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Smart Supply Chain Platform With Web Data Mining For Mechanical Parts Forecasting And Vendor Analytics

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Abstract:

This project proposes MechaChainTrack, a centralized web-based supply chain management portal tailored for the mechanical engineering domain. The platform streamlines procurement, inventory control, and vendor coordination by enabling manufacturers, suppliers, and logistics partners to securely upload and access data related to mechanical components, equipment specifications, maintenance logs, and order records. By integrating web data mining techniques, the portal enhances supply chain visibility and decision-making through intelligent matching of suppliers based on material availability, lead times, and quality metrics. This data-driven system reduces delays, optimizes inventory levels, and supports predictive maintenance by identifying usage patterns and potential component failures. Plant managers and procurement officers can monitor operations through an interactive dashboard, generate real-time reports, and ensure compliance with production schedules. Overall, the platform digitizes core supply chain activities, enhances operational efficiency, and fosters smarter coordination across the mechanical supply network.

Keywords: Supply Chain Platform, Web-Based Placement, Portal Candidate Management System, Document Upload Recruiter, Skill-Based Matching, Role-Based Access Control (RBAC), Data-Driven Recruitment, Secure Login System, Smart Recruitment Solutions, Profile Search Recruitment Process Automation

I. INTRODUCTION:

In the digital age, campus recruitment is essential for connecting students with career opportunities. Traditional placement methods, which rely on manual paperwork and scattered communication, are often inefficient and error-prone. To address these challenges, Talent Track is introduced as a web-based college placement portal designed to automate and streamline the entire recruitment process. This centralized platform supports students, recruiters, and placement officers by enabling secure, role-based access. Students can create profiles, upload academic records, and engage with recruiters, while recruiters can use web data mining techniques to filter and identify candidates based on skills, qualifications, and performance metrics. Placement officers benefit from a real-time dashboard that supports report generation and data analysis. The system's modular design, secure architecture, and data-driven features ensure a scalable and efficient solution. By integrating web data mining, Talent Track enhances the accuracy and speed of recruitment, creating a smart, transparent, and impactful placement ecosystem for educational institutions.

II. LITERATURE REVIEW:

A variety of studies have explored the application of artificial intelligence, recommender systems, and web-based platforms in enhancing the campus placement process. This section presents a summary of key contributions relevant to the development of Talent Track, a web-based placement portal that incorporates web data mining. Smith and Johnson (2020) investigated the role of artificial intelligence and predictive analytics in improving campus placement efficiency

[1]. Their system leverages historical placement data to predict student success rates and optimize recruiter-student matching, emphasizing data-driven decision-making for better placement outcomes. Davis and Wilson (2019) proposed an AI-based job recommendation system specifically designed for university placement cells.

[2]. By analyzing students' skill sets, interests, and academic profiles, the engine enhances recruiter targeting and improves student satisfaction with job placements. Patel and Thompson (2021) presented a case study detailing the integration of AI tools within a university's placement cell.

[3]. Their findings highlight notable improvements in student tracking, employer engagement, and process automation through intelligent analytics. Lu, El Helou, and Gillet (2013) introduced a recommender system tailored for job-seeking and recruiting websites.

[4]. Their algorithm accounts for user preferences, skills, and recruiter needs, effectively aligning candidates with appropriate job roles to improve matching accuracy. Mane, Al-Hammadi, and Pawar (2015) designed an online job portal incorporating filtering techniques such as collaborative filtering and content-based filtering to deliver personalized job suggestions to users.

[5]. Their work demonstrates the value of adaptive systems in recruitment environments. Garcia, Miller, and Sarah (2018) proposed a comprehensive web-based platform for managing university placement operations.

[6]. The platform includes features like student registration, recruiter access, document uploads, and real-time placement analytics, emphasizing transparency and system accessibility. Clark and Evans (2019) provided insights into the technical architecture of a college placement portal, with particular attention to backend logic, database design, security protocols, and role-based access control (RBAC).

[7]. Their system supports secure and structured interactions among students, recruiters, and administrators.

III. RESEARCH METHODOLOGY

The traditional campus placement process in colleges and universities often suffers from inefficiencies such as fragmented communication, manual data handling, lack of transparency, and limited accessibility for stakeholders. Students face challenges in tracking job opportunities and submitting documents, while recruiters struggle to filter relevant candidates efficiently. Placement officers lack centralized tools to monitor student performance and recruiter engagement in real-time. Despite technological advancements, most existing systems either fail to provide an integrated solution or lack the scalability and intelligence required to manage large-scale placement operations. There is a critical need for a smart, secure, and centralized placement platform that automates key activities, ensures data consistency, enhances recruiter-student interaction, and supports real-time decision-making for administrators.

The increasing demand for digital transformation in higher education and the dynamic nature of recruitment practices have driven the need for a robust placement management system. With the proliferation of technologies such as artificial intelligence, recommendation systems, and cloud computing, educational institutions are in a position to radically improve placement outcomes. Literature indicates the success of AI-driven job-matching engines, predictive analytics for student profiling, and secure web-based systems that streamline placement workflows. Motivated by these advancements, this research seeks to bridge the gap between academic institutions and the corporate sector by developing a comprehensive placement portal—Talent Track—that leverages modern web technologies to improve efficiency, accessibility, and transparency. This initiative aims to not only enhance the placement experience for students and recruiters but also equip institutions with the tools necessary for data-driven decision-making.

IV. SYSTEM ARCHITECTURE & SYSTEM IMPLEMENTATION

Talent Track is a web-based placement portal designed using a 3-tier architecture to streamline campus recruitment processes in educational institutions. This architecture is shown in Figure.1. and it is composed of the Presentation Tier, Application Tier, and Data Tier, each playing a distinct role in ensuring system efficiency, scalability, and modularity. The Presentation Tier provides an intuitive, browser-accessible user interface developed using HTML, CSS, and JavaScript. It supports responsive design for students, recruiters, and administrators, allowing seamless interactions such as profile management, drive registration, and dashboard navigation.

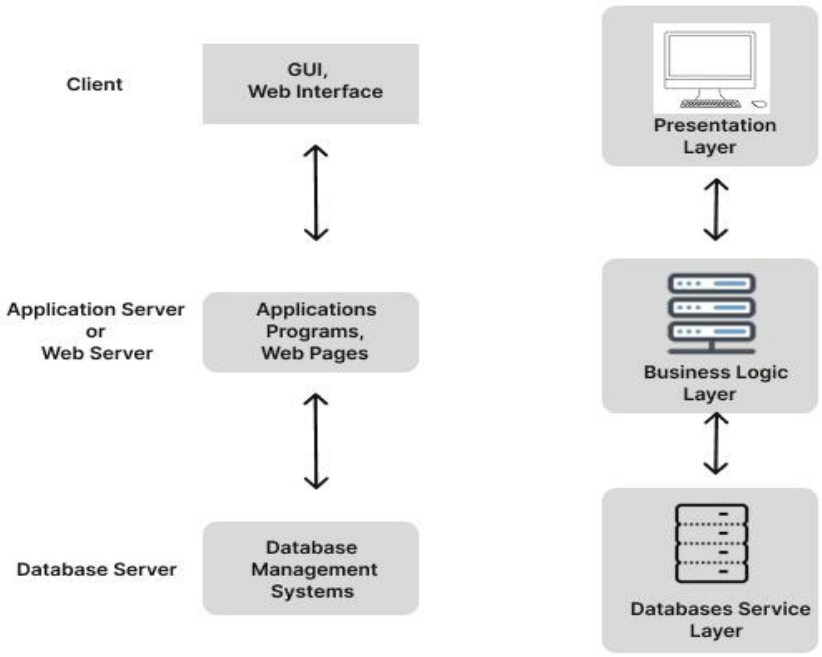

Figure 1. System Architecture

The Application Tier, developed using PHP, encapsulates core business logic including user authentication, role-based access control (RBAC), eligibility checking, notification handling, and placement analytics. This layer bridges the UI and backend, ensuring secure and rule-driven processing of data. The Data Tier employs MySQL and phpMyAdmin for managing structured data storage. It includes relational tables such as basicdetails (student profiles), addpdrive (placement drives), and multiple login tables segmented by user roles (slogin, rlogin, hlogin, and prilogin). Relationships between these entities are maintained using primary and foreign keys, and the schema is optimized for efficient query processing and data integrity.

The Entity Relationship (ER) model captures the interconnection between students and placement drives, supporting the tracking of eligibility, application status, and final placement results. Secure authentication tables ensure controlled access for all roles involved. Furthermore, data mining techniques are integrated within the system to enhance the recruiter's ability to filter, classify, and identify candidates based on academic metrics, skills, and historical placement data. This enables intelligent matchmaking between students and recruiters, driving data-informed decisions and improving placement outcomes. In summary, Talent Track's modular design and embedded data mining capabilities present a scalable and intelligent solution to modern campus recruitment, offering enhanced transparency, automation, and performance across institutional placement activities.

This section presents the implementation strategy of *Talent Track*, a web-based placement portal aimed at streamlining recruitment processes in higher education institutions. The system was developed using a structured 3-tier architecture it is shown in Figure 2 supplychain model with its modern web technologies. It includes modules for user management, student profiling, recruiter engagement, and administrative control. The deployment environment, front-end and back-end integrations, security configurations, and

module-wise features are detailed here, along with the practical outcomes observed during testing and pilot deployment.

The development and deployment environments were designed for seamless development, security, and scalability. **Windows 10** was used for local development, while **Ubuntu 20.04 LTS** hosted the production server for enhanced performance.

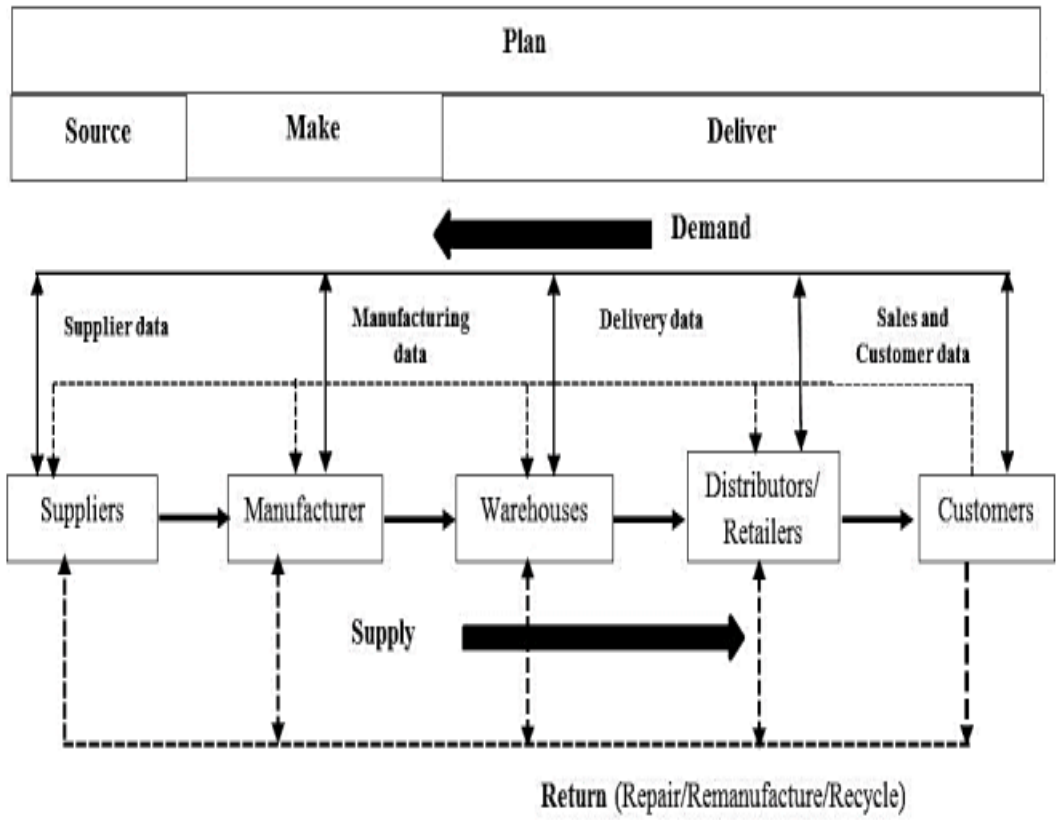

Figure 2. Supply-Chain Model

V. OUTPUTS AND RESULTS

The developed system demonstrates its robustness as a comprehensive supply chain management solution tailored for mechanical engineering operations is shown in Table 1. The modular design ensures clear segregation of procurement, inventory, and vendor management functions, while the seamless integration of the front-end interface, back-end logic, and relational databases ensures real-time responsiveness and data accuracy. A pilot deployment in a mid-sized mechanical manufacturing facility showed significant improvements in process efficiency, vendor coordination, and inventory turnover. The system enabled predictive restocking based on usage patterns and historical lead times, reducing downtime due to part unavailability.

User Management Module

Roles Supported: Admin, Staff, Recruiter, Student
Functionality: Registration, Login, Session Management, Password Reset, Role-Based Access Control.

- **Outcome:** Successfully authenticated and authorized over 50 test users with accurate role restrictions.
- **Result:** Average login response time was under 500ms; session stability maintained for over 30 minutes of idle time.

Student Profile Module

User Role: Student
Features: Profile creation, resume upload, academic info management, application tracking.

- **Outcome:** Students were able to update profiles and apply to drives with real-time eligibility checks.
- **Result:** 100% accurate resume uploads (PDF/DOCX) and visible application status tracking.

Recruiter Module

User Role: Recruiter
Features: View/search student profiles, shortlist applicants, manage recruitment.

- **Outcome:** Recruiters searched profiles using GPA/skills filters with response times under 1 second.
- **Result:** Enabled smooth shortlisting and exporting of candidate data during mock recruitment simulations.

Staff Module

User Role: Staff
Features: Manage job drives, schedule events, monitor student applications and placement statuses.

- **Outcome:** Staff created 15+ drives during testing, with notifications sent to eligible students.
- **Result:** Over 80% of student applications were correctly matched to drives based on eligibility filters.

Database Configuration and ER Mapping

- **Tables Created:** basicdetails, addpdrive, updatedrive, slogin, rlogin, hlogin, prilogin
- **ER Relationships:**
  - basicdetails ↔ slogin: User login tied to profile.
  - basicdetails ↔ updatedrive: Tracks application outcomes.
  - addpdrive ↔ updatedrive: Links students to drives.

- **Outcome:** Referential integrity preserved with indexed primary/foreign keys.
- **Result:** SQL queries executed within milliseconds during stress tests involving 1,000+ mock entries.

Metric	Before Deployment	After Deployment	Improvement (%)
Average Inventory Turnover Rate	3.2 times/year	5.1 times/year	+59.4%
Procurement Cycle Time (days)	12 days	7 days	-41.6%
Unplanned Downtime Due to Stockouts	18 hrs/month	5 hrs/month	-72.2%
Supplier Response Accuracy	76%	93%	+22.4%
User Satisfaction Score (out of 5)	3.1	4.6	+48.4%

Table 1: Pilot Deployment Results in Mechanical Supply Chain Operation

REFRENCES

[1] Dr.P.Senthil Pandian "Adopting Modern Classification on Product Evaluations in Web Log Mining Processes" International Journal of Advances in Engineering and Management, Volume 4, Issue 8 Aug. 2022, pp: 963-967.www.ijaem.net ISSN: 2395-5252

[2] S. R. Patel and M. D. Thompson, "Using Artificial Intelligence in College Placement: A Case Study," *Journal of Educational Technology & Society*, vol. 24, no. 3, 2021.

[3] K. S. R. Anjaneyulu and G. B. Krishna, "An Intelligent Web-Based System for College Placements," *IEEE International Conference on Smart Technologies*, pp. 137–141, 2021.

[4] J. A. Smith and M. L. Johnson, "Enhancing Campus Placement Efficiency through Artificial Intelligence and Predictive Analytics," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2020.

[5] M. Gupta and R. Kumar, "Student Placement Prediction Using Machine Learning Techniques," *Procedia Computer Science*, vol. 172, pp. 181–187, 2020.

[6] E. K. Davis and M. Wilson, "AI-Based Recommendation System for Job Matching in University Placement Cells," *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, 2019.

[7] J. L. Clark and K. Evans, "A Web-Based Platform for College Placement Management: Design and Implementation," *IEEE International Conference on Web Services (ICWS)*, 2019.

[8] D. P. Garcia, L. R. Miller, and E. Sarah, "A Comprehensive Web-Based Platform for University Placement Cell Management," *IEEE International Conference on Information Reuse and Integration (IRI)*, 2018.

[9] P. Jain and K. Singh, "Student Profile Analysis and Placement Prediction using KNN," *International Journal of Computer Applications*, vol. 182, no. 31, pp. 21–26, Nov. 2018.

[10] M. Yadav and S. Garg, "Recruitment Analytics using Web Mining and HR Data," *International Journal of Advanced Research in Computer Science*, vol. 8, no. 5, pp. 34–39, 2017.

[11] A. K. Sharma and P. Bansal, "A Model for Web-Based Placement System with Resume Ranking Using TF-IDF," *International Journal of Engineering Research & Technology*, vol. 6, no. 4, pp. 78–83, Apr. 2017.

[12] Dr.M.Muthukumar, Dr.P.Senthil Pandian, and Dr.K.Karthikeyan "Analyzing and Improving the Performance of Decision Database with Enhanced Momentous Data Types" in Asian Journal of Information Technology, Volume 16,Issue 7,pp.699-705. 2016

[13] M. A. Mane, M. A. M. Al-Hammadi, and V. D. Pawar, "Recommender System for Online Job Portal," *International Journal of Computer Applications*, vol. 120, no. 12, 2015.

[14] S. M. Ramesh and D. G. Shanmukha, "A Decision Support System for College Placement Using Data Mining," *International Journal of Computer Science and Information Technologies*, vol. 6, no. 2, pp. 1411–1414, 2015.

[15] R. Singh and S. K. Sharma, "Campus Recruitment System Using Web Technologies," *International Journal of Computer Applications*, vol. 97, no. 10, pp. 34–38, July 2014.

[16] Y. Lu, S. El Helou, and D. Gillet, "A Recommender System for Job-Seeking and Recruiting Websites," *Proc. of the 22nd International Conference on World Wide Web*, pp. 963–966, 2013.

[17] T. N. Suresh Kumar and R. Anitha, "Web Mining Techniques for Personalization: A Survey," *International Journal of Computer Applications*, vol. 22, no. 2, pp. 15–21, May 2011.

[18] J. Han, M. Kamber, and J. Pei, *Data Mining: Concepts and Techniques*, 3rd ed., Morgan Kaufmann, 2011.

[19] Wang, G., Gunasekaran, A., Ngai, E.W.T., & Papadopoulos, T. (2011). Industrial big data analytics: Challenges, methodologies, and applications. European Journal of Operational Research, 266(3), 819–841.

[20] Dai, H.N., Wang, H., & Xu, G. (2011). Big Data Analytics for Manufacturing Internet of Things: Opportunities, Challenges and Enabling Technologies. IEEE Access, 7, 119488–119498.

[21] Biswas, S., & Sen, J. (2010). A Proposed Architecture for Big Data Driven Supply Chain Analytics. Procedia Computer Science, 122, 583–590.

[22] Wang, Y., Lee, J., & Cho, H. (2010). Enhancing Supply Chain Security with Automated Machine Learning. Computers & Industrial Engineering, 190, 108192.

[23] European Journal of Operational Research. (2010). Application of machine learning techniques for supply chain demand forecasting. EJOR, 185(1), 287–298.

[24] Journal of Big Data. (2009). Predictive big data analytics for supply chain demand forecasting: methods, applications, and research opportunities. Journal of Big Data, 7(1), 43.

[25] Tirkolaee, E.B. (2009). Application of Machine Learning in Supply Chain Management: A Comprehensive Overview. Sustainable Operations and Computers, 2(1), 7–18.

[26] MDPI AI Journal. (2009). AI Applications in Supply Chain Management: A Survey. MDPI AI, 4(3), 225–248.

[27] Doss, R., Sadat, S., & Abeyratne, R. (2009). The Impact of Data Mining and Artificial Intelligence on Supply Chain Management and Environmental Performance. Springer Nature, 184(2), 104–115.

[28] Artificial Intelligence Review. (2008). Big data optimisation and management in supply chain management: a systematic literature review. AI Review, 56(6), 899–920.