

M.KUMARASAMY COLLEGE OF ENGINEERING , DEPT OF AIDS – B.TECH

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AGC1361 - Agile Methodology - Review 2

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NEXT-GEN TARGET MARKETING: REAL-TIME EMOTION-AWARE AD CREATION

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Objectives

The primary objective of the project is

- AI-Powered Ad Generation
- Intelligent Campaign Management
- Real-Time Analytics & Insights
- Modern User Experience

Expected Outcomes:

- Democratize professional advertising
- Improve marketing ROI
- Showcase full-stack expertise

Introduction

- NextGen Ads is an AI-powered advertising platform that transforms how businesses create and manage digital marketing campaigns.
- By leveraging artificial intelligence, our platform automates ad content generation, provides intelligent multi-platform campaign management, and delivers real-time analytics.
- Built with modern technologies like NextJS, FastAPI and MongoDB, it shows professional advertising by reducing creation time from weeks to minutes, enabling businesses of all sizes to compete effectively while maximizing their marketing ROI through AI-driven personalization and optimization.

Literature Review Contd..

Year	Authors	Title of the Paper	Algorithm/ Methodologies/ Techniques	Merits	Demerits
2025	Ma Xinyuan	Emotion-Driven Marketing: An Analysis of Brand's Using Emotional Stimulation to Promote Consumption	Theoretical/empirical analysis of brands using emotional stimuli in advertising (narrative, color, story)	Connects emotion stimulation to consumption behaviour; shows real brand examples and emotional arousal models.	Does not integrate ML or real-time detection; more traditional marketing lens than algorithmic.
2025	Tri Wahyudi	Exploring Emotional and Ethical Experiences of AI-Personalized Advertising Among Social Media Users”	Qualitative study; examines emotional & ethical responses of users exposed to AI-personalized ads	Highlights the emotional side of personalized advertising—how users feel monitored, ambivalent, or intimate with algorithmic delivery.	Does not propose technical model; more phenomenological than algorithmic; cultural/geographic scope limited.

Literature Review

Year	Authors	Title of the Paper	Algorithm/ Methodologies/ Techniques	Merits	Demerits
2024	García-Hernández R. A., Luna-García H., et al.	A Systematic Literature Review of Modalities, Trends, and Limitations in Emotion Recognition, Affective Computing, and Sentiment Analysis	Systematic review; categorizes unimodal vs multimodal emotion recognition (e.g., text, audio, visuals, physiological)	Establishes broad landscape of emotion recognition research; emphasizes need for multimodal approaches.	Does not focus specifically on advertising or ad delivery; higher level than implementation in marketing campaigns.
2024	Zhang Y., Chen M., Wang R.	Emotion Recognition in Consumers Based on Deep Learning and Image Processing: Applications in Advertising	Deep learning + image processing for consumer emotion recognition; links results to adjusting ad content and strategy.	Bridges technical emotion detection methods with marketing/advertising strategy; shows actionable insight for ad content adjustment.	Practical deployment and scale may be not fully addressed; may not include full real-time adaptive ad system.

Literature Review Contd..

Year	Authors	Title of the Paper	Algorithm/ Methodologies/ Techniques	Merits	Demerits
2022	Caruelle D., Shams P., Gustafsson A. et al.	Affective Computing in Marketing: Practical Implications and Research Opportunities Afforded by Emotionally Intelligent Machines	Review of affective-computing in marketing; machines detecting/responding to human emotions.	Highlights how emotion-intelligent machines can transform marketing tasks; identifies opportunities for emotional personalization.	Still early stage in many marketing applications; lacks large scale empirical results in real-ad systems.
2017, 2019	Shukla A., Gullapuram S., Kankanhalli M., et al.	“Affect Recognition in Ads with Application to Computational Advertising” (2017); “Recognition of Advertisement Emotions with Application to Computational Advertising” (2019)	Multimodal emotion recognition in ads: visual/audio features, CNNs, EEG signals; multi-task learning; dataset of ads labelled for emotions.	Demonstrates effectiveness of content + user physiological signals for ad emotion recognition; shows direct application to ad placement.	Datasets fairly small; limited real-world deployment; focus on insertion in video streams, not full ad recommendation systems.

Identification of Problem & Analysis

- Small and Medium Businesses (SMBs) cannot afford expensive advertising agencies or complex enterprise marketing software.
- Creating effective, personalized ads is slow, requires constant A/B testing and often results in poor performance due to low relevance.
- Marketers struggle in using multiple tools for content creation, campaign management and analytics, leading to inefficiency and errors.

Our Analysis

- **The Gap:** There is a critical market gap for an integrated, affordable, and AI-driven platform that can power professional ad creation.
- **The Opportunity:** Leveraging Generative AI (LLMs) to automate content creation is the most efficient way to close this gap and deliver highly personalized ad copy at scale.

Existing System

- **Simple Template-Based:** Existing tools often use static templates and simple keyword substitution, lacking deep contextual understanding.
- **Lack of Integration:** Campaign management tools are separate from content creation tools, requiring manual data transfer.
- **Post-Hoc Optimization:** Analytics are often delayed, providing insights *after* campaigns have already wasted budget, rather than enabling real-time adjustments.
- **Focus on Experts:** Current enterprise is often overly complicated and expensive, limiting access for small business owners and content creators.

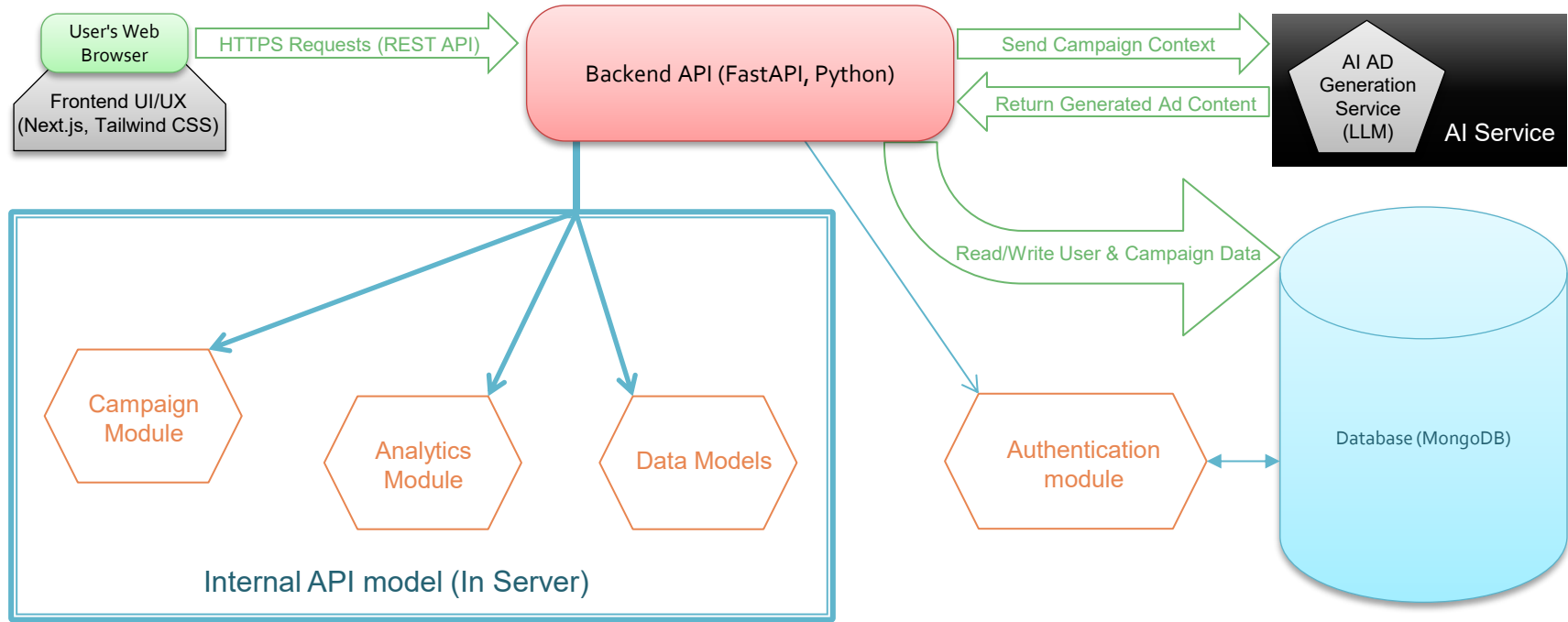
Comparison

Feature	Existing Systems	NextGen Ads (Proposed)
Ad Creation	Manual, Template-Driven, Keyword-Based	AI-Driven , Context-Aware
Optimization	Post-Campaign Analysis (Slow)	Real-Time Analytics , Data-Driven Reporting
Platform	Fragmented Tools, High Cost	Unified Dashboard , Cost-Effective
User Experience	Complex, Cluttered Enterprise UIs	Beautiful UI/UX Intuitive Design
Data Use	Static Segments, Delayed Insights	Real-Time Metrics

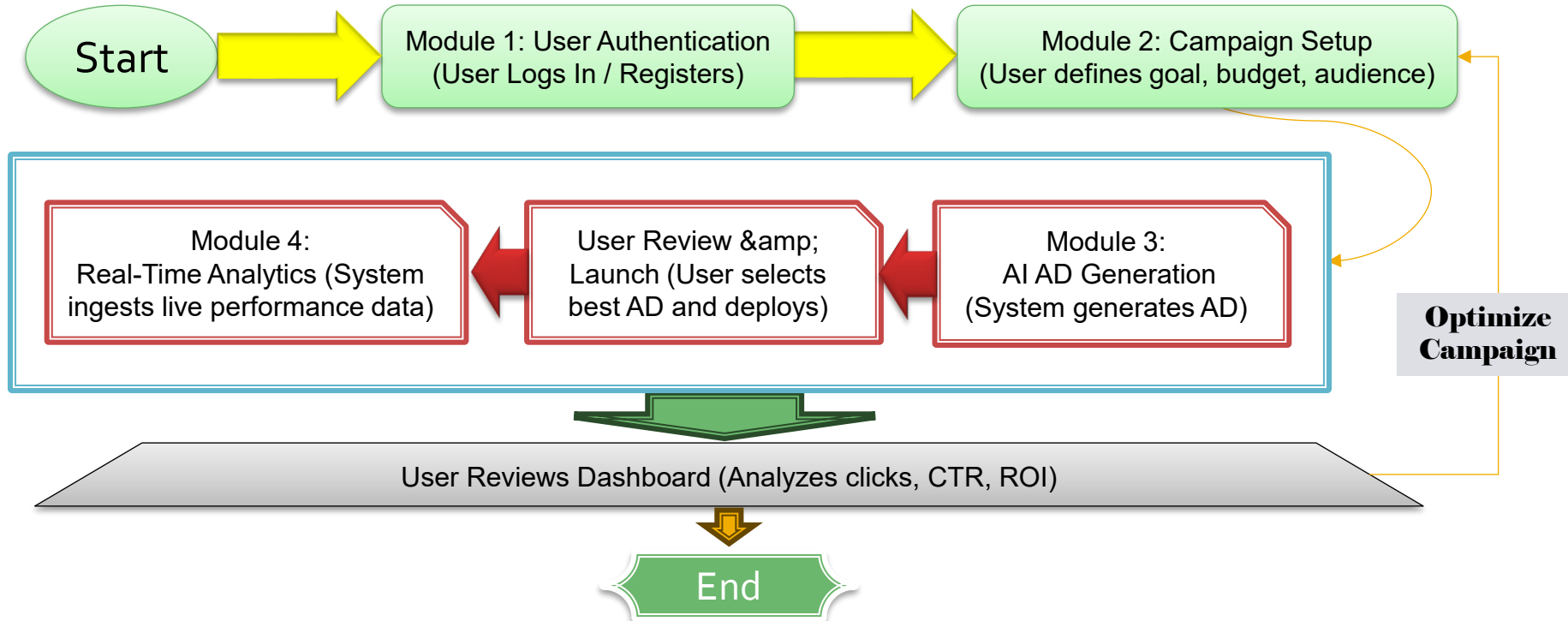
Proposed System

Component	Technology	Function
Frontend (UI/UX)	NextJS, TypeScript, Tailwind CSS	Provides a responsive, intuitive and visually stunning user interface (Dark/Light Mode).
Backend (API)	FastAPI (Python)	High-performance, secure core API for data handling, business logic and third-party integrations.
Database	MongoDB (NoSQL)	Flexible, scalable storage for user data, campaign details and high-velocity analytics data.
AI/ML Service	LLMs (e.g., Gemini, Opal)	Dedicated service for prompt engineering, generating ad content and future budget optimization.

Proposed System Architecture



Methodology of Proposed Work



Innovativeness

- **Generative Ad Creation (LLM-in-the-Loop):** Generating actual, ready-to-use ad content (visual concepts) instead of just generic templates.
- **Focus on Design Excellence:** Prioritizing a modern, beautiful UI/UX to make a powerful tool feel simple and accessible.
- **Scalable Microservice Design:** Separating the Core AI Service and Real-Time Analytics into distinct, optimized components.

Novelty in Research Proposal

- The novelty lies not in inventing a new algorithm, but in the **integrated, production-ready application of modern Generative AI and full-stack architecture** to solve a real-world business problems.
- **Full-Stack Collaboration:** Building a seamless, end-to-end system where the UI, API, database and AI work together perfectly.
- **Conversion-Centric AI:** The AI model is engineered to generate copy that is directly optimized for user goals (clicks, sign-ups) based on campaign context, rather than simple academic text generation.
- **Demonstration of Development:** The project uses advanced patterns like FastAPI and dedicated MongoDB schemas, reflecting industry standards.

Software & Hardware Requirements Specification

HARDWARE REQUIREMENTS

Processor	: Intel Core i7 or AMD Ryzen 7
RAM	: 32 GB or more
Hard disk	: 512 GB SSD or higher
Graphics Card	: 48GB VRAM Dedicated GPU (RTX 5090)
OS	: Windows 11 / Linux

Software & Hardware Requirements Specification

SOFTWARE REQUIREMENTS

Language	:	NextJs, Nodejs, Python 3.11+
Database	:	MongoDB
Tools	:	n8n, Google ADK, Google Opal

List of Modules

- User & Authentication Module
- Campaign Management Module
- AI Ad Generation Service Module
- Real-Time Analytics Module
- Data Models & Schemas Module
- Frontend UI/UX Module

Plan of Work Completion


- Phase 1: Planning and Setup
- Phase 2: Backend Core
- Phase 3: Frontend MVP
- Phase 4: Testing
- Phase 5: Analytic

Summary of Module -1

User & Authentication Module

- **Module Goal:** Securely manage all platform users.
- **Key Functionality:**
 - Handles User Registration and Login.
 - Third Party Websites Authentication.
 - Manages User Profiles and Account Settings.
 - Uses **JWT (JSON Web Tokens)** for stateless, secure API access.

Module 1 Demonstration

 **Next Gen Target Marketing**

Welcome Back


Sign in to your account to continue creating AI-powered ads


Email

Password

Sign In


OR CONTINUE WITH

 Google

 LinkedIn

[Forgot your password?](#)

Don't have an account? [Sign up](#)

 **Next Gen Target Marketing**

Create Your Account

Join thousands of marketers creating AI-powered advertisements

First Name

Last Name

Work Email

Role

Select your role

Company (Optional)


Password


☐ I agree to the [Terms of Service](#)

☐ I understand how my data will be used for AI ad personalization as described in the [Privacy Policy](#)

Create Account

OR CONTINUE WITH

 Google

 LinkedIn

Module 1 - Results & Discussion

- **Expected Result:** Fully secured platform where every API request is authenticated.
- **Discussion / Impact:**
 - **Essential Security:** Establishes a professional security boundary, necessary for any commercial system.
 - **Reliability:** Guarantees data integrity and personalized user access control.

Summary of Module -2

Campaign Management Module

- **Module Goal:** Central hub for all ad campaigns.
- **Key Functionality:**
 - Allows users to **Create, Read, Update, and Delete (CRUD)** campaigns.
 - Stores crucial data: Target Audience, Budget, and Campaign Goal.
 - Feeds data to the AI service for ad creation.

Module 2 Demonstration

Alpha Creators

Main

Dashboard

AI Generator

Campaigns

Analytics

Account

Profile

Settings

Help

John Doe

Pro Plan

Sign Out

Campaign Manager

Manage and monitor your AI-powered advertising campaigns

New Campaign

Total Campaigns

5

2 active

Total Ads

61

+12 this week

Total Spend

\$13.2K

This month

Total Reach

245K

Unique users

Search campaigns...

Filter

All Campaigns

Campaign	Status	Ads	Spend	CTR	Conv.	Reach	Modified	Actions
<div>Summer Sale Blitz</div> <div>Sales • Created 15/01/2024</div>	Active	15	\$2,847	8.7%	234	45.2K	2 hours ago	<div></div> <div></div>
<div>Brand Awareness Q1</div> <div>Awareness • Created 10/01/2024</div>	Active	8	\$1,230	6.2%	89	78.1K	1 day ago	<div></div> <div></div>
<div>Product Launch Campaign</div> <div>Lead Generation • Created 05/01/2024</div>	Paused	12	\$3,456	9.1%	345	32.7K	3 days ago	<div></div> <div></div>

Module 2 - Results & Discussion

- **Expected Result:** A clean, organized dashboard showing all campaign statuses.
- **Discussion / Impact:**
 - **Context Backbone:** Provides the necessary **contextual data** to the AI, ensuring personalized ad generation.
 - **Workflow Centralization:** Simplifies the entire ad setup process, eliminating external tools.

Summary of Module -3

- **Module Goal:** Automate the writing and ideation of advertisements.
- **Key Functionality:**
 - **Prompt Engineering:** Converts user input data into advanced prompts for the Large Language Model (LLM).
 - Generates multiple optimized Visual Concepts.
 - Runs as a dedicated service to ensure high performance.

Module 3 Demonstration

Personal / Next Gen Target Marketing + Add tag

1/2 Active Share Saved ... Star 155,718

Executions

Auto refresh

Nov 12, 23:55:18
Succeeded in 3.356s

Nov 12, 23:51:44
Succeeded in 3.817s

Nov 12, 23:51:29
Succeeded in 33ms

Nov 12, 23:50:29
Succeeded in 2.989s

Nov 12, 23:48:04
Succeeded in 3.493s

Nov 12, 23:47:56
Succeeded in 34ms

Nov 12, 23:47:40
Error in 2.039s

Nov 12, 23:47:05
Succeeded in 36ms

Editor Executions Evaluations

Nov 12, 23:55:18
Succeeded in 3.356s | ID#109

```
graph LR; Webhook[Webhook] -- "1 item" --> AI_Agent[AI Agent]; AI_Agent -- "1 item" --> Edit_Fields[Edit Fields manual]; Edit_Fields -- "1 item" --> Respond_to_Webhook[Respond to Webhook]; AI_Agent --- Chat_Model[Chat Model]; AI_Agent --- Memory[Memory]; AI_Agent --- Tool[Tool]; Chat_Model --- Gemini_Model[Google Gemini Chat Model];
```

Logs

Success in 3.356s | 256 Tokens

Webhook

AI Agent

Google Gemini Chat M...

Edit Fields

Respond to Webhook

Respond to Webhook: Success in 2ms

Input Output ...

OUTPUT

Input Data (1 item) Response (1 item)

cleanPrompt

A sun-drenched, wide-angle shot captures a fluffy golden retriever puppy, no older than 10 weeks, bounding joyfully through a vibrant meadow teeming with wildflowers in full bloom. The flowers, a kaleidoscope of crimson poppies, azure cornflowers, and sunny yellow buttercups, sway gently in a light breeze. The puppy's fur shimmers with a golden sheen as it leaps and pounces, its ears flopping with each playful movement. Focus is razor-sharp on the puppy's expressive eyes, reflecting the pure joy of the moment, while the background is softly blurred, creating a bokeh effect from the dappled sunlight filtering through distant trees. The overall aesthetic is warm and inviting, reminiscent of a classic impressionist painting, with hyperrealistic details such as individual blades of grass and pollen clinging to the puppy's nose. The color palette is rich and saturated, evoking a feeling of blissful summer days and carefree abandon, presented in a cinematic 8K resolution.

AGC1361 - AGILE METHODOLOGY – REVIEW 2

27

Module 3 - Results & Discussion

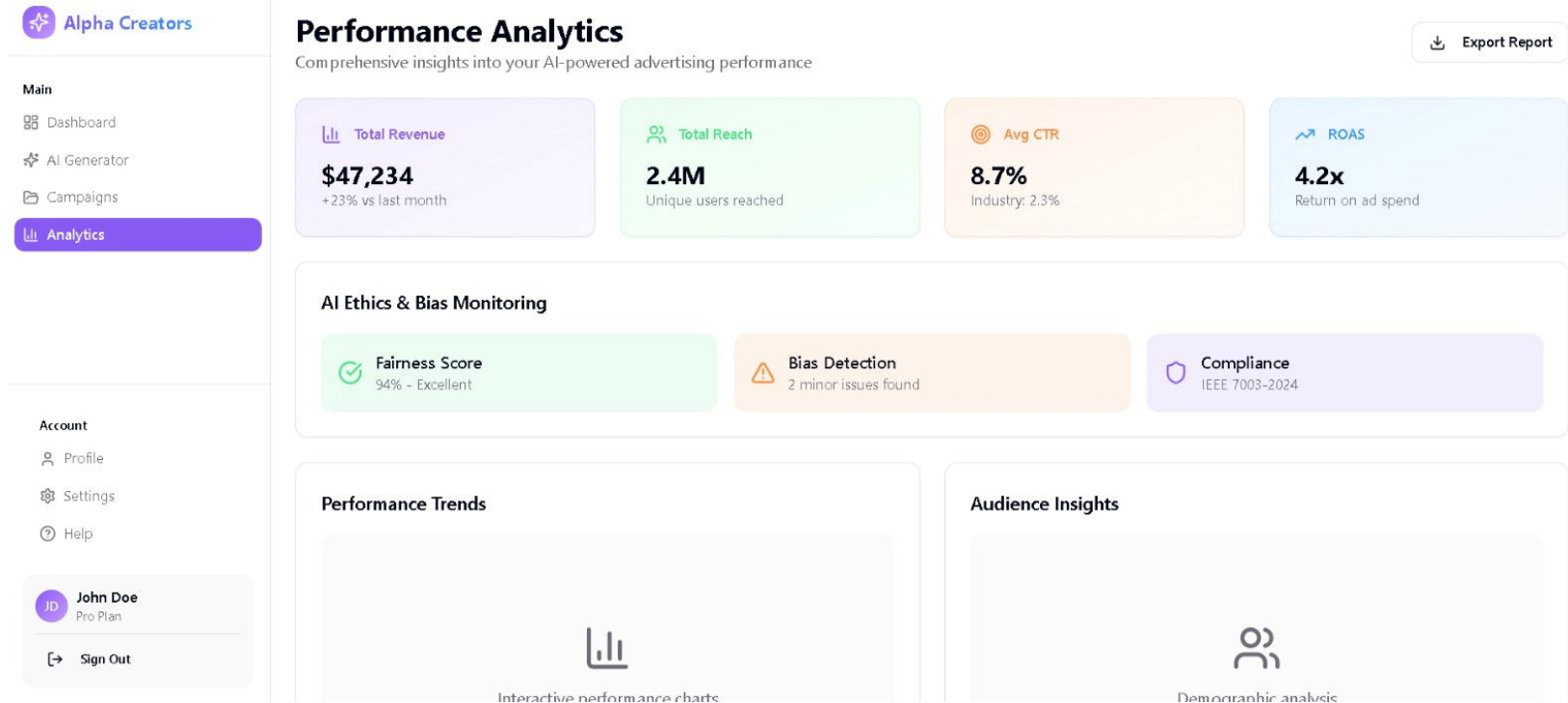
- **Expected Result:** High-quality, ready-to-use ad content generated in seconds.
- **Discussion / Impact:**
 - **Main Innovation:** This is the core competitive advantage, demonstrating the power of AI in a business context.
 - **Time & Cost Savings:** Completely **Reduces human effort** and time-to-market for launching new ads.

Summary of Module -4

Real-Time Analytics Module

- **Module Goal:** Track and visualize live campaign performance data.
- **Key Functionality:**
 - Ingests performance metrics (Clicks, Impressions, Cost).
 - Calculates key KPIs like CTR and ROI.
 - Uses **WebSockets / Polling** to update data on the dashboard in near real-time.

Module 4 Demonstration



Module 4 - Results & Discussion

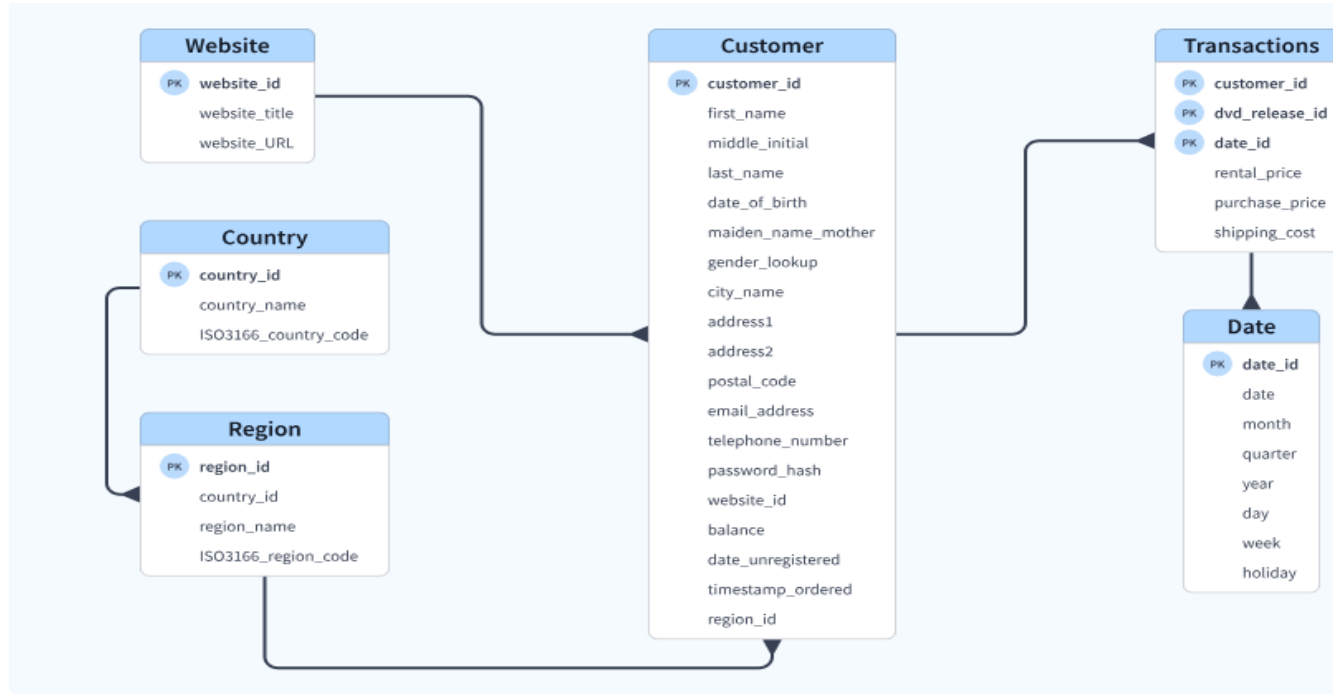
- **Expected Result:** Interactive charts and metrics that refresh every few seconds.
- **Discussion / Impact:**
 - **Data-Driven Optimization:** Allows users to make **live decisions** on budget and creative changes, preventing budget waste.
 - **Full Lifecycle Coverage:** Shows a complete understanding of the advertising process, from creation to optimization.

Summary of Module -5

Data Models & Schemas Module

- **Module Goal:** Define and enforce the data structure for the entire application.
- **Key Functionality:**
 - Defines **MongoDB Collections** (User, Campaign, Ad, Analytics, etc.).
 - Uses **optimal** models for strict data validation on the Backend API.
 - Specifies database indexes for fast query performance.

Module 5 Demonstration



Module 5 - Results & Discussion

- **Expected Result:** Consistent, validated, and error-free data flow between all modules.
- **Discussion / Impact:**
 - **Scalability Backbone:** A robust schema is the foundation for future scaling and feature expansion.
 - **Reliability:** Prevents common bugs and ensures data integrity, a sign of professional engineering.

Summary of Module -6

Frontend UI/UX Module

- **Module Goal:** Deliver a beautiful, intuitive and modern user experience.
- **Key Functionality:**
 - Built with **NextJs, TypeScript and Tailwind CSS**.
 - Leverages the **UI** component library for a polished look.
 - Implements application routing and responsive design for all devices.

Module 6 Demonstration

Alpha Creators

Main

Dashboard

AI Generator

Campaigns

Analytics

Account

Profile

Settings

Help

John Doe

Welcome back, John! 🙌

Here's what's happening with your AI-powered advertising campaigns.



Ads Generated

147

+23 this week



Active Campaigns

8

2 launching soon



Avg. CTR

7.8%

+12% vs industry



Total Reach

284K

This month



Generate New Ad
Create with AI in minutes



New Campaign
Plan your next campaign



View Analytics
Deep dive into performance

Recent Campaigns

View All

Summer Sale Campaign Active

🚀 12 ads 📊 8.7% CTR 👥 24.3K reach ⌚ 2 days ago

Edit



Module 6 - Results & Discussion

- **Expected Result:** Visually stunning interface with smooth navigation (includes Dark/Light Mode).
- **Discussion / Impact:**
 - **User Adoption:** Makes a complex platform feel simple and easy to use, increasing user engagement.
 - **Portfolio Standout:** A high-quality, professional interface is crucial for a project demonstration and elevates the overall technical presentation.

Conclusion

- The **NextGen Ads** successfully achieves its objective of building a production-grade, AI-powered system.
- **Technical Achievement:** Demonstrated proficiency in a full modern stack by implementing complex features like dedicated AI services and real-time data visualization.
- **Business Impact:** Created a scalable solution that **professional advertising**, enabling cost-effective, high-quality ad creation for any business.
- **Innovation:** Integrated **Generative AI** into an end-to-end workflow, showcasing a truly next-generation approach to digital marketing technology.






Feature Work

- **Budget Optimization Module:** Implement a **Reinforcement Learning (RL) or ML model** to automatically suggest budget reallocations based on real-time performance data.
- **Direct Platform Integration:** Move beyond simple data tracking to direct API integration (e.g., Facebook Ads API) for **one-click ad deployment**.
- **Multi-Language Support:** Expand the AI service to generate and manage ad campaigns in multiple languages to support international markets.
- **Visual Asset Generation:** Integrate with latent diffusion models (e.g., DALL-E) to generate AI-driven **visual concepts** for ads alongside text copy.

International Conference Details

S. No	Paper Id	Paper Title	Accepted / Rejected	IEEE – Conference Details	Conference Completed	Conference Date
1.	4th ICASE T_DEL _0562	NEXT-GEN TARGET MARKETING: REAL-TIME EMOTION-AWARE AD CREATION	Accepted	4th International Conference on Advances in Science, Engineering & Technology (ICASET- 2025), Delhi	No	15.11.2025 and 16.11.2025
2	171118 3	NEXT-GEN TARGET MARKETING: REAL-TIME EMOTION-AWARE AD CREATION	Accepted	International peer- reviewed and multidisciplinary IRE Journals!	NO	28.10.2025

International Conference Presentation Certificate

 IFERP[®] Academy <small>Empower Your Research Journey</small>	 4th INTERNATIONAL CONFERENCE ON ADVANCES IN SCIENCE, ENGINEERING & TECHNOLOGY	 HYBRID CONFERENCE [INPERSON & ONLINE]
 ICASET <small>15 - 16 November 2025 Delhi, India</small>		 Scopus[®]
<div>📅 15th - 16th November 2025</div> <div>📍 Delhi, India</div>		
<div>Ref No : 100044</div> <div>Date : 09/10/2025</div> <div>Conference Secretariat - Delhi, India</div>		
<p style="text-align: center;"><u>Letter of Acceptance</u></p>		
Abstract / Paper ID : 4th ICASET_DEL_0562		
Paper Title : NEXT-GEN TARGET MARKETING: REAL-TIME EMOTION-AWARE AD CREATION		
Author Name : Mrs Deebika R K,		
Co-Author Name : Naresh D, Ruthuvarshan E, Subash S, Subikshan M		
Institution : M Kumarasamy College of Engineering		
Dear Mrs Deebika R K,		
Congratulations!		

International Conference Presentation Certificate

Congratulations!

Your paper has been ACCEPTED successfully in the international peer-reviewed and multidisciplinary IRE Journals!

Paper Title: Next-Gen Target Marketing: Real-Time Emotion-Aware Ad Creation

Paper ID: 1711183

Author(s): Deebika R K ; Naresh D ; Ruthuvarshan E ; Subash S ; Subikshan M

Will be published: Volume - 9 | Issue - 4 | October 2025

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Note: At least one of the author(s) should complete the following step (before 12-10-2025)