allot time slots for appointments.

Step 7: Confirm the allocated appointment times.

Step 8: Save a log of the Vice Chancellor's actions in the system.

Step 9: Allow the Vice Chancellor to log out.

Step 10: End the process.

End Function

In this structure, the steps within the algorithm are represented as actions that occur within the function Manage Vice Chancellor Appointments(). The function's purpose is to guide the Vice Chancellor through the appointment management process, including tasks like generating reports, allotting appointment times, logging actions, and finally logging out.

### 3.3 Workflow Diagram of the Proposed System

In the process of appointment management within the system, the interaction of both Visitors and the Vice Chancellor is outlined in Figure 2. For Visitors, the process commences with their arrival at the system page, prompting a check for existing accounts. Those without accounts proceed to register and subsequently log in. Following this, appointment booking takes place, with the system suggesting available times. Visitors either agree with the proposed time and confirm the appointment or opt for an alternative time. This leads to confirmation and, eventually, logging out of the system.

On the other hand, the Vice Chancellor's involvement begins with their login, granting access to generate reports on appointment bookings. The Vice-Chancellor further allocates specific time slots for appointments, confirming these allocations. The system diligently maintains a log of the Vice Chancellor's actions. The process concludes with the Vice Chancellor's log out, concluding the appointment management workflow.

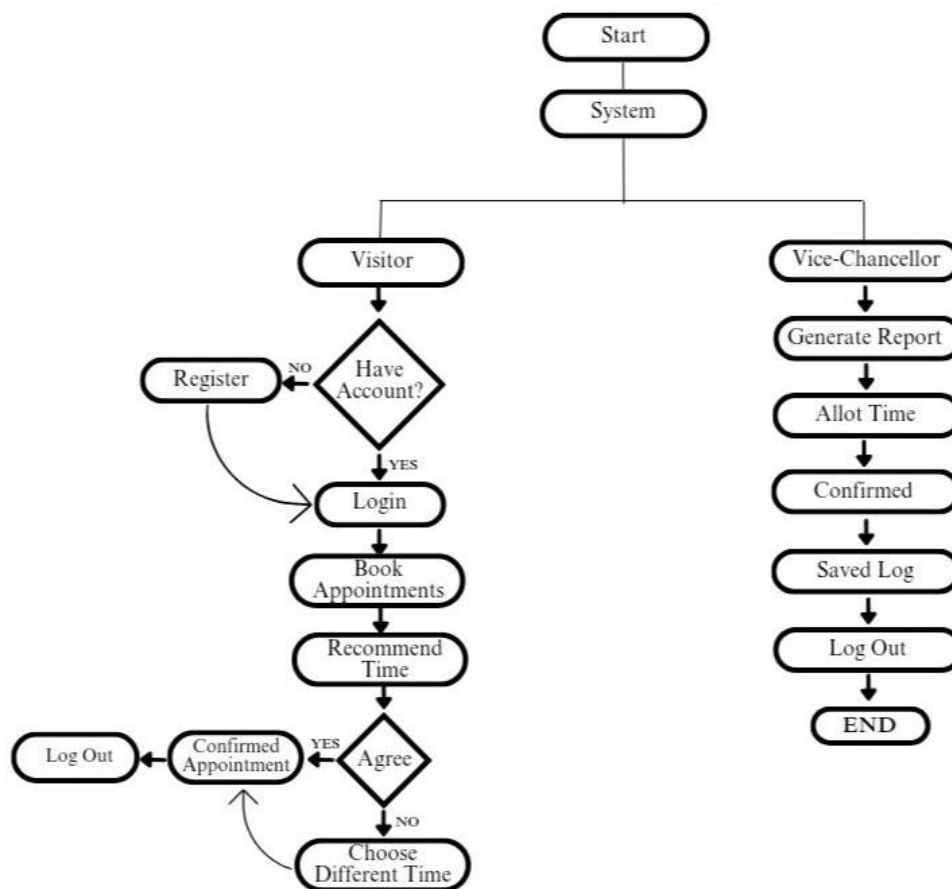


Figure 2: Workflow of the System

#### IV. RESULT AND DISCUSSION

This project stage involved a thorough analysis of the proposed system by university staff to assess its effectiveness. As part of this evaluation, a random sample of 50 individuals, comprising 29 males and 21 females, was selected to provide feedback and insights on the system. Below, is the table illustrating the obtained results.

Table 1: User Characteristics Table

	Frequency	Percentage (%)
<b>Gender</b>		
Male	29	58
Female	21	42
<b>Age</b>		
18 - 40	26	52
41 - 60	18	36
61 - 80	6	12
<b>Do you access the internet?</b>		
Yes	46	92
No	4	8
<b>How do you access the internet?</b>		
Mobile Phone	28	56

Computer + Mobile (Both)	22	44
<b>Have you ever booked an appointment at university before?</b>		
Yes	5	10
No	45	90
<b>How often do you book an appointment?</b>		
Never	44	88
Daily	0	0
Weekly	5	10
Monthly	1	2
Occasionally	0	0
<b>How was your experience with the existing system?</b>		
Good	2	4
Bad	48	96

In this study, the system was tested using a questionnaire and direct usability of the system. Therefore, to know the user's thoughts about the proposed Automated Scheduling System for BGC Trust University Bangladesh, a questionnaire was created to extract their opinions.

Table 1 above shows the characteristics of the randomly selected users which consist of their age, Internet access, how they access the Internet, if they ever book an appointment, how often they book an appointment, experience with the existing system, and expectations about the proposed system.

A total number of 26 people is between the ages of 18-40 years old, 18 people are between the ages of 41-60 year old, and 6 people are between the ages of 61- 80 years old which consist of 58% male and 42% female. 92% of people access the Internet while 8% of people do not. 56% use mobile devices to access the internet while 44% use the computer system. 10% of the people have booked an appointment before while 90% have not booked an appointment before. 88% have never booked an appointment, 0% book appointments daily, 10% book appointments every week, 2% book appointments every month, and 0% book appointments occasionally. 4% have a good experience with the existing system, while 96% have a bad experience with the existing system.

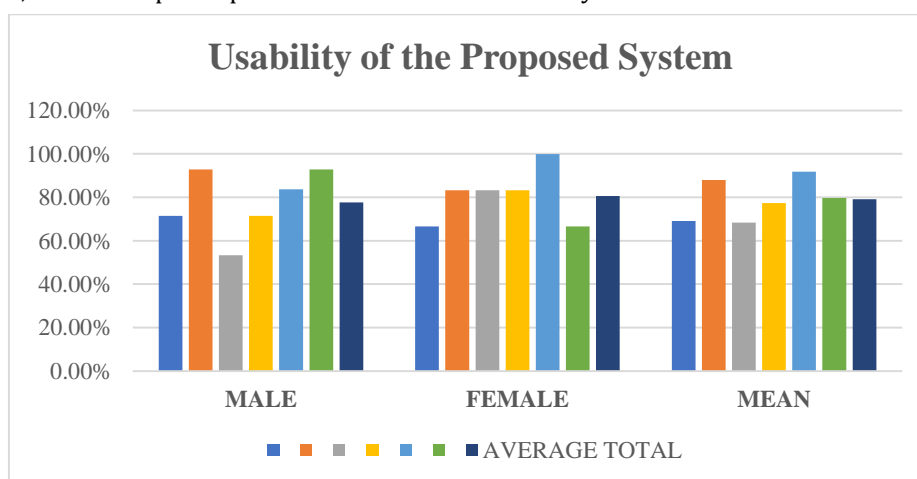
**Table 2: Users' Opinions Table**

Sl.	Usability of Automated Visitor Appointment Scheduling System	Male	Female	Mean
1.	The suggested visitor appointment scheduling system for BGCTUB offers a time-efficient solution.	71.43%	66.67%	69.06%
2.	This recommended visitor appointment scheduling system for BGCTUB is designed with user-friendliness in mind.	92.86%	83.33%	88.01%
3.	The proposed visitor appointment scheduling system for BGCTUB has the potential to eliminate the current system.	53.33%	83.33%	68.32%
4.	This suggested visitor appointment scheduling system for BGCTUB has the potential to become the established method	71.43%	83.33%	77.35%

	for appointment scheduling.			
5.	The envisioned visitor appointment scheduling system for BGCTUB boasts a well-organized structure.	83.71%	99.99%	91.85%
6.	This proposed visitor appointment scheduling system for BGCTUB facilitates interaction.	92.86%	66.67%	79.77%
<b>Average Total</b>		<b>77.60%</b>	<b>80.54%</b>	<b>79.07%</b>

The data in Table 2 demonstrate the effectiveness and efficiency of the suggested system, and the following is a summary of the findings:

- A total of 69.06% of respondents concurred that the new system offers time-saving benefits.
- An impressive 88.01% of participants affirmed that the newly proposed system is user-friendly.
- Approximately 68.32% of individuals expressed a preference for the new proposed system over the existing one.
- A notable 77.35% of respondents indicated their agreement with the idea of adopting the new proposed system as the standard method for scheduling appointments.
- A significant 91.85% of those surveyed praised the well-structured nature of the new proposed system.
- Furthermore, 79.77% of participants concurred that the new system fosters interaction.



**Figure 3:** Usability Chart of the Proposed System.

The analysis presented in the table above, which involved testing the system with a sample size of 50 individuals, comprising 29 males and 21 females, demonstrates the system's successful performance. As a result of the positive outcomes obtained from the survey and the average total, we got 79.07% which deemed that the proposed system for BGCTUB will be concluded, having successfully fulfilled its intended purpose.

## V. CONCLUSION

The “Streamlining Visitor Appointments: Automated Scheduling System for BGC Trust University Bangladesh” project represents a significant step forward in modernizing and optimizing the appointment scheduling process within the university’s Vice Chancellor’s Office. This paper has provided a comprehensive overview of the project, from its inception to the evaluation of user opinions. The existing manual appointment scheduling system at BGC Trust University Bangladesh posed numerous challenges, including inefficiencies, lack of transparency, security risks, and limited flexibility. The proposed automated system was designed to address these issues and enhance the overall appointment management process. The evaluation of the proposed system through a questionnaire and usability testing yielded highly positive results. Users, both male and female, expressed strong agreement that the system offered time-efficient solutions, user-friendliness, and the potential to eliminate the current system. The majority of respondents also believed that the proposed system could become the established method for appointment scheduling, praised its well-organized structure, and



acknowledged its ability to facilitate interaction. These positive responses indicate that the system has met user expectations and has the potential to significantly improve the appointment scheduling experience at the university. The proposed system for the BGC Trust University Bangladesh has shown great promise in revolutionizing appointment scheduling within the university's administrative offices. The project intends to improve user satisfaction, streamline processes, and reduce inefficiencies by switching from a manual, paper-based system to an automated, web-based one. The good user response confirms how technology may redefine and improve administrative procedures, resulting in a more productive and efficient work environment. This project serves as a guide for other organizations wanting to automate appointment scheduling for increased efficiency and user satisfaction.

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