SPARKATHON 2025

TITLE PAGE

- **Problem Statement ID –** PEC OO12
- **Problem Statement Title -** AI-Powered Chatbot for Student & Faculty Information Access
- **PS Category- Software/Hardware -** Software
- **Team Name (Registered on portal) -** GOS

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IDEA TITLE

Proposed Solution:

- Role-Based Access Control (RBAC) ensures that users (students, mentors, class teachers, and HoDs) can only access the data they are authorized to view. This approach protects sensitive academic records while allowing relevant stakeholders to make data-driven decisions.
- A chatbot powered by Gemini API enables seamless interaction, allowing users to ask questions about academic records naturally, either via text or voice commands.
- A robust backend ensures that academic records are fetched instantly and securely whenever a user makes a request.
- The system provides detailed academic insights to mentors, class teachers, and HoDs, enabling better decision-making and student performance tracking.
- Since academic data is sensitive, the system must implement strong security measures.

Unique features:

- AI Chatbot with Text & Voice Interaction
- Role-Based Access Control (RBAC)
- Secure Database Integration for Instant Data Retrieval
- Academic Analysis & Insights for Faculty
- Data Privacy & Security Measures

Key features:

- **Fast Query Execution:** Optimized queries ensure minimal response time for chatbot requests.
- **Data Consistency:** Real-time updates ensure users always get the latest information.
- **Attendance Insights:** Highlights students with poor attendance for intervention.
- **Performance Trends:** Visualization of student progress over time.

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TECHNICAL APPROACH

Tech stack used:

Web-development:

- JavaScript
- Bootstrap – Front end framework
- Flask – Backend framework
- Werkzeug – Security purpose application

API:

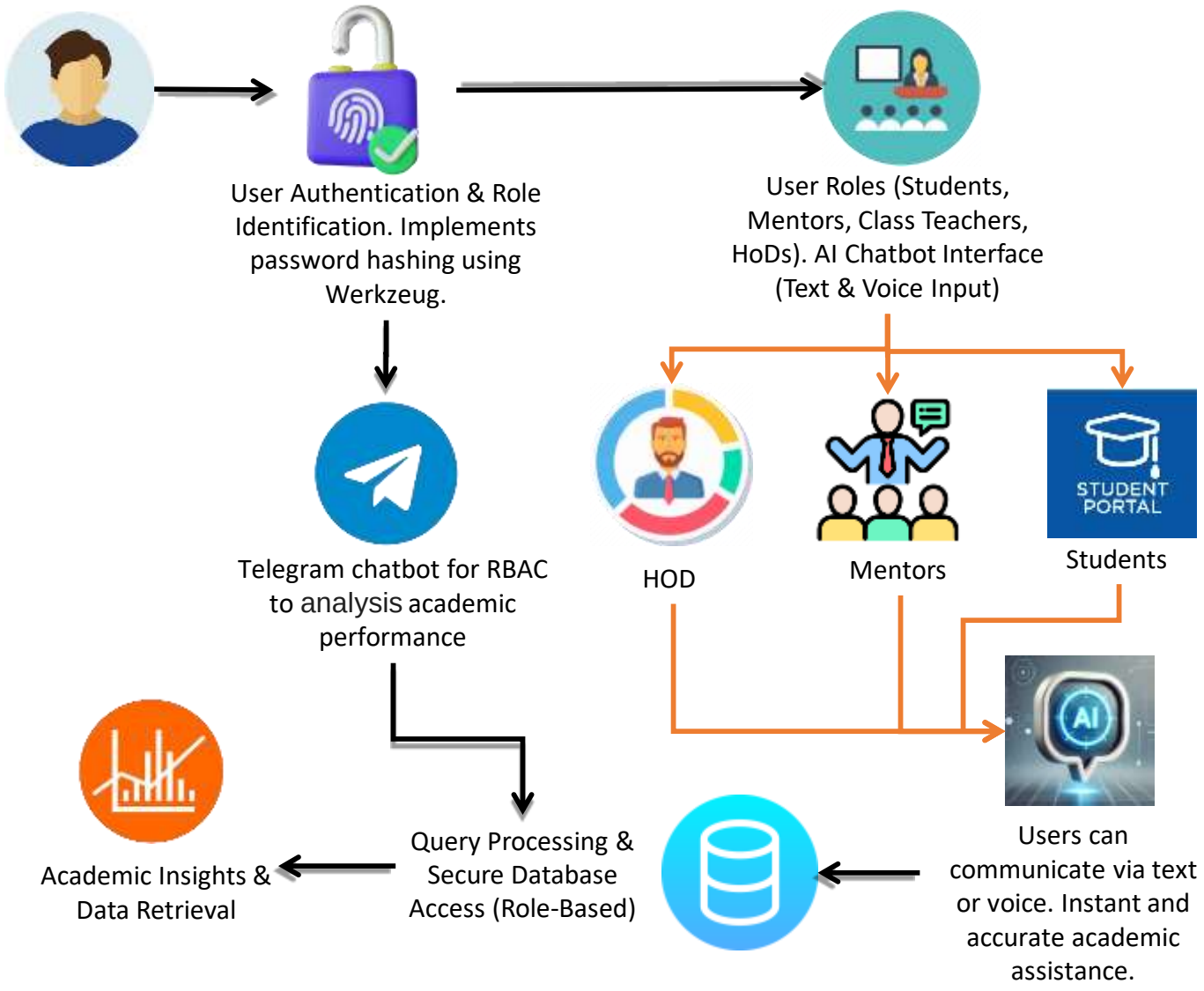
- Gemini API
- Telegram bot token

Database:

- SQLite

Data Analytics:

- Tableau – To create an interactive dashboard



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FEASIBILITY AND VIABILITY

Feasibility Analysis:

✓ Technical Feasibility :

- Role-based access control (RBAC) can be implemented using authentication protocols.
- AI chatbot integration is possible using chatbot API.

✓ Operational Feasibility :

- Easy-to-use chatbot and analytics dashboard improve accessibility.
- Requires faculty training but enhances efficiency in the long run.

✓ Economic Feasibility :

- Cloud-based solutions minimize infrastructure costs.
- Reduces faculty workload, leading to long-term cost savings.

Potential Challenges and Risks:

✗ Data Security & Privacy :

- Academic records contain sensitive data that require encryption and compliance with FERPA/GDPR.
- Risk of unauthorized access if RBAC is not implemented properly

✗ AI Chatbot Accuracy:

- Chatbot API may misinterpret student queries, affecting response accuracy.

✗ Adoption Resistance:

- Some faculty and students may be reluctant to use AI-driven systems.
- Need for training and awareness campaigns.

Strategies for Overcoming These Challenges:

✓ Data Security Measures :

- Implement AES-256 encryption, multi-factor authentication (MFA), and audit logs.
- Regular security audits and compliance checks.

✓ Improving AI Chatbot Accuracy :

- Use machine learning models trained on educational datasets.
- Continuous feedback loops to refine chatbot responses.

✓ Encouraging Adoption :

- Conduct training sessions for students and faculty.
- Offer a trial phase with support for early users.

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IMPACT AND BENEFITS

Potential Impact on the Target Audience:

1. **Students:**
   - Instant access to academic details, performance insights, and learning resources.
   - Improved engagement through AI-driven chatbot assistance.
2. **Mentors & Faculty:**
   - Detailed academic insights help in personalized mentoring.
   - Real-time data analytics assist in improving teaching strategies.
3. **Class Teachers & HoDs:**
   - Data-driven decision-making for curriculum improvement.
   - Enhanced communication with students and faculty through chatbots.

Benefits of the Solution:

1. **Social Benefits:**
   - **Increased Accessibility:** AI chatbots provide instant academic support, reducing response time for student queries.
   - **Equal Learning Opportunities:** Ensures students receive timely academic support, regardless of location.
2. **Economic Benefits:**
   - **Scalability:** Can be implemented across multiple institutions with minimal additional investment.
   - **Improved Student Performance:** Leading to better job placements and institutional reputation.
3. **Environmental Benefits:**
   - **Paperless Administration:** Reduces the need for physical records, minimizing paper consumption.
   - **Sustainable Education:** Promotes eco-friendly and technology-driven learning.

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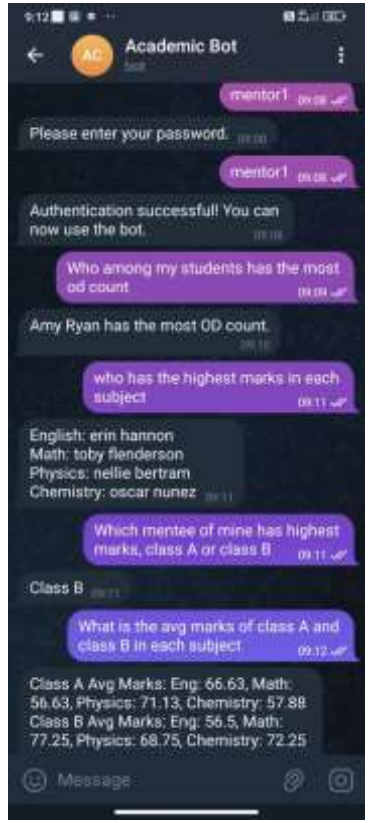
RESEARCH AND REFERENCES

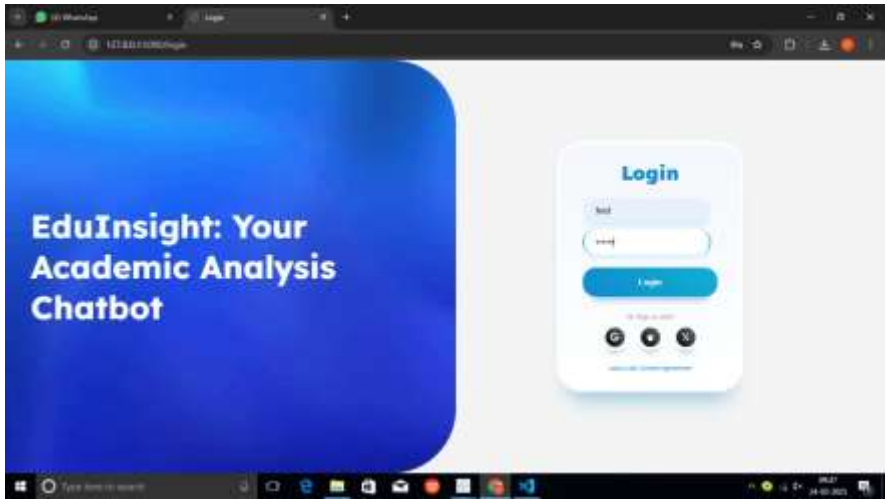
- https://pe.gatech.edu/blog/meet-jill-watson-georgia-techs-first-ai-teaching-assistant
- https://www.youtube.com/watch?v=ukzFI9rgwfU

Git Hub Repository :
https://github.com/S-Prathyush/sparkathon-academic-analysis-chatbot

Telegram Bot:



Login page:



ChatBot output: