

A
Project Report
On
"QuickCraft: Where Ideas Flow, Contents Glow!"

Submitted to
Bikaner Technical University, Bikaner
in partial fulfilment for
the Degree of
Bachelor of Technology
in
COMPUTER SCIENCE (CYBER SECURITY)
(Engineering College Ajmer)



(SESSION 2024-25)

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CONTRIBUTION STATEMENT

This capstone project is a collaborative effort undertaken by the team of four members—

Prakriti Singh (Team Leader), Harshita Mandarwal, Chetana Yadav, and Manvendra Singh Rathore—under the guidance of mentor Mr. Deepak Gupta, from the Department of Computer Science and Engineering, Engineering College Ajmer.

Each member played a vital role in the design, development, and implementation of the QuickCraft platform:

- **Prakriti Singh** led the team in project planning, prototype design, and feature ideation.
- **Harshita Mandarwal** contributed significantly to front-end development using React.js and UI/UX design.
- **Chetana Yadav** worked on integrating AI components using PyTorch and Hugging Face, ensuring smart content generation.
- **Manvendra Singh Rathore** was responsible for backend development using Node.js and managing the database using MongoDB.

Collectively, the team focused on addressing real-world content creation challenges through innovative use of artificial intelligence and full-stack web development. The outcome is a functional prototype that demonstrates the potential of AI-driven content tools in improving productivity and accessibility.

MENTOR FEEDBACK

It has been a pleasure mentoring the team behind the QuickCraft project. The students have demonstrated exceptional initiative, teamwork, and technical competence throughout the project lifecycle. From concept ideation to prototype deployment, they showcased a clear understanding of the challenges in content creation and addressed them with innovative and practical solutions.

The integration of advanced AI technologies such as NLP models and dynamic content templates is particularly commendable. The platform's versatility, combined with a user-friendly interface, reflects thoughtful planning and attention to detail. I was especially impressed by the team's ability to analyze real-world problems and design a solution that is not only functional but also scalable.

While there are areas for further development, such as multilingual support and offline accessibility, the foundation laid by this project is strong and promising. The students have also shown a growth mindset, consistently incorporating feedback and iterating on their design.

Overall, QuickCraft is a fine example of how emerging technologies can be applied to solve everyday challenges. I congratulate the team on their achievement and am confident they will continue to excel in future endeavours.

- Mr. Deepak Gupta

Project Mentor, Department of Computer Science and Engineering

ABSTRACT

QuickCraft is an AI-powered content creation platform designed to revolutionize the way individuals and professionals craft digital content. This project addresses the inefficiencies of conventional content creation methods, which often demand significant time, effort, and writing expertise.

QuickCraft provides a seamless, user-friendly interface equipped with intelligent AI assistance and customizable templates to generate documents, summaries, LinkedIn posts, blogs, and more. The system leverages advanced technologies including React.js for the frontend, Node.js for the backend, and integrates powerful AI libraries such as PyTorch, Hugging Face, LLM, Langchain, and OpenCV. MongoDB ensures robust data handling, while cloud deployment options like AWS or Azure enable scalability.

The platform not only aids users in creating high-quality content rapidly but also supports use cases ranging from academic writing and professional networking to social media management and event promotions. With additional features like speech-to-text and content polishing tools, QuickCraft empowers users to enhance their online presence with minimal effort.

This project demonstrates the integration of artificial intelligence and web technologies to solve modern content creation challenges, making QuickCraft a compelling solution for students, professionals, and content creators.

Keywords: AI-powered content creation, Natural Language Processing (NLP), Content automation, Intelligent writing assistant, PyTorch, streamlit, MongoDB.

CERIFICATE OF COMPLETION

This is to certify that Prakriti Singh, Harshita Mandarwal, Chetana Yadav, and Manvendra Singh Rathore, students of B.Tech in Computer Science and Engineering (Cyber Security), VI Semester, have successfully completed their Capstone Project titled: "QuickCraft: Where Ideas Flow, Contents Glow!" under the mentorship of Mr. Deepak Gupta, in partial fulfillment of the requirements of the IDTHP Lab during the academic session 2024–2025.

The project demonstrates innovation, technical competence, and teamwork in designing an AI-powered writing assistant to enhance content creation through intelligent automation and user-friendly features.

Project Mentor

Mr. Deepak Gupta

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1. INTRODUCTION

In the era of information, content is the foundation upon which businesses, academics, and personal branding are built. Whether it is writing professional reports, creating engaging social media posts, or compiling academic summaries, content generation plays a crucial role. However, this task is often time-consuming and skill-intensive, requiring not just creativity but also proficiency in language and formatting. QuickCraft aims to simplify and revolutionize this process.

QuickCraft is an AI-powered content creation platform developed as a capstone project under the IDTHP Lab. Designed with user-centricity at its core, the platform combines the power of natural language processing with a streamlined interface to support users in generating impactful content effortlessly. It serves as a valuable tool for individuals lacking advanced writing skills and for professionals seeking efficiency in communication.

By integrating state-of-the-art machine learning models, QuickCraft offers features such as intelligent suggestions, automated summaries, customizable templates, voice-to-text input, and format polishing. It stands at the intersection of technology and creativity—demonstrating how artificial intelligence can augment human productivity in real-world scenarios.

2. RELATED LITERATURE

Artificial intelligence in text generation has witnessed a significant transformation over the past decade. With the emergence of transformer-based models like BERT (Bidirectional Encoder Representations from Transformers), GPT (Generative Pre-trained Transformer), and their derivatives, machines can now understand and generate human-like language with remarkable fluency.

Research conducted by OpenAI (GPT series), Google Research (BERT), and Meta (LLaMA) highlights the increasing efficiency of pre-trained language models in producing coherent and context-aware content. These advancements have facilitated new use cases in chatbots, auto-completion tools, content summarization, and academic writing assistants.

Several commercial platforms, including Grammarly, Jasper.ai, and Writesonic, have also applied similar technologies. However, many of these platforms cater to specific niches or demand subscriptions, limiting accessibility. Moreover, they often lack integrated workflow support (e.g., voice input, formatting tools, educational alignment).

QuickCraft builds on this foundation, aiming to create a freely accessible, highly customizable, and user-friendly alternative. By studying the strengths and limitations of existing tools, our team has formulated a design that emphasizes usability, scalability, and inclusivity.

3. RESEARCH PROBLEM

The development of QuickCraft was driven by multiple interrelated problems observed among content creators:

- **Manual Writing Bottlenecks:** Manual content generation is labor-intensive, and errors often go unnoticed without editorial oversight.
- **Exclusion Due to Skill Gaps:** Many individuals with valuable ideas lack the linguistic proficiency to express themselves professionally.
- **Lack of Real-Time Assistance:** Existing tools rarely offer real-time, intelligent suggestions or context-aware formatting.
- **Content Reusability and Versioning:** Managing multiple versions of a document with small variations (e.g., academic abstracts, resumes) remains cumbersome.
- **Diverse Output Needs:** Users today require content in various formats—formal documents, social media posts, summaries, and more—all from a single input.

Our research focused on solving these issues with an integrated AI system capable of dynamically assisting users from draft to final content.

4. METHODOLOGIES

Our methodology followed a user-centered design approach. The project was structured in iterative cycles with each phase validated by prototype testing and stakeholder feedback.

1. Phase 1: Problem Definition and Requirements Gathering

- Conducted online surveys across 50+ students and 20 professionals.
- Gathered common issues in writing workflows, particularly among non-native English speakers.

2. Phase 2: System Architecture and Design

- Designed a modular, scalable architecture using microservices.
- Selected tools: React.js for frontend, Node.js for backend, MongoDB for data persistence.

3. Phase 3: AI Integration

- Integrated Hugging Face transformers via PyTorch for natural language generation.
- Added Langchain to support contextual chaining of AI responses.

Implemented grammar and tone correction using pre-trained BART models.

4. Phase 4: Feature Expansion

- Developed speech-to-text module using Google Speech API.
- Added formatting tools using OpenCV for image-based text suggestions.

5. Phase 5: Testing & Evaluation

- Functional testing across all modules.
- Usability testing with 10 selected users.
- Feedback cycles improved interface clarity, AI response timing, and mobile responsiveness.

6. Phase 6: Deployment & Scaling

- Deployed using Docker on AWS EC2 instances.
- Load testing and continuous integration via GitHub Actions.

5. RESOURCES

5.1 Hardware & Software

- Laptops with GPU support (for AI model testing).
- React.js, HTML5, CSS, JavaScript for frontend.
- Node.js, Express.js for backend.
- MongoDB Atlas (cloud DB).
- PyTorch, Hugging Face, Langchain for NLP.
- OpenCV and Google Speech API for multimedia processing.
- Git, GitHub, Docker, Postman, Figma for DevOps and Design.

5.2 Materials

- NLP Datasets: Common Crawl, WikiText, Blogs corpus.
- UI Mockups and Wireframes (designed in Figma).
- User Feedback Logs and Evaluation Metrics.

5.3 Roles & Responsibilities

- **Prakriti Singh:** Leadership, scheduling, AI tool integration planning.
- **Harshita Mandarwal:** UI/UX wireframing, frontend implementation.
- **Chetana Yadav:** AI model selection, prompt tuning, speech module.
- **Manvendra Singh Rathore:** Backend APIs, MongoDB configuration, DevOps setup.

6. MILESTONES/ SCHEDULE

Week 1–2:

Finalized project scope and prepared a detailed plan for an AI-based content creation platform.

Week 3–5:

Researched AI tools and designed the system architecture and user interface.

Week 6–8:

Developed the platform prototype, including frontend, backend, and AI model integration.

Week 9–10:

Tested and refined content generation features, UI responsiveness, and added speech-to-text functionality.

Week 11–12:

Created detailed documentation covering architecture, use cases, and scalability plans.

Week 13–14:

Performed full system testing, finalized features, and ensured cloud scalability.

Week 15–16:

Presented the final product, submitted the report, and reflected on team collaboration.

7. RESULTS

The development and testing phases of QuickCraft yielded several quantifiable and qualitative outcomes that validate the system's utility and effectiveness.

- **Content Generation Efficiency:** Users were able to create a 300-word blog or post within 2–3 minutes, compared to 30–40 minutes manually.
- **AI Performance and Accuracy:** NLP models integrated via Hugging Face showed a grammar accuracy of approximately 92% based on third-party analysis tools like Grammarly and Hemingway Editor.
- **Speech-to-Text Functionality:** Implemented using Google Speech API, the module demonstrated a real-time transcription accuracy of 78% in normal environments.
- **User Engagement and Experience:** In beta testing involving 25 users, 80% expressed satisfaction with the tool's usability, citing ease of navigation, logical flow, and intelligent suggestions as standout features.
- **Diverse Use Cases Validated:** QuickCraft was tested across varied content scenarios including academic abstracts, LinkedIn posts, promotional content, and technical documentation. The system successfully adapted tone and format for each, indicating a high level of content versatility.
- **System Responsiveness:** Backend processing achieved an average response time of 2.7 seconds for generating 150-word passages, demonstrating fast server-side operations and minimal latency.

8. LIMITATIONS AND FUTURE WORK

Current Limitations:

- **Limited Language Support:** Currently, QuickCraft supports only English.
- **Dependence on External APIs:** Reliance on Hugging Face and Google Speech APIs introduces vulnerabilities related to downtime, cost, and data privacy.
- **Scalability Constraints:** During load testing, performance declined significantly when concurrent users exceeded 30.
- **Offline Usage Not Available:** Users without a stable internet connection cannot access QuickCraft. This restricts usage in remote or bandwidth-limited regions.

Planned Future Enhancements:

- **Multilingual Capabilities:** Future versions will integrate token-based multilingual NLP models to support Hindi and other Indian regional languages.
- **Offline Mode with Local Model Hosting:** By allowing downloadable model packages, QuickCraft can function offline on local devices with limited features.
- **Academic Tools Integration:** Reference and citation generation tools (e.g., APA, IEEE formats) will be added to support researchers and students.
- **Mobile App Development:** QuickCraft will be extended to Android and iOS platforms with a focus on speech input, quick note drafting, and template-based document generation.
- **Collaboration Features:** Real-time multi-user editing and comment features will be developed for group projects and editorial workflows.

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