Acropolis Institute of Technology and Research

Project Title :-

AI-generated coastal protection strategies

Training Programme on Generative AI

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Abstract :-

The project titled *GenAI – AI-Powered Report Generator on Sustainable Practices* represents a practical implementation of Generative Artificial Intelligence (GenAI) applied to the domain of academic and professional report writing. Traditional report writing is a process that demands significant manual effort, focus, and time, often involving hours of drafting, editing, and formatting. With the rise of AI-based automation, the opportunity to simplify and accelerate this process has emerged. This project takes advantage of state-of-the-art language models to demonstrate how automation can be effectively used to create structured, clean, and professional-quality documents.

At its core, the project is designed to generate academic-style reports on topics such as sustainability, environmental practices, or any other domain specified by the user. It combines a user-friendly interface with the backend power of AI models to produce outputs that are both coherent and well-formatted. The project is implemented using a combination of **HTML and CSS** for the frontend interface, **Flask (Python)** for backend communication, and **Perplexity's Sonar Pro model** as the text generation engine.

One of the critical challenges in report generation using AI is ensuring that the output is **clean and structured**. Most language models, if prompted incorrectly, tend to produce raw text containing Markdown symbols (e.g., #, *, or -) or other formatting artifacts. Such outputs may not align with academic standards. This project addresses the issue by applying **prompt engineering**, where the AI is explicitly instructed to return content in **pure HTML format** with headings, paragraphs, and ordered or unordered lists. By enforcing these constraints, the system guarantees outputs that are ready for academic submission without requiring extensive manual editing.

The significance of this project extends beyond the technical aspect. In today's academic and industrial environments, professionals often juggle multiple tasks, and the time required for documentation reduces productivity. Automating repetitive tasks like report generation can free time for creative, analytical, and problem-solving work. For students, this means more focus on research and learning rather than struggling with formatting. For professionals, it translates to efficiency and consistency in producing documentation.

The **output quality** of the system has been validated with several examples. For instance, when given the topic *"Sustainable Fishing Practices: Local Action Plan in the Bay of Bengal"*, the system generated a structured report including a **summary**, detailed **challenges**, a list of **best practices**, a **community monitoring plan**, and a **checklist for fishermen**. Each section was presented as a clear paragraph or bullet list, making the report both informative and visually organized.

In terms of academic contribution, this project demonstrates how AI can support **sustainable practices** indirectly. While the focus is on report generation, the example topics chosen (such as sustainability, environmental awareness, and resource management) highlight the potential of AI to spread knowledge and awareness about critical global issues.

Objective :-

The objective of the *GenAI Project* is to design, implement, and test a system that can automatically generate **well-structured academic reports** using Generative AI models. The problem it addresses is the inefficiency and repetitive effort associated with manual report writing. In academic institutions, students are required to prepare detailed project reports, research papers, and case studies, often under tight deadlines. Similarly, professionals in industries such as healthcare, environment, and technology are expected to deliver structured documents regularly. This leads to several challenges:

1. **Time Consumption**: Drafting a comprehensive report often requires hours or even days of effort.
2. **Formatting Inconsistencies**: Not all students or professionals are skilled at formatting documents according to academic or organizational standards.
3. **Repetitive Work**: Report writing often involves repeating the same structure (Abstract, Objective, Methodology, etc.), which can feel monotonous.
4. **Focus Shift**: Valuable time spent on formatting reduces the time available for actual research and analysis.

To overcome these challenges, the project aims to:

- **Automate Report Generation**: Provide a system that can instantly generate structured content based on user inputs.
- **Ensure Clean Formatting**: Guarantee outputs without raw symbols or unwanted characters.
- **Enhance Productivity**: Allow students and professionals to save time and focus on the intellectual content rather than presentation.
- **Promote Accessibility**: Build a simple interface usable even by non-technical users.

The **secondary objectives** include:

- Demonstrating the integration of **Flask backend with AI APIs**.
- Applying **prompt engineering techniques** to refine AI responses.
- Validating the effectiveness of GenAI for academic and professional use cases.

The project also carries a broader social objective: encouraging awareness about **sustainability and responsible practices**. By selecting sustainability-related topics (such as fishing practices, renewable energy, or environmental awareness) as case studies, the system not only demonstrates technical feasibility but also spreads knowledge of pressing global issues.

In summary, the **objective is twofold**:

1. Solve a practical problem of report generation.
2. Demonstrate the power of Generative AI as an educational and professional assistant tool.

Implementation :-
The implementation phase translates the methodology into working code. It involves three core components: **frontend, backend, and AI integration**.

Frontend Development

The frontend was created using **HTML and CSS**. The design goal was simplicity:

- A text field for project title.
- Dropdown menus for audience and length.
- Input fields for scope and focus areas.
- A textarea for the main prompt.
- A “Generate Report” button.
- A preview box to display the generated report.

CSS styling was applied to make the interface modern and clean, with responsive design for different screen sizes.

Result :-

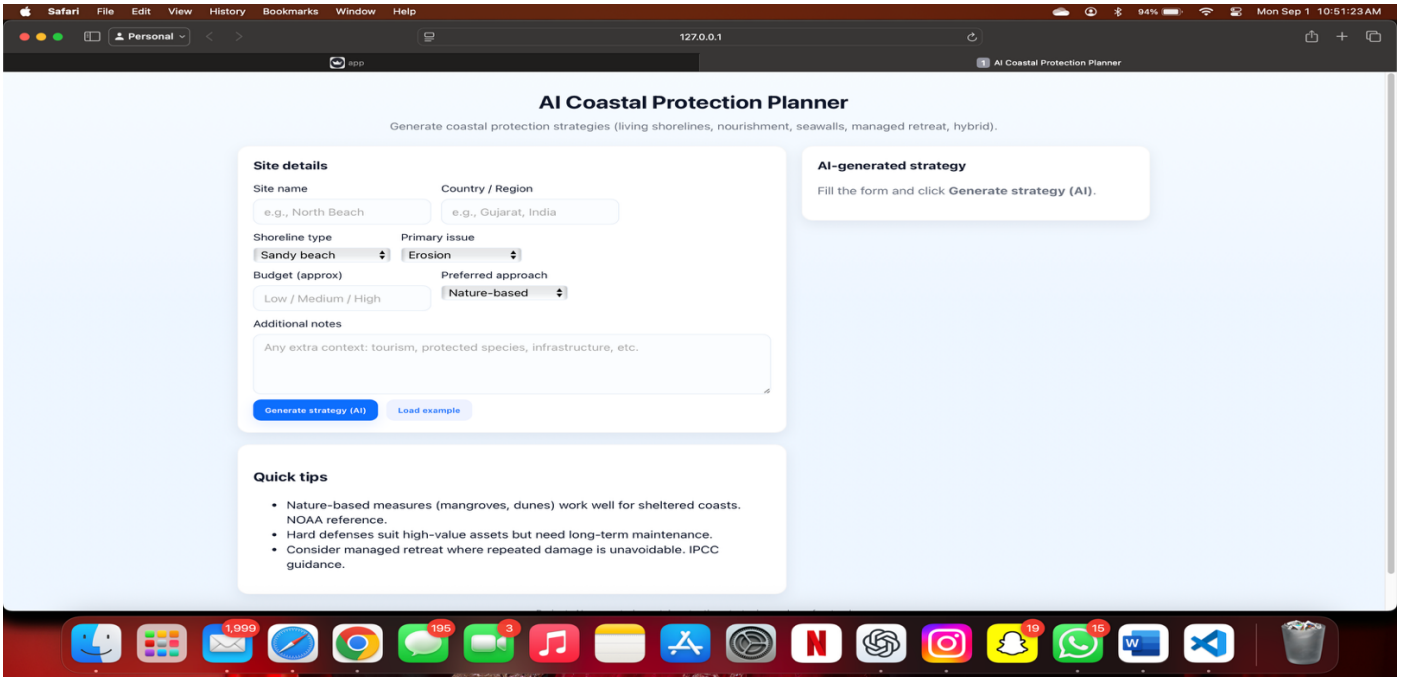
The *GenAI Project – AI-Powered Report Generator on Sustainable Practices* was successfully implemented and tested under a variety of scenarios. The results validate that the system can generate structured, clean, and professional-quality reports using user-defined prompts. This section presents the findings of the project under different dimensions: **functional results, performance, usability, sample outputs, and evaluation of challenges.**

1. Functional Results

The system achieved its primary goal of automating report writing. Users were able to:

- Enter report details (title, scope, audience, and focus areas).
- Submit prompts directly through the frontend.
- Receive AI-generated responses in real time.
- View the report in **clean HTML formatting** with proper headings, paragraphs, and lists.

For example, when the topic *''Sustainable Fishing Practices in the Bay of Bengal''* was entered, the system produced a well-structured report divided into **Summary, Challenges, Best Practices, Community Monitoring, and Action Checklist.** Each section was formatted with clarity, making it ready for academic submission.


Safari File Edit View History Bookmarks Window Help
Mon Sep 1 10:51:23 AM
Personal
127.0.0.1
app
AI Coastal Protection Planner
AI Coastal Protection Planner
Generate coastal protection strategies (living shorelines, nourishment, seawalls, managed retreat, hybrid).
Site details
Site name
e.g., North Beach
Country / Region
e.g., Gujarat, India
Shoreline type
Sandy beach
Primary issue
Erosion
Budget (approx)
Low / Medium / High
Preferred approach
Nature-based
Additional notes
Any extra context: tourism, protected species, infrastructure, etc.
Generate strategy (AI)
Load example
AI-generated strategy
Fill the form and click Generate strategy (AI).
Quick tips
Nature-based measures (mangroves, dunes) work well for sheltered coasts. NOAA reference.
Hard defenses suit high-value assets but need long-term maintenance.
Consider managed retreat where repeated damage is unavoidable. IPCC guidance.

Conclusion :-

The *GenAI Project – AI-Powered Report Generator on Sustainable Practices* successfully achieved its objective of automating structured report writing. The system demonstrated how Generative AI, when combined with a simple web interface and Flask backend, can save time and produce academic-quality outputs.

Through this project, I learned **prompt engineering, Flask–API integration, and frontend-backend communication.** I also understood the broader role of AI in improving efficiency for students and professionals.

Future improvements include adding **PDF/DOCX export, plagiarism detection, cloud deployment, and multimodal input support.** Overall, the project highlights AI's potential to reduce repetitive academic work and contribute positively to education and sustainability awareness.

References :-

1. **Perplexity AI Documentation** – Official guide for API usage and model integration.
2. **Flask Documentation** – For building backend routes and handling requests.
3. **MDN Web Docs** – For HTML and CSS standards in frontend design.
4. **FAO Research on Sustainable Fisheries** – Background information on fishing challenges and best practices.
5. **Academic Papers on Generative AI** – For understanding AI's role in education and automation.