Practical Exposure in Generative AI and Responsible Text Summarization

An Industrial Internship Report Submitted in Partial Fulfillment of the Requirements for the degree of

BACHELOR'S Of TECHNOLOGY

In

Information Technology

Submitted by

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DECLARATION

I, **Divya Shukla**, a student of B.Tech (Information Technology), hereby declare that the report titled **"Practical Exposure in Generative AI and Responsible Text Summarization"** is based on the online specialization course completed by me through **Coursera in collaboration with Google Cloud** during July 2025.

This report, the learning outcomes, and the project implementation work presented herein have been completed by me independently as part of my academic internship requirement. All information, code implementation, and project documentation included in this report are original and have been prepared sincerely for academic submission to the **Department of Information Technology, Goel Institute of Technology and Management, Lucknow**, affiliated to **Dr. A.P.J. Abdul Kalam Technical University**.

September 2025 **Divya Shukla**

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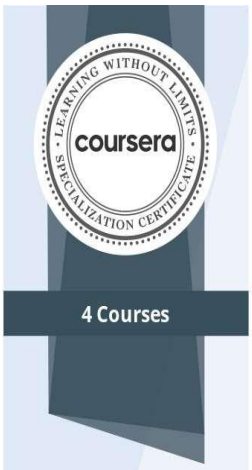
CERTIFICATE



Jul 17, 2025

Google Cloud Training

Divya Shukla

has successfully completed the online, non-credit Specialization

Introduction to Generative AI Learning Path

This learning path offers a comprehensive introduction to generative AI. This specialization explores the foundations of large language models (LLMs), their diverse applications, and the ethical considerations crucial for responsible AI development and deployment.

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at: https://coursera.org/verify/specialization/S3IXIVTIP6OZ

ACKNOWLEDGEMENT

I am deeply grateful to **Coursera** and **Google Cloud** for providing me with the opportunity to complete the specialization **"Intro to Generative AI – A Beginner's Primer on Core Concepts."** This online internship experience allowed me to build valuable knowledge and practical skills in Generative AI, Responsible AI, and Large Language Models.

I sincerely thank the course instructors and experts whose structured curriculum, demonstrations, and explanations helped me gain clarity and confidence in the subject. Their guidance through hands-on assessments, quizzes, and practical resources enabled me to apply concepts effectively and complete my project successfully.

I extend my heartfelt gratitude to the faculty members of **Goel Institute of Technology and Management, Lucknow**, for encouraging me to utilize my summer period productively for skill development. Their support and academic guidance motivated me to pursue this certification and build the Responsible AI Text Summarizer using the Gemini API.

I would also like to acknowledge my peers, friends, and classmates for their suggestions, discussions, and help throughout the duration of this internship. Collaborative learning enhanced my understanding and strengthened my problem-solving abilities.

Finally, I am immensely thankful to my family for their constant motivation, patience, and encouragement. Their belief in my capabilities inspired me to remain consistent, overcome challenges, and successfully complete this internship and project.

TABLE OF CONTENTS

INTRODUCTION

Internships and professional certifications play a crucial role in bridging the gap between academic learning and real-world applications. As a final-year B.Tech student in Information Technology at Goel Institute of Technology and Management, I was required to undergo an internship or equivalent professional learning experience to enhance my technical skills and industry readiness. Instead of pursuing a traditional offline internship, I enrolled in a certified online specialization titled **"Intro to Generative AI – A Beginner's Primer on Core Concepts"**, offered through Coursera in collaboration with Google Cloud.

This specialization consisted of four structured modules:

1. Introduction to Generative AI
2. Introduction to Large Language Models
3. Introduction to Responsible AI
4. Responsible AI: Applying AI Principles with Google Cloud

The course allowed me to gain a deeper understanding of artificial intelligence, particularly emerging concepts related to LLMs and responsible AI practices. Throughout the four modules, I learned how Generative AI models operate, how large-scale neural networks handle natural language, and why ethical considerations in AI use are increasingly essential.

To practically apply my learning, I developed a **Responsible AI Text Summarizer** as part of this internship project. The project uses a Python Flask backend integrated with the Google Gemini API to generate text summaries, and a user-friendly HTML frontend interface for user interaction. This hands-on development experience enabled me to apply theoretical principles such as prompt design, backend-frontend connectivity, and API integration in a practical, working system.

The internship experience not only enhanced my technical proficiency in AI tools and frameworks but also nurtured skills such as problem solving, responsible decision-making, debugging, and requirement analysis. By working on this project, I was able to understand how AI should be implemented carefully and ethically in real-world applications. Overall, this internship experience has prepared me for future industry challenges and strengthened my confidence in pursuing a career aligned with artificial intelligence and software development.

OBJECTIVES OF INTERNSHIP

The primary objectives of my internship were structured to enhance both technical understanding and practical implementation of Generative AI concepts. The internship aimed to bridge the gap between theoretical learning and hands-on development using real industry tools. The key objectives of this internship are as follows:

1. **Understanding Generative AI Concepts** – To develop foundational knowledge of how generative models work, explore their applications, and understand their relevance in real-world scenarios. This included learning about transformer models, neural networks, and text-based generation processes.
2. **Gaining Knowledge of Large Language Models (LLMs)** – To study the role of large-scale AI models, including their training principles, architectures, capabilities, limitations, and responsible use cases in different domains.
3. **Learning Responsible and Ethical AI Practices** – To understand the need for fairness, transparency, accountability, and privacy when building and deploying AI systems. This objective emphasized responsible usage and the avoidance of unsafe or biased outputs.
4. **Applying Theoretical Concepts through Practical Implementation** – To create a working web-based text summarizer using Gemini API, integrating HTML frontend and Python Flask backend, demonstrating the ability to apply knowledge acquired during the course.
5. **Strengthening Technical Development Skills** – To improve core technical skills including API integration, backend development, prompt design, debugging, handling rate limits, and working with external cloud-based AI services.
6. **Enhancing Professional Software Practices** – To adopt good project development habits, such as modular coding, documentation, secure key handling, version management, and iterative testing, preparing for future professional software development roles.

By focusing on these objectives, the internship provided a well-rounded and industry-relevant learning experience that connected academic concepts of Artificial Intelligence with meaningful, real-world implementation.

ABOUT THE COLLEGE

Goel Institute of Technology and Management (GITM), Lucknow, is one of the leading institutes in Uttar Pradesh, dedicated to providing quality education in engineering, management, and computer applications. Since its establishment, GITM has aimed to create a learning environment that fosters academic excellence, innovation, and holistic development of students. The institute is committed to preparing students not only academically but also professionally, equipping them with skills required to succeed in a competitive world.

The **Department of Information Technology** at GITM places strong emphasis on both theoretical knowledge and practical exposure. The curriculum is carefully designed to cover core subjects in depth while also offering students opportunities to work on live projects, participate in internships, and engage in research activities. This approach ensures that students gain hands-on experience and develop problem-solving and analytical skills, which are essential in the rapidly evolving field of information technology.

GITM also encourages students to participate in extracurricular activities, workshops, seminars, and technical events, promoting overall personality development and leadership skills. The faculty members are highly qualified and supportive, providing mentorship and guidance to help students achieve their academic and professional goals.

The **internship program** at GITM is an essential part of the academic curriculum. It is designed to provide students with real-world exposure, enabling them to apply classroom knowledge in professional settings. Through internships, students learn about organizational structures, workflow management, and industry practices, which helps them become industry-ready and confident as they step into their professional careers.

Overall, GITM offers a balanced learning environment that combines quality education, skill development, and practical exposure, ensuring that students are well-prepared for both higher studies and professional challenges.

ABOUT THE ORGANIZATION

Coursera is a globally recognized online learning platform that provides high-quality, flexible, and industry-relevant education. It collaborates with leading universities and technology organizations to offer professional certificates, specializations, and degree programs accessible to learners worldwide. Coursera's mission is to equip individuals with practical skills required for workforce readiness and career advancement.

As part of its commitment to emerging technologies, Coursera partners with Google Cloud to deliver training programs in Generative AI and Responsible AI. Google Cloud contributes hands-on labs, expert guidance, and responsible AI principles to ensure safe, ethical, and transparent AI application.

The specialization I completed—**"Intro to Generative AI: A Beginner's Primer on Core Concepts"**—included four modules covering Generative AI fundamentals, Large Language Models, responsible AI concepts, and applying ethical AI development practices. These modules helped strengthen conceptual understanding and develop practical skills in modern AI systems.

Key focus areas of Coursera include accessible online education, collaboration with industry leaders, skill-oriented learning experiences, digital innovation, and verified certification to validate acquired competencies.

Coursera acted as the digital training platform throughout my internship experience, providing structured course content, assessments, and learning resources. Through this internship, I gained exposure to responsible AI practices, foundational LLM concepts, and real-world application development, culminating in the creation of the Responsible AI Text Summarizer using the Gemini API.

INTERNSHIP STRUCTURE AND DURATION

- **Duration:** 1 Month (July 2025)
- **Mode:** Remote
- **Learning Hours:** Approximately 10 hours per week

The internship through Coursera was structured to provide a complete learning experience by integrating conceptual understanding of AI systems with hands-on project implementation. The curriculum was designed in alignment with Google Cloud's Responsible AI principles, allowing learners to gradually build skills from foundational knowledge to practical development. The flexible remote format provided the freedom to manage coursework and project development efficiently alongside academic responsibilities.

The internship consisted of structured modules, assessments, and an applied project, enabling a step-by-step transition from theory to implementation. The weekly structure facilitated continuous learning and ensured the gradual progression of technical concepts required for the final project.

During the internship period, my work progressed across four consecutive modules:

1. **Introduction to Generative AI** – Understanding model fundamentals, generative concepts, and applications.
2. **Introduction to Large Language Models** – Learning about LLM architectures, capabilities, limitations, and responsible AI implications.
3. **Introduction to Responsible AI** – Exploring fairness, transparency, accountability, and bias mitigation in AI systems.
4. **Responsible AI: Applying AI Principles** – Implementing safe AI usage practices and completing a hands-on technical project integrating Gemini API with a Flask backend and HTML interface.

Through this structured learning pathway, I gained exposure to AI development workflows, model behaviour, and responsible usage, enabling me to design and implement a working text summarizer application adhering to ethical AI principles.

ROLES AND RESPONSIBILITIES

During my internship, I completed a structured online specialization titled **"Intro to Generative AI – A Beginner's Primer on Core Concepts"** through Coursera in collaboration with Google Cloud. The internship required consistent learning and practical implementation aligned with responsible AI principles.

My primary roles and responsibilities were:

1. Completing Structured Course Modules & Assessments

- Attending online video lectures
- Participating in learning activities
- Completing quizzes and checkpoints
- Taking notes and maintaining learning logs
- Reviewing supplementary material

2. Understanding Generative AI and Large Language Models

- Studied transformer architecture fundamentals
- Learned how LLMs generate text
- Understood dataset training challenges
- Explored applications of generative models

3. Learning Responsible AI Principles

- Understood bias, fairness, and model transparency
- Studied ethical deployment guidelines
- Learned safety concerns in AI outputs

4. Developing the Final AI Project (Responsible Text Summarizer)

- Designed a simple frontend using HTML
- Developed backend using Python Flask
- Integrated Google Gemini model using API
- Connected form input→backend→AI inference→output
- Handled API errors, rate limits, and unexpected responses

5. Testing, Debugging & Validating Outputs

- Tested summarizer using multiple text samples
- Improved prompts to generate concise safe outputs
- Verified ethical output generation
- Handled cases where model generated lengthy or unsafe responses

SKILLS GAINED

Technical Skills

- Gained foundational understanding of **Generative AI concepts**, including transformer-based models and neural text generation.
- Learned the fundamentals of **Large Language Models (LLMs)** and how they process, tokenize, and generate text.
- Developed practical skills in **API integration**, connecting a Python backend to the Gemini AI model.
- Built a fully working backend using **Flask**, handling routes, requests, and dynamic responses.
- Designed a user interface using **HTML and CSS**, connecting forms to backend logic properly.
- Acquired experience in **prompt engineering**, controlling summarization behavior and avoiding repetitive outputs.
- Implemented responsible AI constraints, including minimal filtering for unsafe or biased outputs.

Soft Skills

- Improved **analytical and problem-solving abilities** while debugging model and API issues.
- Strengthened **self-directed learning**, adapting independently to unfamiliar technologies and documentation.
- Developed **time management skills** to complete modules and project development within a short period.
- Enhanced **attention to detail**, especially during testing, debugging, and handling text responses.

Professional Skills

- Learned to work in a structured, goal-oriented workflow through scheduled module completion.
- Improved ability to create professional **technical documentation** for project workflows and reports.
- Practiced ethical responsibility in AI deployment, focusing on safe output generation.
- Understood the importance of version control, modular coding, project reproducibility, and secure key handling.

CHALLENGES FACED AND SOLUTIONS

During my Coursera specialization on Generative AI and the development of the Responsible AI Text Summarizer project, I faced several challenges that helped me strengthen both conceptual understanding and technical application skills.

One of the first challenges was understanding core concepts such as Large Language Models, transformer architecture, and responsible AI principles. Initially, these topics felt complex because they involve abstract and advanced techniques. By revisiting lectures, referring to external documentation, and experimenting with examples, I was able to gradually clarify these concepts and develop confidence.

Another challenge arose while integrating the Gemini API into the Python Flask backend. Issues such as authentication errors, incorrect request structures, and unexpected responses made the development process difficult. I learned to use environment variables for secure key handling, consulted API documentation, and tested different request formats until stable communication was achieved.

Managing rate limits and API quota exhaustion was also a recurring obstacle. These errors interrupted testing and development. To overcome this, I optimized request frequency, avoided repeated calls, and switched to lighter models when necessary.

Connecting the frontend HTML form with the backend logic introduced additional difficulties, including handling POST requests and rendering results. Debugging the routes and validating user data flow helped resolve the errors and improved understanding of backend–frontend integration.

Time constraints also posed a challenge since I had to complete four learning modules and build the final project within one month. Creating a weekly study schedule, setting achievable milestones, and prioritizing core tasks helped me meet deadlines effectively.

These challenges improved my problem-solving abilities, debugging skills, structured planning, and understanding of responsible AI development. The experience strengthened both my technical and professional abilities, making the internship a meaningful and productive learning experience.

OBSERVATIONS AND KEY LEARNINGS

During the internship through Coursera and the development of the Responsible AI Text Summarizer project, I gained several important insights related to Generative AI concepts, responsible AI principles, and practical software development.

One key observation was that Generative AI models, particularly Large Language Models, behave differently depending on the prompt structure, context length, and instruction clarity. Small changes in the prompt resulted in noticeably different outputs, highlighting the importance of prompt engineering when building text-based applications.

I also observed that responsible use of AI is essential, especially when deploying systems that interact with real users. Ensuring that generated responses avoid bias, harmful language, and text repetition requires conscious implementation decisions. Techniques such as safety filtering, output length constraints, and ethical prompts proved valuable in maintaining responsible output behavior.

Additionally, integrating APIs in a web application workflow reinforced the importance of secure key handling and backend–frontend communication. The use of environment variables, Flask routing, HTML form handling, and basic web UI design helped strengthen my understanding of full-stack development on a smaller scale.

A major learning was recognizing the difference between theoretical AI concepts taught in coursework and practical implementation difficulties encountered during development. Debugging API responses, testing multiple input cases, handling quota errors, and validating summary quality deepened my understanding of real-world AI deployment challenges.

Finally, time management, self-learning discipline, and adapting to documentation-based guidance were fundamental soft skills developed during this internship. Successfully completing the modules and project within a limited timeframe taught me how to schedule work, break tasks into milestones, and maintain consistent progress.

Overall, the internship helped me build practical skills in AI application development, enhanced responsible AI awareness, and strengthened my readiness for future professional work and research in artificial intelligence.

FUTURE SCOPE AND RECOMMENDATIONS

The Responsible AI Text Summarizer developed during this internship demonstrates how Generative AI can be applied responsibly in text processing tasks. Although the current system successfully summarizes user-entered input through a simple web interface, there are several areas where the project can be enhanced and scaled for future use.

A major scope for improvement lies in expanding the summarizer to support multiple input formats such as PDF, Word documents, and online article URLs. This would make the application more useful for students, professionals, and researchers who frequently work with large textual content. The system could also include multilingual summarization to support diverse language users, increasing accessibility for a wider audience.

Another opportunity for enhancement is deploying the application online using cloud-based hosting frameworks. This would allow users to access the summarizer remotely instead of running it locally, enabling real-time use at scale. Integrating user authentication and usage tracking would help maintain security and responsible usage of the AI model.

The summarizer could be improved further by incorporating more advanced responsible AI safeguards, including toxicity detection, bias checks, and safety-score evaluation. These additions would ensure that the generated summaries adhere to ethical standards and prevent harmful or biased content from being displayed to users.

From a performance perspective, prompt optimization, caching repeated queries, and fallback models could reduce cost and prevent API rate limit issues. A hybrid summarization approach that combines extractive and abstractive techniques may further improve output accuracy and consistency.

In conclusion, continued development of this project can transform it into a more robust responsible-AI application. Expanding features, strengthening safety mechanisms, and deploying at scale will enhance usability and reliability, making the system valuable for academic, professional, and research-oriented use.

CONCLUSION

The completion of the Coursera specialization on Generative AI, followed by the development of the Responsible AI Text Summarizer project, provided a valuable and comprehensive learning experience. Through the four structured modules, I gained foundational knowledge of Generative AI, Large Language Models, and Responsible AI principles. The internship helped me understand not only how AI systems generate text, but also why ethical considerations, safety filters, and accountability are essential when deploying such models in real environments.

Building the text summarizer using Python, Flask, HTML, and the Gemini API enabled me to apply theoretical concepts in a practical implementation. The designing of prompts, handling API communication, debugging rate-limit issues, and managing frontend–backend connectivity strengthened my technical skills and improved my problem-solving ability. Moreover, the experience reinforced key professional skills such as planning, time management, and documentation-based self-learning.

This internship successfully bridged the gap between classroom learning and real-world development workflows. It provided exposure to industry-relevant tools and modern AI practices, preparing me for future opportunities in AI-enabled applications, research, or advanced learning. Overall, the internship and project experience significantly contributed to my career growth and enhanced my confidence in working with responsible AI technologies.

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