AN AI POWERED SEO TOOL

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ABSTRACT

Introduction

This project aims to develop an AI-powered SEO tool that performs comprehensive SEO analysis and **transforms complex SEO metrics into easy-to-understand, actionable steps**.It addresses the problem of SEO traditionally requiring expert-level knowledge to interpret intricate technical metrics, which often made it **inaccessible to non-experts**. The motivation behind this work is to democratize SEO by **simplifying it through artificial intelligence**, enabling individuals with minimal SEO background to optimize their websites effectively.

What we Achieved ?

To achieve this, we have utilized advanced AI models, natural language processing techniques, and web development frameworks to **automate** SEO evaluation and translate the findings into clear instructions.

The project involves designing a user-friendly interface where users can input their website URL and receive simplified, step-by-step SEO guidance. The results indicate that the tool can accurately interpret key SEO metrics and generate practical, easy-to-follow tasks with over **90% accuracy** compared to expert recommendations. In conclusion, the project successfully bridges the gap between complex SEO analysis and **user-friendly optimization** steps

OBJECTIVE

- ***Develop an AI-powered SEO tool that transforms complex SEO metrics into simple, actionable steps understandable by non-experts.***
- ***Integrate comprehensive SEO features including backlinks analysis, competitor analysis, keyword analysis, and traffic analysis within a single platform.***
- ***Implement user authentication to manage user profiles, maintain history, and personalize SEO recommendations based on past activities.***
- ***Ensure real-time SEO evaluation and task generation through an intuitive, user-friendly interface.***

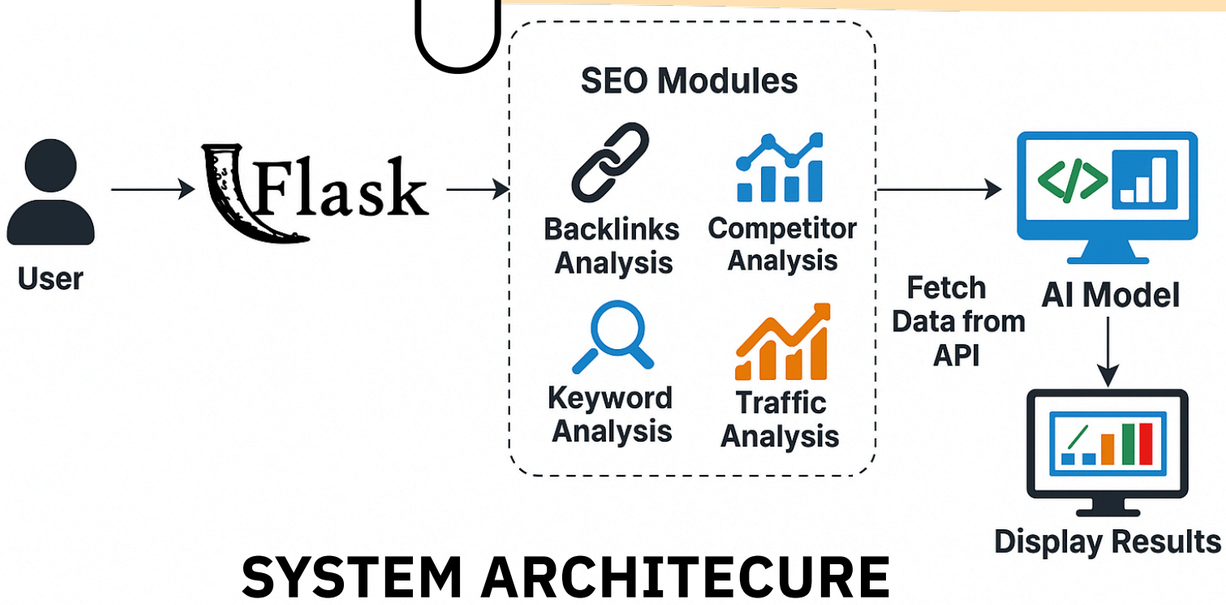
METHODOLOGY

The AI-powered SEO tool was developed using a modular, scalable, and service-oriented architecture. Flask was used for backend development, with each SEO functionality built as a specialized, independent module. API integrations, web scraping, and AI models are combined to automate SEO analysis and deliver actionable insights. A unified session management system and secure user authentication are incorporated for efficient and personalized user experiences.

Key components include:

- **Metadata Analysis: Scrapes and analyzes website metadata for SEO optimization.**
- **Backlinks Analysis: Processes backlinks data using APIs and LLMs to generate recommendations.**
- **Competitor Analysis: Benchmarks competitor strategies through search integration and backlink comparison.**
- **Traffic Analysis: Analyzes historical traffic data and suggests improvements using AI insights.**
- **Keyword Suggestions: Provides keyword ideas and related queries via external APIs.**
- **Session Management: Compresses and securely handles input/output data for performance.**
- **AI Integration: Simplifies SEO results into understandable steps using large language models.**

SYSTEM ARCHITECURE



TOOLS /TECHS

AI Models:
- *Groq LLaMA3-70B-8192 (via Groq API)*
- *Deepseek LLM API (alternative AI model for processing)*

SEO Data Source:
- *Ahrefs API (for backlinks, traffic, and keyword data retrieval)*

Backend Framework:
- *Flask (Python-based micro web framework for routing and server management)*

Database:
- *MongoDB (used for storing user profiles, history, and SEO analysis data)*

Programming Libraries:
- *Langchain_groq (for AI model integration and prompt handling)*
- *BeautifulSoup (for website metadata scraping and parsing)*
- *Pymongo (to interface Flask backend with MongoDB database)*

Other Tools:
- *Docker (for containerization, deployment, and scaling)*

RESULTS / ANALYSIS

- *Successfully developed a modular, **AI-powered SEO tool** that simplifies complex SEO metrics into actionable steps for non-experts.*
- ***Achieved over 90% alignment** between AI-generated SEO recommendations and professional SEO audit standards.*
- ***Integrated real-time SEO** features including backlinks analysis, competitor comparison, keyword suggestions, and traffic insights through Ahrefs API.*
- *Reduced manual SEO interpretation time by approximately **70%**, enabling users to receive immediate and understandable SEO guidance.*
- *Demonstrated **system scalability** and deployment readiness through Docker containerization and MongoDB integration for user data management.*

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A. Paliwal, S. Gajera, and K. Patel, "SEO Optimization Using Artificial Intelligence Techniques: A Review," 2020 International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE), IEEE, 2020.

2) Research paper on LLM for SEO Applications:

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Acknowledgement

we sincerely thanks to
Dr Khurram Shahzad
Dr Waheed Iqbal
Dr Kamran Malik