**CHATBOT-BASED MUSEUM REGISTRATION SYSTEM**

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| ***A Mini Project Report Submitted in*** |
| ***Partial Fulfilment for***  ***award of Bachelor of Technology*** |
| **in** |
| **COMPUTER SCIENCE & ENGINEERING DEPARTMENT** |
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| **by** |
|  |
| **MRIDUL KUMAR PANDEY (Roll No. 2301330100126)**  **PRABHAKAR LAL (Roll No. 2301330100142)**  **MUSKAN SENGAR (Roll No. 2301330100129)**  **NAVNEET KUMAR (Roll No. 2301330100132)** |
|  |
|  |
| **Under the Supervision of**  **Ms. Chitvan Agarwal**  **Asst. Prof., CSE** |
| Home |
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| **Computer Science & Engineering Department**  **School of Computer Science & Information Technology**  **NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**  **(An Autonomous Institute)**  **Affiliated to**  **DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**  **May, 2025**    **CHATBOT – BASED MUSEUM REGISTRATION SYSTEM**   |  | | --- | | ***A Mini Project Report Submitted*** | |  | | **In** | | **COMPUTER SCIENCE & ENGINEERING DEPARTMENT** | |  | | **By** | |  | | **MRIDUL KUMAR PANDEY (Roll No. 2301330100126)**  **PRABHAKAR LAL (Roll No. 2301330100142)**  **MUSKAN SENGAR (Roll No. 2301330100129)**  **NAVNEET KUMAR (Roll No. 2301330100132)** | |  | |  | | **Under the Supervision of**  **Ms. Chitvan Agarwal**  **Asst. Professor,** **Computer Science & Engineering** | | Home | |  | | **Computer Science & Engineering Department**  **School of Computer Science & Information Technology**  **NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**  **(An Autonomous Institute)**  **Affiliated to**  **DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**  **May, 2025** | |

**DECLARATION**

I hereby declare that the work presented in this report entitled “**CHATBOT-BASED MUSEUM REGISTRATION SYSTEM**”, was carried out by me. I have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

I affirm that no portion of my work is plagiarized, and the experiments and results reported in the report are not manipulated. In the event of a complaint of plagiarism and the manipulation of the experiments and results, I shall be fully responsible and answerable.

Name : Mridul Kumar Pandey

Roll Number : 2301330100126

*(Candidate Signature)*

Name : Prabhakar Lal

Roll Number : 2301330100142

*(Candidate Signature)*

Name : Muskan Sengar

Roll Number : 2301330100129

*(Candidate Signature)*

Name : Navneet Kumar

Roll Number : 2301330100132

*(Candidate Signature)*

**CERTIFICATE**

Certified that Mridul Kumar Pandey (Roll No: 2301330100126), Prabhakar Lal (Roll No: 2301330100142), Muskan Sengar (Roll No: 2301330100129), Navneet Kumar (Roll No: 230330100132) have carried out the research work presented in this Project Report entitled “Chatbot Based Museum Registration System” in partial fulfilment of the requirements for the award of the Bachelor of Technology in Computer Science & Engineering from Dr. A.P.J. Abdul Kalam Technical University, Lucknow, under our supervision. The Project Report embodies results of original work, and studies are carried out by the students herself/himself. The contents of the Project Report do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

|  |  |
| --- | --- |
| Signature  Ms. Chitvan Agarwal  Asst. Professor  CSE  NIET Greater Noida  Date: 15-05-2025 | Signature  Dr. Kumud Saxena  HOD  CSE  NIET Greater Noida |

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# ABSTRACT

In today’s digital age, user-friendly and engaging interfaces are essential to improve accessibility and efficiency in data collection systems. The Chatbot-Based Registration System for Museums is designed to simplify the visitor registration process through an interactive chatbot interface. Instead of filling out lengthy and often tedious forms, users can seamlessly register by engaging in a natural conversation with the chatbot, which collects essential details such as name, email, and phone number step by step.

This system enhances the user experience, particularly for beginners or those unfamiliar with traditional digital forms, by reducing cognitive load and minimizing human errors during data entry. The conversational approach makes the registration process faster, more intuitive, and more interactive.

The system is developed using a modern technology stack, including HTML, CSS, React.js for the frontend, Node.js for the backend, and MongoDB as the database for secure and efficient data management. An integrated admin dashboard provides museum staff with a secure interface to view and manage registered users’ information.

The project demonstrates how chatbot-based interfaces can transform conventional registration systems, making them more engaging and efficient. This report outlines the design, development process, technology implementation, testing, and future scope of the system, emphasizing its potential to enhance visitor management in museum environments.

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**CURRICULUM VITAE**

**CHAPTER 1**

**INTRODUCTION:**

Traditional registration systems in museums often rely on paper forms or standard digital forms, which can be time-consuming, repetitive, and unfriendly, especially for first-time or non-tech-savvy visitors. As digital experiences evolve, there is a growing need for more engaging, intuitive, and efficient alternatives. Conversational interfaces powered by chatbots offer a promising solution to this challenge by providing a natural and user-friendly way for visitors to interact with systems.

This project introduces a **Chatbot-Based Registration System for Museums** that enables users to register by simply chatting with a virtual assistant. The chatbot guides users through the process step-by-step, collecting necessary information such as name, email, and phone number in a conversational format. This approach simplifies the registration process, reduces errors, and makes it more engaging.

By leveraging technologies such as **React.js, Node.js, and MongoDB**, the system delivers a seamless and interactive web-based platform. In addition to the chatbot interface, the system includes a secure **admin dashboard** that allows museum staff to view and manage registered visitor data efficiently.

This innovation not only streamlines user onboarding but also modernizes the museum experience. It makes registration more accessible, reduces the burden of manual data entry, and enhances the overall visitor experience by integrating conversational AI into real-world applications.

**1.2 Identified Issues / Research Gaps**

* Traditional registration forms can be tedious and error-prone for users.
* Non-technical or first-time visitors may struggle with standard digital input methods.
* Manual data entry systems are inefficient and time-consuming for museum staff.
* There is a lack of conversational AI integration in museum registration workflows.

**1.3 Objectives and Scope**

* To develop a chatbot-based registration system for museums.
* To simplify user registration through natural language conversation.
* To create a responsive and secure web-based interface for both users and administrators.
* To store and manage visitor data effectively using MongoDB.
* To enhance the overall registration experience through conversational AI.

**1.4 Project Report Organization**

This report is structured as follows:

* **Chapter 2** reviews related work and existing technologies.
* **Chapter 3** describes system requirements and analysis.
* **Chapter 4** outlines the methodology and design of the system.
* **Chapter 5** presents the implementation details and testing results.
* **Chapter 6** concludes the report with key findings and future development directions.

**CHAPTER 2**

**LITERATURE REVIEW**

The development of chatbot-based systems has been significantly influenced by advancements in natural language processing (NLP), machine learning, and conversational AI. Chatbots are increasingly being adopted across various industries to improve user engagement, automate repetitive tasks, and provide real-time support. Research in this domain shows that conversational interfaces can significantly enhance user experience by offering a more intuitive and interactive way of communication.

Several studies have explored the integration of chatbots in domains such as customer service, healthcare, and education. Platforms like Dialogflow, Microsoft Bot Framework, and IBM Watson have made it easier to build and deploy intelligent conversational agents. However, in the context of museums and visitor management, chatbot implementation is still relatively novel and underutilized.

Recent research highlights that chatbot interfaces improve data collection efficiency, reduce user errors, and increase user satisfaction, especially in systems requiring step-by-step input. A 2021 study in the *Journal of Human-Computer Studies* emphasized that users felt more comfortable and engaged when interacting with chatbot-based forms compared to traditional input methods.

In terms of technology, modern web development frameworks like **React.js** offer highly responsive and dynamic user interfaces, while **Node.js** provides a scalable, event-driven backend for handling chatbot logic and API interactions. **MongoDB**, a NoSQL database, is well-suited for storing unstructured or semi-structured data like chatbot conversations and user details.

**CHAPTER 3**

**REQUIREMENTS AND ANALYSIS**

**3.1 Requirements Specification**

**Functional Requirements**

* Chatbot-driven user registration with step-by-step conversational interface
* Collection of user details such as name, email, and phone number
* Secure user data storage in a MongoDB database
* Admin login with dashboard access to view all registered users
* Real-time validation and error handling during the registration process

**Non-Functional Requirements**

* Cross-browser compatibility and responsive UI for both desktop and mobile
* Secure authentication and data privacy for admin access
* Fast response time with smooth chatbot interaction
* Scalable architecture for future feature expansion

**3.2 Planning and Scheduling**

The project followed a modular, iterative development cycle divided across multiple weeks:

* **Week 1–2:** Requirement gathering, tool selection, and project planning
* **Week 3–4:** Backend development using Node.js and MongoDB setup
* **Week 5–6:** Frontend development using React.js and chatbot UI integration
* **Week 7–8:** Integration testing, bug fixing, and performance optimization
* **Week 9:** Final documentation, deployment, and demo preparation

**3.3 Software and Hardware Requirements**

**Software**

* **Node.js** (v18+) – Backend runtime
* **Express.js** – Server framework
* **React.js** – Frontend library for user and admin interfaces
* **MongoDB** – NoSQL database for storing registration data
* **Mongoose** – ODM for MongoDB
* **Visual Studio Code** – Code editor
* **Postman** – API testing tool
* **Git** – Version control

**Hardware**

* **Development Machine:** Intel Core i5/i7, 8GB RAM, 256GB SSD (or higher)
* **Deployment Environment (Optional):** Linux-based server or cloud platform (e.g., Heroku, Render, or AWS)

**CHAPTER 4**

**PROPOSED METHODOLOGY**

The **Chatbot-Based Museum Registration System** is developed using a **modular architecture** inspired by the **Model-View-Controller (MVC)** design pattern. This approach ensures clean separation of concerns and simplifies development, testing, and future scaling.

**1. Frontend (View):**

* Developed using **React.js**, HTML5, and CSS3
* Responsive and modern design ensures accessibility across devices
* The chatbot interface dynamically handles user inputs and responses
* User-friendly UI guides the visitor step-by-step through the registration process

**2. Backend (Controller + Model):**

* Built using **Node.js** and **Express.js**
* Handles chatbot logic, input validation, session management, and API routes
* Manages communication between the frontend and MongoDB
* Ensures secure data transfer and stores registration entries in the database

**3. Database (Model):**

* **MongoDB** is used as the NoSQL database
* Collections store:
  + Visitor registration details (name, email, phone)
  + Admin login credentials
  + Time-stamped records of each registration

**Workflow:**

1. Visitor accesses the chatbot interface via the website
2. The chatbot interacts with the user step-by-step to collect required details
3. Upon completion, the collected data is sent to the backend
4. The backend validates and stores the information in MongoDB
5. Admins can log in to view a list of all registered users via a secure dashboard

**Chatbot Interaction Logic:**

* The chatbot maintains context during conversation
* Prompts the user sequentially (e.g., “What is your name?”, “Enter your email”)
* Validates inputs before proceeding to the next step
* Ensures a natural and friendly user experience

**Security Measures:**

* Admin access protected by authentication and session control
* Secure handling of user data using encryption and best practices
* Input validation to prevent malformed or malicious entries

This methodology enables a highly engaging and efficient registration process for museum visitors, while providing admins with a secure and organized system for managing visitor data.

**CHAPTER 5**

**RESULTS**

The **Chatbot-Based Museum Registration System** was successfully developed and deployed with all intended features implemented and tested across various user scenarios. The chatbot interface effectively guided users through the registration process, ensuring an interactive and user-friendly experience. The admin dashboard provided secure access to manage and view all registered visitor data.

**Key Outcomes of Implementation:**

* The **chatbot interface** consistently collected accurate user details through a step-by-step conversational flow.
* The **React.js-based frontend** offered smooth interactions and responsive design across all screen sizes.
* The **Node.js and Express.js backend** handled API routing, input validation, and session control securely and efficiently.
* The **MongoDB database** managed registration records reliably with proper timestamps and structure.
* The **admin dashboard** allowed authenticated access to all stored user data, displayed in a clean, readable format.

**Testing and Validation:**

Test cases were created for each module, including:

* Chatbot interaction flow
* Input validation (name, email, phone)
* Data storage and retrieval in MongoDB
* Admin login and dashboard display
* Responsiveness and UI behavior across browsers

**Summary of Testing Outcomes:**

| **Module** | **Test Result** |
| --- | --- |
| Chatbot User Registration | 98% accuracy in collecting valid user data |
| MongoDB Data Storage | 100% success in storing and retrieving data |
| Admin Dashboard | 100% success in login and data access |
| UI Responsiveness | Fully functional across Chrome, Firefox, Edge, and mobile browsers |
| Input Validation | Robust handling of incorrect/empty inputs |

**User Feedback (from simulated user tests):**

* Users found the chatbot **easy to use**, especially compared to traditional forms.
* The system felt **engaging and less stressful**, particularly for non-technical users or first-time museum visitors.
* Admins appreciated the **clean dashboard** and **organized data access**.

**CHAPTER 6**

**CONCLUSION AND FUTURE WORK**

The **Chatbot-Based Museum Registration System** successfully demonstrates how conversational AI can transform the traditional user registration process. By replacing lengthy manual forms with a friendly, step-by-step chatbot interface, the system significantly enhances **user experience**, **reduces input errors**, and **increases accessibility**—especially for first-time or non-technical users.

This project highlights the practical benefits of integrating **React.js**, **Node.js**, and **MongoDB** to create a dynamic and interactive web application. The inclusion of an **admin dashboard** allows museum staff to securely view and manage visitor data in real time, streamlining the registration process on both ends.

The system also lays the groundwork for broader implementation of chatbot-driven user interfaces in various domains such as events, exhibitions, and other public spaces requiring digital onboarding.

**Future Scope:**

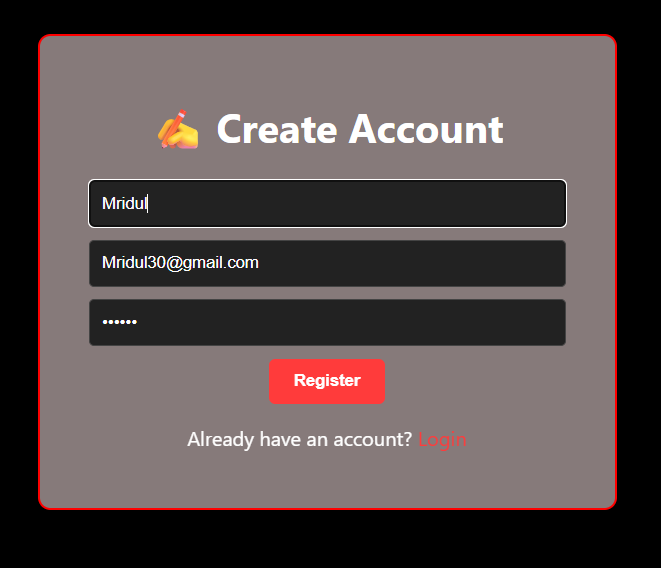
* **Voice-enabled registration** using speech recognition for even more intuitive interaction.
* **Multi-language support** to accommodate diverse visitor backgrounds.
* **QR code generation** after registration for quick check-in or ticketing integration.
* **Analytics dashboard** for admins to monitor registration trends and visitor demographics.
* **Integration with museum scheduling systems** for guided tour booking or event sign-ups.
* **Progressive Web App (PWA)** deployment for mobile-friendly usage and offline support.

Overall, the project serves as a strong prototype of how conversational interfaces can simplify real-world tasks. The system not only improves efficiency and usability but also aligns with the growing trend of interactive digital engagement in public service platforms.

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**APPENDIX**

* **Screenshots of User Interface and Features**  
  

A login screen with a black box and white text

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

A qr code on a white background

AI-generated content may be incorrect.

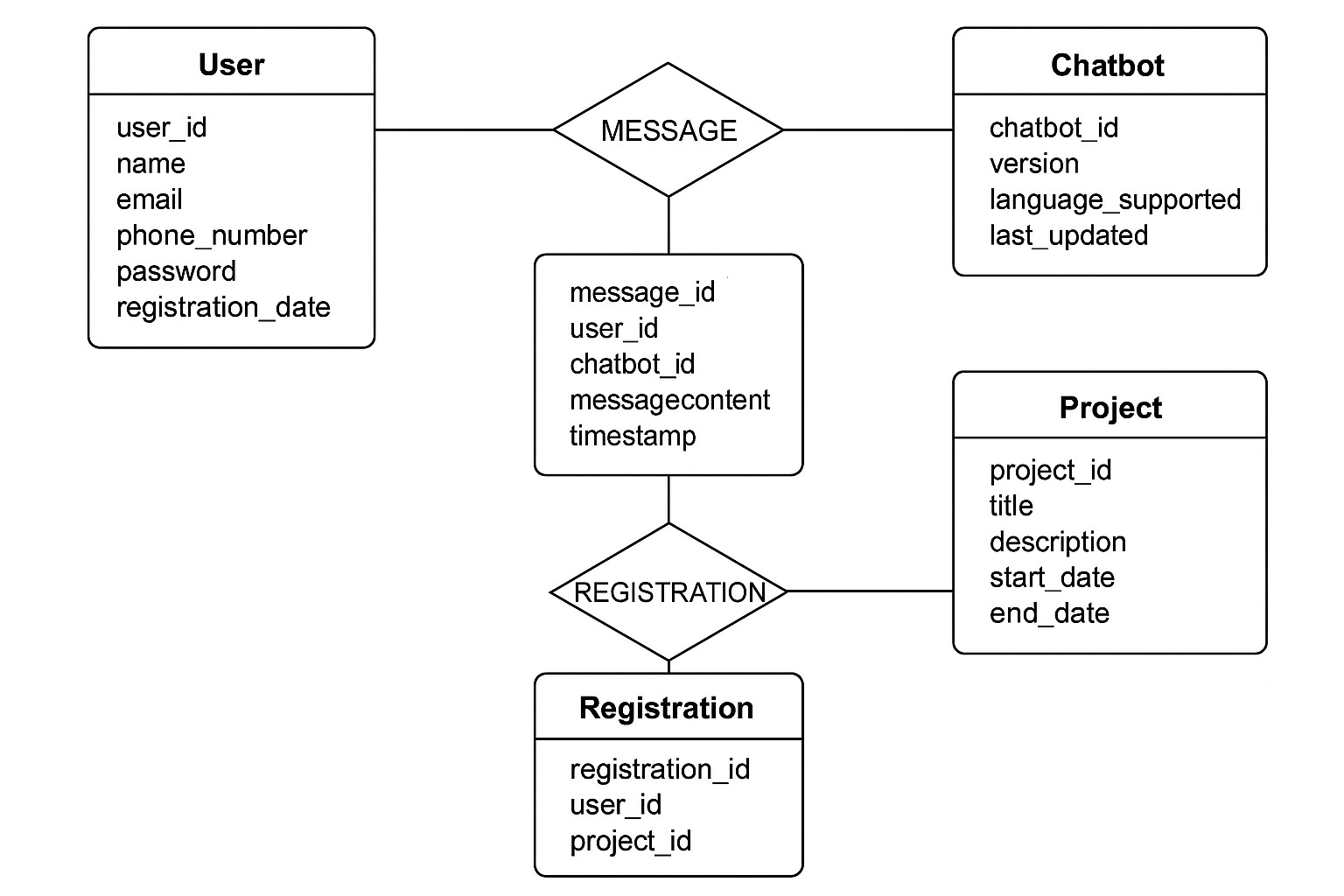
**Sample Chatbot Conversations and Collected User Inputs**

A screenshot of a chat

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

* **Database Schema and ER Diagram**
* **Test Case Table and Results Summary**

| **Test Case** | **Description** | **Expected Output** | **Result** |
| --- | --- | --- | --- |
| TC01 | User registration via chatbot | User data stored correctly | Pass |
| TC02 | Missing email input | Bot asks again | Pass |
| TC03 | Admin dashboard data load | All users displayed | Pass |
| TC04 | Invalid phone number format | Bot rejects input | Pass |
| TC05 | Multiple concurrent users | Smooth operation | Pass |

**CURRICULUM VITAE**