



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 12, December 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.524

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Cold Email Generator using Llama and LangChain

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ABSTRACT: In today's competitive software services market, personalized outreach is vital for securing new projects. This paper presents a Cold Email Generator utilizing Llama 3.1, Chroma DB, and LangChain to enhance sales strategies. The tool automates email creation by extracting relevant skills from job postings and tailoring content to client needs. Chroma DB, a vector database, retrieves portfolio information to boost personalization, while Llama 3.1 ensures real-time performance via cloud deployment on Groq. With a user-friendly interface and scalable modular design, the generator is a practical solution for targeted marketing. Companies like Nike and JP Morgan can benefit from its innovative approach to improving outreach success and client acquisition.

KEYWORDS: Cold Email Generator, Llama 3.1, Chroma DB, Groq Cloud, LangChain, AI-driven Marketing, Job Portal Scraping, Sales Automation.

I. INTRODUCTION

A Cold Email Generator is a tool for the competitive software services industry, offering a strategic edge in acquiring clients and securing projects. This AI-powered system streamlines sales outreach using advanced technologies like Llama 3.1, Chroma DB, and LangChain to craft highly personalized and targeted cold emails. By incorporating job portal scraping, it identifies relevant skills from job postings, enabling precise email customization aligned with client needs. Chroma DB enhances outreach by retrieving portfolio data for better personalization, making client engagement more impactful. Llama 3.1 model hosted on Groq, the system utilizes Llama 3.1 for real-time response generation, ensuring swift and accurate email crafting. Its modular design ensures scalability and maintainability, adapting seamlessly to the evolving demands of software service companies. This paper underscores the transformative potential of AI-driven solutions to revolutionize sales outreach, offering an innovative approach to lead generation and client acquisition. The Cold Email Generator demonstrates how automation enhances efficiency, personalization, and engagement in the software services sector.

II. LITERATURE SURVEY

In the paper Llama: Open and Efficient Foundation Language Models by Hugo Touvron, Thibaut Lavril, Gautier Izacard, and others, the authors present LLaMA, a suite of models (7B-65B parameters) trained exclusively on public datasets. LLaMA-13B outperforms GPT-3 (175B) on most benchmarks, offering state-of-the-art performance with greater efficiency. The authors highlight open access to their models, promoting democratized research in language modelling [1]. In Attention Is All You Need by Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, and others, the authors introduce the Transformer, an attention-only model achieving state-of-the-art results in machine translation. By eliminating recurrence and convolutions, it enhances parallelization, scalability, and efficiency in sequence tasks [2]. In Llama 3: The Herd of Models by the Meta Llama Team, the authors present Llama 3, advanced foundation models up to 405B parameters. Supporting multilinguality, coding, and reasoning, it achieves state-of-the-art results and introduces open research and multimodal capabilities [3].

III. RELATED WORK

A. Existing System

In Existing cold email system, companies use basic email templates and manual outreach to connect with potential clients. These systems rely on static templates with minimal personalization, making them less effective at securing responses. The typical workflow involves researching clients, drafting generic emails, and sending them to a broad list. While CRM tools manage contacts and track responses, personalization is limited to simple substitutions like names or companies. These systems can't dynamically adjust content based on recipient-specific data, often risking being marked as spam. Keyword-based scraping tools gather data but produce unstructured results, requiring more manual effort. As a result, traditional cold email systems are time-consuming, impersonal, and fail to leverage data effectively. This makes it harder to stand out in a competitive market.

B. Proposed System

The proposed cold email generator utilizes advanced AI tools like Llama 3.1, Chroma DB, and LangChain to transform sales outreach for software service companies. By automating email personalization and targeting, the system improves outreach efficiency and effectiveness. Job portal scraping identifies relevant skills and requirements, enabling tailored emails that address specific client needs. Integration with Chroma DB allows semantic search for retrieving portfolio links, making the emails more relevant by showcasing related expertise. The cloud-based architecture ensures fast inference speeds with Llama 3.1, enabling real-time email generation. The tool is accessible to sales teams for easy customization of emails. Its modular design ensures scalability and ease of future enhancements. The system streamlines cold email outreach, enhancing lead generation efforts. Ultimately, it empowers software service companies to improve client engagement and stand out in a competitive market.

IV. METHODOLOGY

The methodology for developing the Cold Email Generator involves a strategic approach, starting with the design of a scalable architecture using advanced AI technologies such as Llama 3.1, Chroma DB, and LangChain to enable the creation of highly personalized cold emails. The system incorporates job portal scraping to extract relevant skills from job postings, ensuring email content is customized to client needs for better engagement. Chroma DB is integrated to retrieve portfolio data, improving email personalization and making client outreach more impactful. The Llama 3.1 model is hosted on Groq, ensuring real-time response generation with Llama 3.1 for swift and accurate email crafting. A modular design is employed, ensuring scalability and easy maintenance, allowing the system to adapt to the evolving needs of software service companies. Rigorous testing, integration, and performance are conducted before deployment. The system is designed to streamline sales outreach, enhance efficiency, and improve lead generation, providing a strategic edge in a competitive market. Comprehensive support ensures smooth user adoption and system optimization, demonstrating the transformative potential of AI-driven solutions for client acquisition.

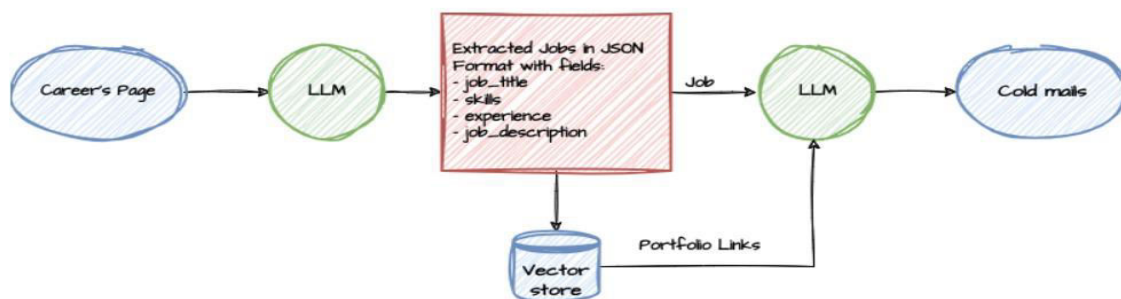


Figure 1: This figure describes the system architecture

The figure depicts the architecture Cold Email Generation using Llama and Langchain demonstrates a streamlined and modular design for efficient functionality. It begins with Career Pages as the input source, where job postings are collected and sent to a Large Language Model (LLM). The LLM processes the career pages to extract relevant job details and organizes them into a structured JSON format with fields like job title, skills, experience, and job

description. The extracted job information is then stored in a Vector Store, which facilitates efficient retrieval and search. Additionally, portfolio links are also stored in the Chroma DB to enhance personalization. The job details and portfolio links are then sent to LLM, which generates customized Cold Emails tailored to the extracted job requirements. These personalized cold emails are then output as the final communication step for recruiters or hiring managers. This architecture integrates LLMs for job parsing and email generation, along with a vector store for efficient data management, enabling an automated, scalable, and accurate solution for job extraction and outreach.

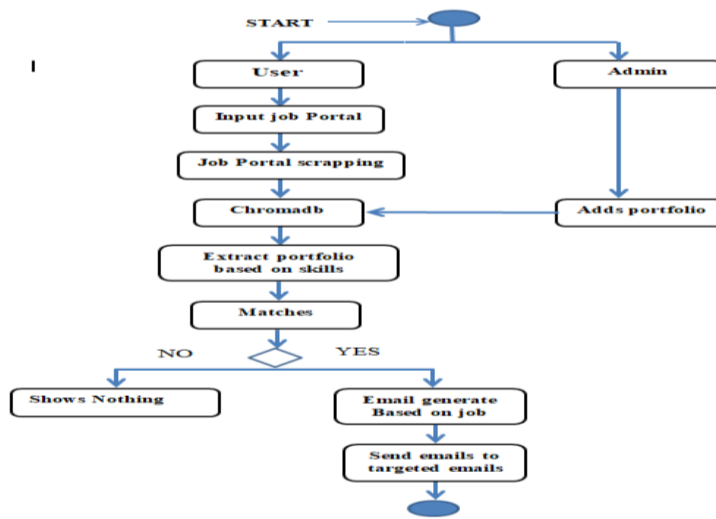


Figure 2: This figure describes the flow of data through activity diagram

The diagram represents the workflow of cold email generator using llama and langchain that streamlines job matching and targeted outreach. The process begins with a User who inputs job portal details, prompting the system to perform Job Portal Scraping to gather job postings. These postings are stored in Chromadb (a vector database), while the Admin simultaneously adds user portfolios to the system. The system then extracts portfolios based on job skills and checks for matches between the job requirements and user skills. If no match is found, the process ends by showing nothing. However, if a match exists, the system automatically generates emails tailored to the job skills and sends them to targeted clients. This structured workflow combines scraping, skill-based matching, and automated outreach to efficiently connect user portfolios with relevant job opportunities.

V. EXPERIMENTAL RESULT

```
page_data = loader.load()
print(page_data)

(Document(metadata={'source': 'https://jobs.nike.com/job/R-38988?fromJob%20search%20funnel', 'title': 'Apply for Lead DevOps Engineer', 'description': 'Nike - Data & Analytics - Gdansk, Pomeranian, Poland', 'language': 'en'}, page_content='Apply for Lead DevOps Engineer\n\nSkip navigationSearch JobsNIKE, INC. JOBSContact JobsJoin The Talent CommunityLife @ NikeOverviewBenefitsBrandOverviewJordanConverseTeamOverviewAdministrative SupportAdvanced InnovationAir Manufacturing InnovationAviationCommunicationsCustomer ServiceDesignDigitalFacilitiesFinance & AccountingGovernment & Public AffairsHuman ResourcesInsights & AnalyticsLegalManufacturing & EngineeringMarketingMerchandisingPlanningPrivacyProcurementProduct Creation, Development & ManagementRetail StoresSalesSocial & Community ImpactSports MarketingStrategic PlanningSupply Chain, Distribution & LogisticsSustainabilityTechnologyLocationsOverviewNike HQNIKE New York HQHQ: Hilversum, The NetherlandsELC: Laakdal, BelgiumGreater China HQDiversity, Equity & InclusionOverviewMilitary InclusionDisability InclusionIndigenous InclusionInternshipsData & AnalyticsLead DevOps EngineerGdansk, PomeranianBecome a Part of the NIKE, Inc. Team\n\nNIKE, Inc. does more than outfit the world's best athletes. It is a place to explore one potential, obliterate boundaries and push out the edges of what can be. The company looks for people who can grow, think, dream and create. Its culture thrives by embracing diversity and rewarding imagination. The brand seeks achievers, leaders and visionaries. At NIKE, Inc. it's about each person bringing skills and passion to a challenging and constantly evolving game.NIKE, Inc. does more than outfit the world's best athletes. It is a place to explore potential, obliterate boundaries and push out the edges of what can be. The company looks for people who can grow, think, dream and create. Its culture thrives by embracing diversity and rewarding imagination. The brand seeks achievers, leaders and visionaries. At Nike, it's about each person bringing skills and passion to a challenging and constantly evolving game.WHO ARE WE LOOKING FOR?We seek passionate Lead DevOps Engineer to build automation to enable machine learning engineers to continuously deliver predictive analytics for forecasting, personalization, and inventory optimization. As a Lead DevOps Engineer, you will be expected to own projects end-to-end - from conception to operationalization, demonstrating an understand
```

Figure 3: Web Scrapped from Job portal

	Techstack	Links
0	React, Nodejs, MongoDB	https://example.com/react-portfolio
1	Angular, .NET, SQL Server	https://example.com/angular-portfolio
2	Vue.js, Ruby on Rails, PostgreSQL	https://example.com/vue-portfolio
3	Python, Django, MySQL	https://example.com/python-portfolio
4	Java, Spring Boot, Oracle	https://example.com/java-portfolio
5	Flutter, Firebase, GraphQL	https://example.com/flutter-portfolio
6	WordPress, PHP, MySQL	https://example.com/wordpress-portfolio
7	Magento, PHP, MySQL	https://example.com/magento-portfolio
8	React Native, Nodejs, MongoDB	https://example.com/react-native-portfolio
9	iOS, Swift, Core Data	https://example.com/ios-portfolio
10	Android, Java, Room Persistence	https://example.com/android-portfolio
11	Kotlin, Android, Firebase	https://example.com/kotlin-android-portfolio
12	Android TV, Kotlin, Android NDK	https://example.com/android-tv-portfolio

Figure 4: Portfolios of the Company

Subject: Expert DevOps Solutions for Seamless Machine Learning Integration

Dear Hiring Manager,

I came across your job posting for a Lead DevOps Engineer and was impressed by your organization's commitment to leveraging machine learning for predictive analytics. As a Business Development Executive at Atliq, I'd like to introduce you to our team of experts who can help you achieve your goals.

At Atliq, we specialize in AI and software consulting, with a proven track record of empowering enterprises through tailored solutions that drive scalability, process optimization, cost reduction, and heightened efficiency. Our team has extensive experience in building automation for machine learning engineers, enabling them to continuously deliver predictive analytics for various applications.

Our expertise in DevOps, particularly in building CI/CD infrastructure using Jenkins, Docker, Kubernetes, and related tools, aligns perfectly with your requirements. We're also well-versed in AWS components and services, including IAM, ECS/EKS, EMB, S3, and Lambda/Serverless. Our proficiency in Infrastructure as a Code using Terraform, as well as programming languages like Python, shell scripting, and SQL, ensures seamless integration with your existing systems.

I'd like to highlight a few examples of our work in the DevOps space:

* Our DevOps portfolio: <https://example.com/devops-portfolio>

* A Python-based machine learning project: <https://example.com/ml-python-portfolio>

* A full-stack JavaScript project showcasing our expertise in building scalable applications: <https://example.com/full-stack-js-portfolio>

These examples demonstrate our capabilities in designing and implementing robust DevOps solutions that cater to the needs of machine learning engineers. Our team is passionate about delivering high-quality solutions that meet the highest standards of excellence.

If you're looking for a reliable partner to help you build automation for your machine learning engineers, I'd be delighted to schedule a call to discuss how Atliq can support your organization. Please let me know if you're interested, and I'll be happy to set up a meeting at your convenience.

Best regards,

Virat
Business Development Executive
Atliq
[Your Email Address]
[Your Phone Number]

Subject: Expert Solutions for NIKE, Inc.'s Supply Chain and AI Initiatives

Dear Hiring Manager,

I came across the job postings for Internship Supply Chain and Data Scientist: Artificial Intelligence at NIKE, Inc. and was impressed by the company's commitment to innovation and excellence. As a Business Development Executive at Atliq, I'd like to introduce our company as a potential partner in fulfilling your technology needs.

Atliq is an AI & Software Consulting company dedicated to facilitating the seamless integration of business processes through automated tools. Our team of experts has a proven track record of empowering enterprises with tailored solutions, fostering scalability, process optimization, cost reduction, and heightened overall efficiency.

For the Internship Supply Chain role, we can leverage our expertise in data visualization and Excel/PowerPoint to streamline supply chain operations. Our proficiency in Tableau and data-visualization tools can help optimize logistics and inventory management.

Regarding the Data Scientist: Artificial Intelligence role, our team has extensive experience in developing AI-powered solutions. We can help NIKE, Inc. harness the power of AI to drive business growth, improve customer experiences, and stay ahead of the competition.

To showcase our capabilities, I'd like to share some relevant portfolio links:

* Machine Learning and Python expertise: <https://example.com/ml-python-portfolio>

* Data Visualization and Tableau expertise: <https://example.com/python-portfolio>

* Full-stack JavaScript expertise for web development: <https://example.com/full-stack-js-portfolio>

* DevOps expertise for streamlined operations: <https://example.com/devops-portfolio>

Our team is committed to delivering high-quality solutions that meet the unique needs of our clients. I'd be delighted to schedule a call to discuss how Atliq can support NIKE, Inc.'s technology initiatives.

Please feel free to contact me at your convenience.

Best regards,

Mohan
Business Development Executive
Atliq

Figure 5 : Generated Email for Devops Solution

Figure 6: Generated Email for Supply Chain

Figure 3 shows web-scraped data from a job portal containing metadata like the source URL, job title, and description for a Lead DevOps Engineer role at Nike. It highlights the company's culture, job responsibilities, and candidate requirements, providing structured data for analysis or skill-based job matching.

Figure 4 shows the company's portfolios, highlighting various technology stacks and their corresponding links. Each portfolio showcases different technologies, such as React, Angular, Vue, Python, and more, along with backend systems like MySQL, PostgreSQL, and Oracle. The provided links lead to individual portfolios for further details.

Figure 5 shows a generated email offering DevOps solutions tailored for seamless machine learning integration. The email highlights company expertise in CI/CD infrastructure, AI, and cloud services while sharing portfolio links to showcase their capabilities. It concludes with a request to schedule a call, emphasizing collaboration and support for the recipient's organization.

Figure 6 presents a generated email offering expert solutions for NIKE, Inc.'s Supply Chain and AI initiatives. The email highlights capabilities in data visualization, AI-powered solutions, and automation, with links to relevant portfolio projects. It concludes with a proposal to discuss how Atliq can support NIKE's technology goals.

VI. CONCLUSION

In conclusion, the Cold Email Generator using LLaMA and LangChain offers an efficient, automated solution for personalized outreach. By leveraging LLaMA, a powerful open-source large language model, the system can analyze job postings, extract key details, and generate highly relevant email content tailored to specific skills and roles. LangChain integrates the model seamlessly with data sources like job portals and vector databases (e.g., Chromadb) for contextual understanding and real-time processing. This combination ensures that the emails are not only accurate but also highly customized, enhancing engagement with targeted clients. The system automates job scraping, portfolio matching, and email generation, saving time and effort while improving outreach effectiveness. Its modular design ensures scalability, allowing it to handle large datasets and adapt to diverse job requirements. By automating repetitive tasks, this tool significantly optimizes the job-seeking and client engagement process.

REFERENCES

1. Hugo Touvron, Thibaut Lavril, Gautier Izacard.: 'Llama: Open and Efficient Foundation Language Model', arXiv , July 2023
2. Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, and others.: 'Attention Is All You Need', arXiv, Aug 2017
3. Meta Llama Team.: 'Llama 3: The Herd of Models' , arXiv, Sep 2024



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