MSBTE PAPER HUB:AI-Based MSBTE Question Paper Analysis System

Siddhant Chaudhari [1], Manasvi Shinde [2], Mrudula Ghadi[3], Nutan Padrat[4] ,Vareesha [5]

Department of Computer Engineering [1], Viva Institute Of Technology,Maharashtra ,India.
Department of Computer Engineering [2], Viva Institute Of Technology,Maharashtra ,India.
Department of Computer Engineering [3], Viva Institute Of Technology, Maharashtra, India.
Department of Computer Engineering[4], Viva Institute Of Technology, Maharashtra, India.

Sidmc2004@gmail.com
mrudulaghadi3112@gmail.com
nutanpadrat878@gmail.com
shindemanasvi20@gmail.com
vareesha7559@gmail.com

Abstract:
Digital education platforms are everywhere now, and students need smarter ways to prep for exams and figure out where they stand. Old-school question paper analysis is slow, manual, and, honestly, it just doesn't fit today's needs. So, we built the Al-Based MSBTE Question Paper Analysis System-a web app that takes the heavy lifting out of question paper review. Powered by Google Gemini Al, it lets students log in securely, store their papers in the cloud, get Al-driven topic breakdowns, and track their progress over time. By blending modern web tools, cloud storage, and generative Al, this system gives students real insights into exam trends and their own learning gaps. Tests show it's faster, clearer, and keeps students engaged way better than the traditional method.

Keywords: Question Paper Analysis, Gemini AI, MSBTE, Web Application, Educational Technology

1. Introduction

Every year, students taking MSBTE exams have to comb through old question papers, hunting for patterns, important topics, and how marks get split up. Usually, this means hours of manual work, and let's be real-it's easy to miss stuff. Now that Al and cloud tech have taken off, there's a much better way to tackle this.

Our Al-driven system steps in here. It uses natural language processing and generative Al to dig into MSBTE question papers. Students just upload their papers, and the platform does the rest: it breaks down topics, highlights what matters, and tracks each student's performance over time. The focus is on making the whole thing secure, easy to use, and able to handle lots of users at once.

We designed it to give students personal, skill-focused feedback, so they actually know where they stand and what to work on. The idea is to help students make smart, confident choices as they plan out their career paths-ready for whatever comes next.

2. Materials and Methods

Here's how we built and tested the Al-Based MSBTE Question Paper Analysis System. We wanted it accurate, scalable, and easy to repeat, so others could build on it too.

2.1 System Development Environment

We used the latest web tech to keep things simple and accessible for everyone. The frontend runs on React.js, so the interface feels smooth and quick. Node.js and Express.js handle everything behind the scenes, and MongoDB Atlas keeps data safe in the cloud. The whole setup works just as well on a laptop, tablet, or phone.

2.2 Data Collection and Input Materials

The system runs on MSBTE question papers that users upload in digital form. These files are the main data source for analysis. Everything has to be in a standard file format, and the system checks each upload to make sure the content is good before doing anything with it.

2.3 User Profiling Method

When users register or use the platform, the system collects their basic academic info and tracks how they interact. Each person gets a unique profile that connects their uploaded question papers with the analysis results. This setup lets users see a personalized history of their analyses and learning insights.

2.4 Data Preprocessing and Content Extraction

Before the Al gets to work, the system cleans up each uploaded question paper. It pulls out the content, drops anything irrelevant, and organizes the text so it's structured and ready for analysis. This step boosts the accuracy and speed of the Al's semantic analysis later on.

2.5 AI-Based Analysis Method Using Gemini AI

Google's Gemini Al handles the heavy lifting-it reads and understands the question papers, figures out subjects, topics, common questions, and spots patterns in exams. Then it lays out clear insights and explanations, all tailored for exam preparation.

2.6 Evaluation Methodology

To see how well the system works, we look at how accurate the analysis is, how fast responses come in, and how users feel about it. We compare what the Al finds against manual analysis to check for accuracy and relevance. User feedback plays a big part, too, guiding improvements and making the platform better over time.

2.7 Block Diagram

Figure 1: System Architecture of the AI-Based MSBTE Question Paper Analysis System Using Gemini AI
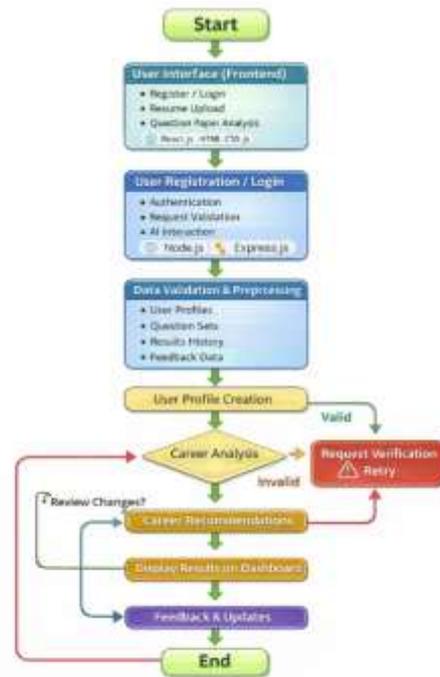
2.8 FLOW CHART

Figure 2: System Workflow of the Web-Based Intelligent Career Advisory Platform

2.8 System Architecture of the Web-Based AI-Based MSBTE Question Paper Analysis System

The Web-Based Intelligent Career Advisory Platform runs on a modular, scalable setup that's all about service. It's built to give users skill-focused, personalized career guidance. Everything's designed to work smoothly together-users, data storage, smart recommendations-and the whole thing keeps security and performance front and center. It uses a classic client-server model with AI packed in to help people make informed career choices.

2.8.1 User Interface Module (Frontend)

This is where users actually interact with the platform. The UI is built with tools like React.js, HTML, CSS, and JavaScript, so it looks sharp and feels natural. Users can sign up, log in, fill out their profiles, upload resumes, and check out their career suggestions-all in one place. Doesn't matter what device you're on, either. Desktop, tablet, phone-the interface just works.

2.8.2 Backend Application Layer

Node.js and Express.js power the backend, handling all the system's main logic. This is where user authentication happens, requests get checked, data gets processed, and different parts of the system talk to each other. The backend uses secure restful APIs, so the frontend, database, and AI engine can all connect and work together without a hitch. It protects your data and keeps everything running reliably.

2.8.3 Database Layer (MongoDB)

MongoDB handles all the data. User profiles, skills, career info, recommendations, subscriptions-it all lives here. Because MongoDB is document-based, it manages all kinds of career-related data easily, even as things change or new features get added. That keeps the platform flexible and ready for whatever comes next.

2.8.4 AI Recommendation Engine

This is where the real brains of the system sit. The AI Recommendation Engine looks at your skills, interests,

education, and assessment scores to come up with personalized career paths. It uses a mix of rule-based logic and AI analysis to figure out which careers fit you, spot any skill gaps, and point you to resources that help you grow. It takes your raw info and turns it into real, useful advice.

2.8.5 Cloud Storage and External Services

We use cloud services to make the system more reliable and flexible. When users upload resumes or documents, cloud storage keeps them safe and easy to access. We also connect to outside tools-like AI APIs and learning platforms-to boost the quality of career advice and keep recommendations fresh.

2.8.6 Interactive Dashboard

The Interactive Dashboard is really the heart of the platform. Here, users see their career plans, recommendations, skill gaps, and progress-all laid out in a way that actually makes sense. With charts, progress bars, and notifications, it's easy for users to track where they stand and figure out what comes next. The whole thing is designed to keep people engaged and help them make better decisions.

3. Results and Discussion

Building the web platform paid off. During testing, everything worked as it should-sign-ups, profiles, skill checks, uploading resumes, and getting AI-powered recommendations all ran smoothly. The system stayed stable and fast, even while tailoring career suggestions to each person. The AI engine dug into user data and offered career paths that matched people's backgrounds, skills, and interests. All the pieces-frontend, backend, database, and AI-fitted together without a hitch.

The platform didn't just hand out generic advice. It spotted skill gaps and suggested real learning options, so users could see exactly what they needed for their chosen careers. The dashboard made all this easy to understand with clear visuals. People who tried the platform said it made career choices much clearer than the usual counseling sessions. In the end, the system proved itself as a smart, practical, and user-focused way

to help people figure out their careers with the help of Al

4. Conclusion

So, here's the bottom line: The MSBTE PAPER HUB makes analyzing old MSBTE question papers way easier. It uses Al to pick out important topics, spot the questions that come up most often, and track exam trends-all without the hassle of doing it by hand. This means students know exactly what to focus on, which makes studying smarter and boosts their grades. Plus, getting to the question paper data is simple and fast, so you save a lot of time and effort. The system's reliable, scalable, and actually easy to use, which really pushes education into the digital age. Down the road, there's room to add even smarter features-think better machine learning, predictive analytics, maybe even a mobile app-to give students more personalized tips and make the platform even more accessible.

5. References

[1] D. E. Super, *A Life-Span, Life-Space Approach to Career Development*, Journal of Vocational Behavior, vol. 16, no. 3, pp. 282- 298, 1980.

[2] J. L. Holland, *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*, 3rd ed., Psychological Assessment Resources, 1997.

[3] *Artificial Intelligence: A Modern Approach*, 4th ed., Pearson Education, 2021.

[4] A. Pérez, J. López, and R. García, "Artificial Intelligence Techniques for Career Recommendation Systems," International Journal of Advanced Computer Science and Applications, vol. 11, no. 6, pp. 45-52, 2020.

[5] R. Sharma and P. Singh, "Skill-Based Career Recommendation Using Intelligent Systems," International Journal of Computer Applications, vol. 174, no. 9, pp. 12-18, 2022.

[6] M. K. Jain and S. Verma, "Web-Based Intelligent Systems for Career Guidance," International Journal of Engineering Research and Technology (IJERT), vol. 9, no. 4, pp. 210–215, 2020.

[7] T. H. Davenport and J. Harris, *Competing on Analytics: The New Science of Winning*, Harvard Business School Press, 2007.

[8] A. K. Mishra and S. Patil, "Resume Parsing and Skill Extraction Using NLP Techniques," Procedia Computer Science, vol. 167, pp. 1281-1288, 2020.

[9] World Economic Forum, *The Future of Jobs Report*, Geneva, Switzerland, 2023.

[10] Google, *Gemini Al Documentation*, Google Developer Resources, 2024.