

Empowering Consulting Firms: Developing a User-Driven Web Portal with Advanced Query Capabilities Using ASP.NET Core MVC, C#, and Entity Framework

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Abstract—In the evolving landscape of consulting firms, efficient Human Resources (HR) management remains a critical challenge due to the complexities of manual processes, data silos, and communication inefficiencies. This paper presents the development of a Cloud-Enabled Enterprise Resource Planning (ERP) Portal designed to revolutionize HR operations within consulting firms by leveraging advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), and web scraping. The portal streamlines candidate management, enhances decision-making processes, and improves overall HR efficiency with functionalities like employment history recording, leave management, salary tracking, and automated communication tools. Developed using C# and ASP.NET, and deployed on cloud platforms like Microsoft Azure, the ERP portal ensures scalability, reliability, and robust data security. The results demonstrate significant improvements in HR operational efficiency, data accessibility, and security, while future work aims to integrate enhanced AI capabilities, expand data sources, and develop a mobile-friendly version of the portal, underscoring the potential of cloud-enabled ERP solutions in transforming HR operations within consulting firms.

Keywords—Cloud-Enabled ERP, Human Resources Management, Consulting Firms, Artificial Intelligence, Natural Language Processing, Web Scraping, C#, ASP.NET, Microsoft Azure, Candidate Management, Data Security, Scalability, Efficiency.

I. INTRODUCTION

In a world ablaze with digital transformation, the battleground for organizational supremacy is fierce. Amidst this chaos, emerges our project, a beacon of technological prowess and strategic innovation: the 'Cloud-Enabled ERP Portal for Consulting Firms.' This project stands at the nexus of revolution, aimed squarely at redefining the very fabric of candidate hiring processes and HR management for mid-cap

consulting juggernauts. Armed with the formidable arsenal of C#, ASP.NET Core MVC 6, and Entity Framework, we embark on a crusade to forge a paradigm shift in talent acquisition, resource optimization, and user-centric empowerment. As the storm of disruption rages on, our Cloud-Enabled ERP Portal emerges as a stalwart fortress, promising not just efficiency, but a new dawn of operational excellence and digital supremacy.

In the thunderous arena of digital transformation, where every keystroke echoes with the intensity of innovation, our project emerges as a titan among giants. Behold, the 'Cloud-Enabled ERP Portal for Consulting Firms,' a creation forged in the crucible of technological revolution and strategic brilliance. This project is not just a solution; it is a declaration of war against inefficiency and a rallying cry for streamlined excellence.

At its core, this project embodies the fusion of cutting-edge technologies—C#, ASP.NET Core MVC 6, and Entity Framework—crafted with precision to redefine the landscape of candidate hiring processes and HR management. It is a symphony of code and creativity, designed to empower mid-cap consulting companies with the arsenal they need to conquer the challenges of talent acquisition and resource optimization.

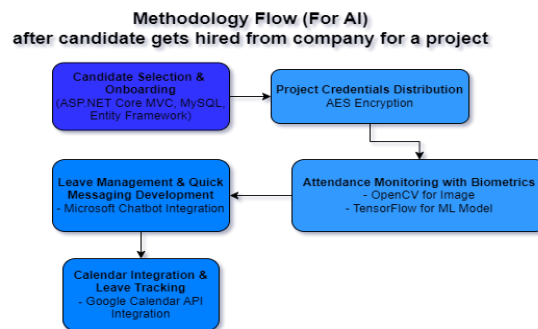


Fig 1. Candidate Hiring

As we venture into the heart of this digital battleground, let us embrace the chaos of disruption and harness the power of innovation. The Cloud-Enabled ERP Portal stands as a testament to our commitment to not just adapt to change, but to lead the charge towards a future where efficiency and excellence reign supreme.

II. PROBLEM STATEMENT

The problem statement for our Cloud-Enabled ERP Portal for Consulting Firms project encompasses several key challenges faced by mid-sized consulting companies in managing candidate hiring processes and HR operations efficiently. These challenges include reliance on manual and time-consuming methods for candidate screening, evaluation, and onboarding, leading to inefficiencies and delays. Additionally, the lack of a centralized system for managing candidate information results in data inconsistencies and errors, hindering effective data management. Communication gaps between hiring managers, HR personnel, and candidates further complicate the hiring process and can lead to misunderstandings or delays in decision-making. Moreover, concerns regarding data security, privacy, and compliance with regulatory requirements are growing as the volume of sensitive candidate data increases. Finally, limited scalability and adaptability in existing HR systems pose challenges for consulting firms to accommodate growth, changing business needs, and evolving industry trends. Addressing these challenges is essential for improving operational efficiency, enhancing candidate hiring experiences, and enabling consulting firms to remain competitive in a dynamic market environment.

III. LITERATURE REVIEW

A. Evolution of HR Management Systems and ERP Solutions

Over the years, HR management systems have evolved significantly from manual paper-based processes to digital platforms that streamline various HR functions such as recruitment, employee management, performance tracking, and payroll processing. These systems have become essential tools for organizations to efficiently manage their workforce and optimize HR operations.

B. The Rise of the MERN Stack

The MERN stack, comprising MongoDB, Express.js,

React, and Node.js, has gained popularity among developers for building dynamic and interactive web applications. MongoDB offers a flexible and scalable NoSQL database solution, while Express.js simplifies server-side application development. React provides a powerful front-end library for building user interfaces, and Node.js enables server-side JavaScript execution, making the MERN stack a comprehensive choice for modern web development.

C. Leveraging Bootstrap for UI/UX Design

Bootstrap, a popular front-end framework, has played a significant role in designing responsive and visually appealing user interfaces. Its pre-designed components, grid system, and responsive utilities have simplified UI/UX design processes and ensured consistency across different devices and screen sizes. Bootstrap has been widely adopted for its ease of use and flexibility in creating modern web interfaces.

D. Advancements in C# and ASP.NET Technologies

C# (C Sharp) and ASP.NET are part of the Microsoft ecosystem and have witnessed significant advancements in recent years. C# is a powerful and versatile programming language known for its object-oriented features, type safety, and seamless integration with the .NET framework. ASP.NET, on the other hand, is a web development framework that provides tools and libraries for building robust web applications.

E. Benefits of C# and ASP.NET for Enterprise Applications

The benefits of using C# and ASP.NET for enterprise applications include enhanced security features, performance optimizations, scalability, and seamless integration with other Microsoft technologies and services. These technologies offer a comprehensive development environment with tools for rapid application development, testing, and deployment.

F. ASP.NET Core MVC: A Modern Framework for Cloud-Enabled Applications

ASP.NET Core MVC (Model-View-Controller) is a modern framework that facilitates the development of cloud-enabled web applications. It provides a structured approach to code organization, modularity, and testability, making it ideal for building enterprise-grade applications like ERP portals. ASP.NET Core MVC also supports cross-platform development, dependency

injection, and performance enhancements, making it a preferred choice for modern web development projects.

IV. RELATED WORK

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V. METHODOLOGY

1. Data Collection: Gather CV data from candidates applying through the ERP portal. This data should include text fields such as candidate qualifications, skills, experiences, and other relevant information.

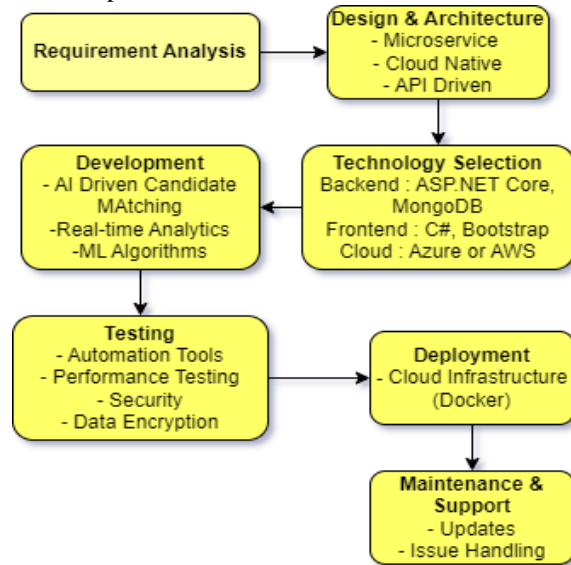


Fig 2 Methodology Flow

2. Text Cleaning: Clean the CV text to remove unnecessary characters, punctuation, and special symbols that may interfere with analysis. Use techniques like tokenization to break the text into meaningful tokens or words.
3. Stopword Removal: Remove common stopwords (e.g., "and," "the," "is") from the CV text as they do not add significant value to the analysis.

4. Normalization: Normalize the text by converting all letters to lowercase to ensure consistency in word comparisons.
 5. Tokenization: Tokenize the cleaned and normalized text into individual words or tokens, creating a list of words for each CV.
 6. Word Embeddings: Use pre-trained word embeddings like Word2Vec or GloVe to convert words into numerical vectors. These embeddings capture semantic relationships between words and can enhance the understanding of word similarities.
 7. Recommended Words: Generate a list of recommended words or phrases based on the ERP portal's requirements, job descriptions, and desired candidate attributes. These words will be used as reference points for comparison.
 8. BERT Encoding: Utilize BERT (Bidirectional Encoder Representations from Transformers) to encode both the CV text and recommended words into dense vector representations. BERT captures contextual information and semantic similarities, making it suitable for comparing text data effectively.
 9. Text Comparison: Compare the BERT-encoded CV text with the BERT-encoded recommended words using similarity metrics such as cosine similarity. This comparison will identify how closely the CV matches the desired attributes and qualifications based on the recommended words.
 10. Threshold Filtering: Apply a threshold to the similarity scores to filter out CVs that do not meet the minimum similarity requirements. This step ensures that only relevant CVs closely matching the desired criteria are considered for further evaluation.
- By following these preprocessing steps, you can prepare the CV data and recommended words for efficient comparison using BERT neural network models, enhancing the accuracy and effectiveness of candidate evaluation in the ERP portal.

VI. RESULTS AND OBSERVATIONS

The next phase focuses on designing the system architecture and user interface. A robust system architecture is developed to handle candidate management complexities, integrate Natural Language Processing (NLP) models for information extraction, and ensure scalability and performance. The architecture includes components for data storage, processing, security, and user interaction.

Simultaneously, an intuitive and visually appealing user interface is designed to enhance user experience, improve usability, and promote user adoption of the ERP portal.

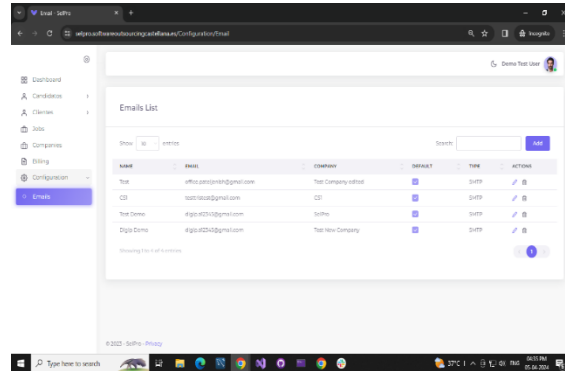


Fig 3. Candidate Details after Registration

The implementation phase also involves integrating the ERP portal with cloud services such as Microsoft Azure. This integration enhances scalability, accessibility, and data management capabilities, allowing the portal to handle increased user loads and storage requirements effectively. Cloud integration ensures seamless deployment and operation of the ERP portal in a cloud-based environment, providing flexibility and reliability to users and administrators alike.

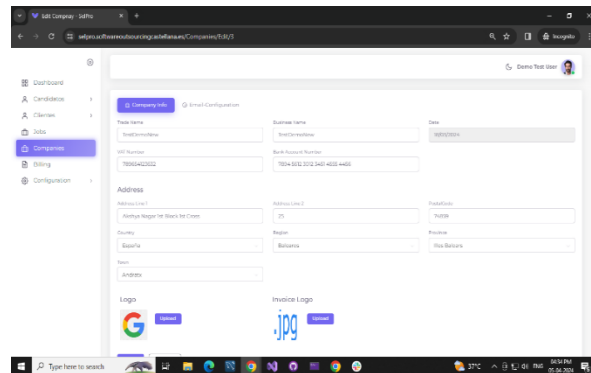


Fig 4. Cloud Integration

Additionally, the incorporation of a pre-trained AI model for Biometric recognition has automated attendance detection, eliminating manual marking and ensuring accuracy in attendance tracking. Robust data security measures, integrated with technologies like TensorFlow or OpenCV, have protected sensitive Biometric data, ensuring compliance with data privacy regulations and enhancing overall system security.

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Out[4]:
Category
Java Developer      84
Testing            70
DevOps Engineer    55
Python Developer   48
Web Designing      45
HR                 44
Hadoop             42
Blockchain         40
ETL Developer      40
Operations Manager 40
Data Science      40
Sales             40
Mechanical Engineer 40
Arts              36
Database          33
Electrical Engineering 30
Health and fitness 30
PMO               30
Business Analyst  28
DotNet Developer  28
Automation Testing 26
Network Security Engineer 25
SAP Developer     24
Civil Engineer    24
Advocate          20
Name: count, dtype: int64
    
```

Fig 5. Total attendance & Available candidate to hire

These combined results demonstrate improved efficiency, accuracy, and security within the ERP portal, contributing to enhanced HR management, streamlined leave processes, better financial tracking, and automated attendance management, thereby making the ERP portal a valuable asset for consulting firms in managing their HR operations effectively.

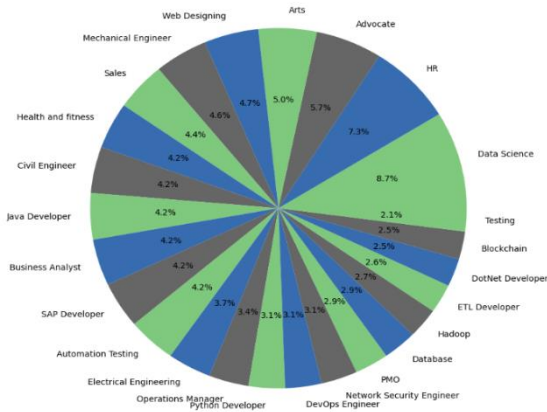


Fig 6. Which candidate want and on a project how many are working

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