

# The AI-Based Internship Recommendation Engine for PM Internship Scheme

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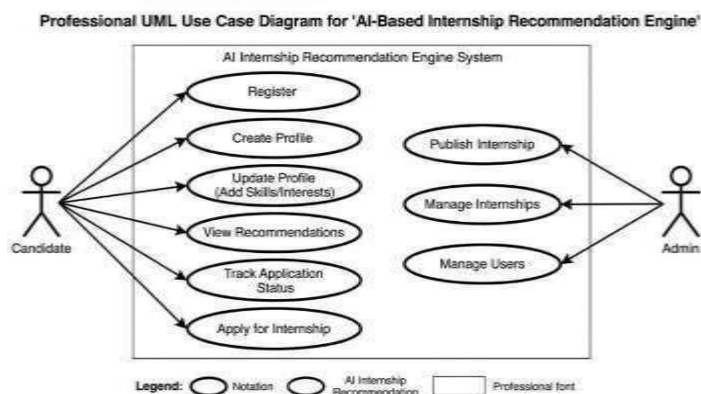
**Abstract:** This branch of computer science is concerned with making computers behave like humans. Artificial intelligence includes game playing, expert systems, neural networks, natural language, and robotics. Currently, no computers exhibit full artificial intelligence (that is, are able to simulate human behavior). The greatest advances have occurred in the field of games playing. The best computer chess programs are now capable of beating humans. Today, the hottest area of artificial intelligence is neural networks, which are proving successful in a number of disciplines such as voice recognition and natural-language processing. There are several programming languages that are known as AI languages because they are used almost exclusively for AI applications. The two most common are LISP and Prolog. Artificial intelligence is working a lot in decreasing human effort but with less growth.

**Keywords:** Data mining, Epistemology, Ontology, Heuristics, optimization

## Introduction

Artificial intelligence is defined as developing

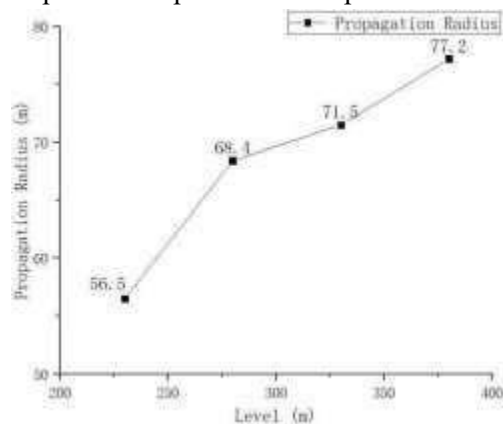
field equations of general relativity. Simply put, wormholes are tunnels connecting two different regions of space-time (Fig 2) (Darling, n.d.). Although scientists are still unaware about the implications of the infinite curvature of spacetime in a black hole, they seem to be able to provide the immense forces of gravity required to curve spacetime into a tunnel, thereby making wormholes a plausible theory, but not one that is practical. Due to the infinite force of gravity in a black hole, a wormhole would collapse the moment it forms by sinking into the black hole. Furthermore, to stabilize a wormhole, a substance known as “exotic matter” i.e., matter with a negative mass, energy and density, is required. Although this substance exists mathematically, it hasn’t been detected in the observable universe (Tillman et al, 2022). However, counter arguments have come forward in light of new research suggesting that if there is a quantum connection (Fig 3) between two black holes, “exotic matter” may not be required to stabilize the tunnel. If such



wormholes indeed do exist in black holes, then quantum information entering the black hole will be able to travel through the wormhole into another part of the universe, thereby solving the paradox of loss. According to the current mining situation and the Wormhole (AKA the Einstein-Rosen Bridge) is a theoretical concept and a solution to Einstein's information in a black hole (Wolchover, 2017). However, as none of this research has empirical evidence, no definitive claims can be made. As the name suggests, white holes are fundamentally opposite to black holes. While it is impossible to escape from a black hole, it would be impossible to enter a white hole (Xiao, n.d.). Both white holes and black holes look similar in nature when observed from space, however, the brief expulsion of matter is what differentiates the two. Viewing a white hole would almost be like a "time reversal" of viewing a black hole (Wood, 2022). However, white holes at best can be called an impossible possibility, mainly because of two reasons. Firstly, for the existence of a white hole on the other side of a black hole, a wormhole would be required to exist inside the black hole joining two regions of spacetime (Fig 4). As seen above, it is highly unlikely for such a theory to be true. Secondly, white holes fail to obey the second law of thermodynamics – entropy (a measure of how many different states particles in a system can be in) in the universe can either remain the same or it can increase; however, computer

that the hydraulic fracturing is carried out at the level of -210 m to -434 m, with a hole depth of 224 m, at -210 m horizontal drilling downward vertical drilling. Therefore, according to the obtained final mining range at the level of -434 m is measured, and it is finally determined that the range of parallel ore body strike of 850 m and vertical ore body strike of 350 m is the hydraulic fracturing construction area. Maternal health is the health care service of women during pregnancy, childbirth, up to the postpartum period. These services are provided with an intention to reduce maternal morbidity and mortality (1, 2).

'WHO indicates that maternal health should help the mother to fulfill natural experience that is emotional to the mother and reduce potential challenges where they suffer health-wise and sometimes even death'. Prior to COVID-19 pandemic, maternal health was already affected by increased maternal mortality and morbidity attributed to decreased socioeconomic status, cultural values and geographical remoteness. These factors increase the risk for pregnancy-related illnesses, negative consequences after birth and maternal death more in developing countries than in developed countries. Recently, the COVID-19 pandemic is feared to have negative impact on maternal health (3-5). Despite sex-disaggregated data on SARS-CoV2 mortalities suggesting more severe health outcomes for men than women, there are concerns that the disease could disproportionately burden women in a social and economic sense (4, 6). Therefore, it is a particularly significant question whether pregnant women are more susceptible to SARS-CoV-2 or might develop severe disease outcomes or suffer SARS-CoV2 associated consequences considering the impact of the pandemic and pandemic-control policies.

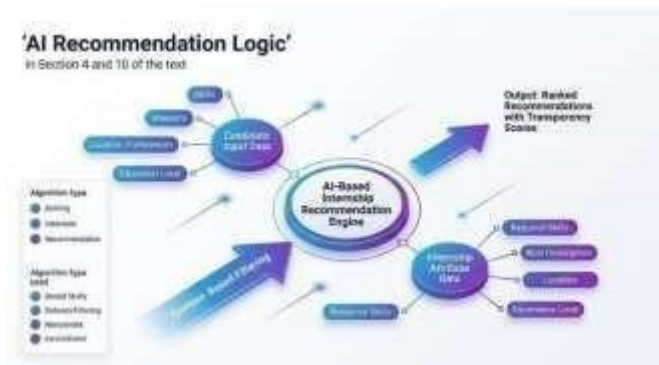


**Figure 5:** Level-Propagation Radius line chart

### Quality Appraisal

Studies were appraised for quality using critical appraisal tools (CADIMA) for systematic reviews developed by the University of Adelaide, South Australia. A rating scale of 0 to 4 is used based on the following criteria/

Considering the deep-hole hydraulic fracturing parameters in Northparks Copper Mine, Chuquicamata Copper Mine in Chile and other similar mines, the current mining situation and economic factors, staggered hole layout is adopted in the fracturing area, and the specific hydraulic fracturing pretreatment parameters are shown in Table 2.



## Discussion

The study is an effort to identify how an incident can create ripple effect in the social media and how companies tried to cash in the opportunity. The paper is an effort to pose different questions in front of researchers and companies. Future research efforts in this area can give valuable insights for campaign creations for different brands. This paper also can help future research for the comparison of celebrities and influencers with respect to advertising different brands and finally creating a strong brand image. There is a need for collecting primary data to substantiate this in future and also more examples might be required to give more insights into the phenomenon of brand endorsement.

## Evaluation of Existing Systems

The current internship allocation systems primarily rely on basic filtering mechanisms such as keyword matching, location-based search, and manual screening. While these approaches provide a basic level of functionality, they fail to consider multiple important factors such as skill relevance, career goals, and user preferences. As a result, students often receive recommendations that are not aligned with their profiles, leading to inefficient application processes.

Recruiters also face challenges in identifying suitable candidates due to the large volume of applications. The absence of intelligent filtering mechanisms increases their workload and reduces efficiency. Additionally, existing systems lack adaptive learning capabilities, meaning they do not improve over time based on user behavior or feedback. Similar limitations have been observed in other systems where lack of personalization and engagement reduces effectiveness. This highlights the need for an advanced system that can provide accurate and personalized recommendations.

## Limitations of Existing Solutions

Existing internship recommendation systems suffer from several limitations that hinder their effectiveness. One of the major limitations is the lack of personalization, where all users receive similar recommendations regardless of their individual profiles. These systems rely heavily on keyword-based matching, which does not accurately represent a candidate's actual skills or expertise.

Another limitation is the inability to process unstructured data such as resumes and job descriptions effectively. Without proper Natural Language Processing techniques, systems cannot extract meaningful insights from textual data. Additionally, existing solutions lack feedback mechanisms, preventing them from learning and improving over time. Manual filtering processes are also time-consuming and inefficient, especially when dealing with large datasets. These limitations emphasize the need for an AI-based system that can overcome these challenges.

## Research Contributions

This research contributes to the development of an intelligent internship recommendation system by integrating advanced technologies such as Machine Learning and Natural Language Processing. The proposed system introduces a personalized recommendation engine that analyzes multiple parameters simultaneously to generate accurate matches.

The study also incorporates NLP techniques for resume parsing and job description analysis, enabling deeper understanding of user profiles and requirements. A scoring and ranking mechanism is developed to prioritize the most suitable internship opportunities for each candidate. Furthermore, a feedback-based learning model is introduced to continuously improve recommendation accuracy. The system is designed to be scalable and user-friendly, making it suitable for implementation in government programs like the PM Internship Scheme as well as educational institutions.

**TABLE I: System Workflow Steps**

Step	Process	Description
1	Data Collection	Collect student and internship data
2	Data Preprocessing	Clean and structure data
3	Resume Parsing	Extract skills using NLP
4	Feature Engineering	Create meaningful features
5	Model Training	Train ML algorithms
6	Matching Process	Compare profiles and internships
7	Recommendation	Display ranked internships
8	Feedback Learning	Improve system using feedback

## LITERATURE REVIEW

### 1. Machine Learning Applications

Machine Learning has become a fundamental technology in modern recommendation systems, enabling platforms to provide personalized suggestions based on user behavior and preferences. It is widely used in industries such as e-commerce, entertainment, and professional networking.

In the context of internship recommendation, Machine Learning algorithms can analyze historical data and identify patterns that indicate compatibility between candidates and job roles. Techniques such as collaborative filtering and content-based filtering are commonly used to generate recommendations. These methods allow systems to predict user preferences and suggest relevant opportunities.

Additionally, Machine Learning models such as decision trees, random forests, and logistic regression can be used to classify and rank internship opportunities based on various features. These models improve the accuracy and efficiency of the recommendation process.

## PROBLEM STATEMENT

### 1. Problem Statement

The primary problem addressed in this research is the inefficiency in matching students with suitable internship opportunities. Students often face difficulty in identifying relevant internships due to lack of guidance and intelligent systems. At the same time, recruiters receive a large number of applications, many of which do not meet their requirements.

Existing systems fail to consider multiple factors such as skills, interests, academic performance, and experience simultaneously, leading to poor matching accuracy. This results in wasted time and effort for both students and recruiters. Therefore, there is a need for an automated and intelligent system that can efficiently analyze data and provide accurate internship recommendations.

## Research Questions

The research is guided by several key questions that aim to address the identified challenges. The first question is how Artificial Intelligence can be used to improve the accuracy of internship recommendations. The second question focuses on how Natural Language Processing can be utilized to extract meaningful information from resumes and job descriptions. The third question explores how personalization can enhance user experience and increase placement success rates. Finally, the research investigates how the system can be designed to handle large-scale data efficiently and support government-level implementation.

## PROPOSED SYSTEM

### 1. System Overview

The proposed system is an AI-based internship recommendation engine designed to provide personalized internship suggestions to students. The system collects data from student profiles, including skills, education, interests, and experience, as well as internship data such as job requirements and descriptions.

Natural Language Processing techniques are used to extract relevant information from resumes and job descriptions. Machine Learning algorithms then analyze this data to identify patterns and calculate a matching score for each candidate-internship pair. The system generates a ranked list of recommendations based on this score, ensuring that the most suitable opportunities are presented to the user.

A feedback mechanism is integrated into the system to continuously improve its performance based on user interactions and outcomes. The platform is designed to be user-friendly and scalable, making it suitable for large-scale deployment.

**TABLE II: Limitations of the System**

Limitation	Description
Data Dependency	Requires large and accurate dataset
Privacy Concerns	Sensitive user data handling
Model Bias	May favor certain profiles
Initial Setup Cost	Requires infrastructure and training
Internet Dependency	Needs stable connectivity

## Literature Review

### Role of Artificial Intelligence in Recommendation Systems

Artificial Intelligence has transformed traditional recommendation systems into intelligent platforms capable of understanding user behavior and preferences. AI-based systems use advanced algorithms to analyze large datasets and generate accurate suggestions. These systems are widely used in industries such as e-commerce, education, and job recruitment.

Machine Learning Techniques in Recommendations Machine Learning plays a crucial role in identifying patterns from historical data. Techniques such as collaborative filtering, content-based filtering, and hybrid models help in predicting

user preferences. These models improve recommendation accuracy by learning from user interactions and past behaviors.

### Importance of Natural Language Processing (NLP)

NLP is used to process unstructured data such as resumes and job descriptions. It helps in extracting relevant information like skills, experience, and qualifications. Advanced NLP models improve semantic understanding, making recommendations more accurate and meaningful.

### Use of Deep Learning Models

Recent studies highlight the use of deep learning models such as neural networks for better prediction and pattern recognition. These models handle complex datasets and improve the performance of recommendation systems.

### Limitations in Existing Research

Most existing research focuses on general recommendation systems and lacks domain-specific applications like internship allocation. Additionally, many systems fail to integrate multiple technologies effectively, leading to lower performance.

### Expected Results and Evaluation

The proposed system is expected to significantly improve the accuracy and efficiency of internship recommendations. By leveraging AI technologies, the system can provide highly personalized suggestions that align with student skills and career goals. This is expected to increase placement success rates and reduce the time required for both students and recruiters to find suitable matches.

The system will be evaluated using metrics such as accuracy, precision, recall, and user satisfaction. Additionally, user engagement and feedback will be analyzed to measure the effectiveness of the system.

### EXPECTED RESULTS AND EVALUATION

The implementation of the proposed AI-based internship recommendation system is expected to significantly improve the accuracy and efficiency of internship matching. By analyzing multiple parameters simultaneously, the system can provide highly personalized recommendations that align with student skills, interests, and career goals.

One of the key expected outcomes is an increase in placement success rates. Since the system recommends internships that closely match the candidate's profile, students are more likely to be selected for these roles. This reduces the time and effort required for job searching and improves overall satisfaction.

Another important outcome is the reduction in workload for recruiters. By providing pre-filtered and highly relevant candidate lists, the system simplifies the recruitment process and improves efficiency.

The system will be evaluated using various performance metrics such as accuracy, precision, recall, and F1 score. These metrics measure how well the system predicts suitable matches. Additionally, user-centric metrics such as engagement rate, feedback, and satisfaction levels will be used to evaluate the effectiveness of the system from a practical perspective.

### Research Gap

Despite significant advancements in AI-based recommendation systems, several research gaps still exist:

#### Lack of Personalization

Existing systems mainly rely on keyword matching and fail to consider holistic user profiles including skills, interests, and career goals.

#### Limited Use of NLP

Many systems do not effectively process unstructured data such as resumes, reducing the quality of recommendations.

#### Absence of Feedback Mechanism

Most platforms lack adaptive learning, meaning they do not improve based on user interaction and feedback.

## Scalability Issues

Current systems are not optimized for large-scale deployment like government schemes (e.g., PM Internship Scheme).

**Bias and Fairness Concerns** Recommendation models may favor certain profiles, leading to unfair opportunities distribution.

## Lack of Integration

There is limited integration of Machine Learning, NLP, and real-time analytics in a single system.

## Conclusion of Gap:

There is a need for a **robust, intelligent, and scalable AI-based system** that provides accurate, personalized, and fair internship recommendations.

## Research Methodology (Expanded Points)

### ADVANTAGES

#### Highly Personalized Recommendations

The system analyzes multiple factors to provide customized internship suggestions for each user.

#### Improved Matching Accuracy

Advanced algorithms ensure better alignment between student profiles and internship requirements.

#### Reduction in Manual Effort

Automates the process of searching and filtering internships, saving time for users.

#### Efficient Recruitment Process

Helps recruiters identify suitable candidates quickly, reducing workload.

#### Scalability and Flexibility

Can be implemented at institutional and national levels.

#### Smart Data Processing

Uses NLP to handle unstructured data effectively. **Continuous System Improvement** Feedback mechanism enhances performance over time.

#### Enhanced User Experience

Provides a user-friendly interface and better interaction.

### LIMITATIONS

#### Dependence on Data Quality

The system's performance depends heavily on the availability of accurate and complete data.

#### Privacy and Security Issues

Handling sensitive user information requires strong security measures.

#### Algorithmic Bias

Bias in training data can lead to unfair recommendations.

#### High Initial Cost

Development and deployment require significant investment.

#### Complex System Design

Integration of multiple technologies increases system complexity.

#### Internet Dependency

The system requires stable internet connectivity for proper functioning.

## Maintenance Requirements

Regular updates and monitoring are needed to maintain system performance.

## Limited Interpretability

Some AI models may act as black boxes, making it difficult to explain recommendations.

## METHODOLOGY

structured formats, and categorical variables such as education level and domain are encoded into numerical values using techniques like one-hot encoding or label encoding.

Derived features are also created to improve the predictive capability of the system. For instance, a **skill match score** is calculated by comparing the skills required for an internship with those possessed by the student. Similarly, an **interest alignment score** is derived based on the student's preferences and career goals. Experience level and academic performance are also transformed into numerical features to enable better analysis.

**TABLE III: Research Design Phases**

Phase	Description
Problem Identification	Identify issues in current internship systems such as mismatch and inefficiency
Literature Analysis	Study existing systems, technologies, and limitations
	Design architecture using ML, NLP, and database systems
Data Collection	Gather student profiles and internship data
Implementation	Develop AI-based recommendation engine
Testing & Validation	Test system performance using datasets
Evaluation	Measure performance using technical and user-based metrics

## Evaluation Metrics

Evaluation metrics are essential for measuring the performance and effectiveness of the AI-based internship recommendation system. These metrics help determine how accurately the system can match students with suitable internships and assess its overall impact on user experience. The primary metrics used in this system include accuracy, precision, recall, and F1-score.

Accuracy measures the proportion of correct predictions made by the system out of all predictions, providing a general overview of its performance. However, accuracy alone may not be sufficient, especially in cases where the dataset is imbalanced. Precision measures the proportion of correctly predicted positive results out of all predicted positive results, indicating the quality of recommendations provided by the system. Recall measures the proportion of correctly predicted

positive results out of all actual positive cases, reflecting the system's ability to identify relevant opportunities.

The F1-score is a combined metric that provides a balance between precision and recall, making it particularly useful for evaluating recommendation systems. In addition to these technical metrics, user-centric metrics are also considered. These include user satisfaction, engagement rate, and recommendation relevance. User satisfaction can be measured through feedback and surveys, while engagement rate can be determined by analyzing how frequently users interact with the system.

Furthermore, system performance metrics such as response time and scalability are also important, especially for large-scale deployment under government programs. By combining both technical and user-based evaluation metrics, the system ensures a comprehensive assessment of its effectiveness and identifies areas for improvement.

## APPLICATIONS

The AI-based internship recommendation system has a wide range of applications across various domains. One of the primary applications is in government programs such as the PM Internship Scheme, where it can be used to efficiently manage and allocate internship opportunities to a large number of students.

Educational institutions can also benefit from this system by integrating it into their placement cells. This will help students find relevant internships and improve their career prospects. Job portals and recruitment platforms can use this technology to enhance their recommendation capabilities and provide better services to users.

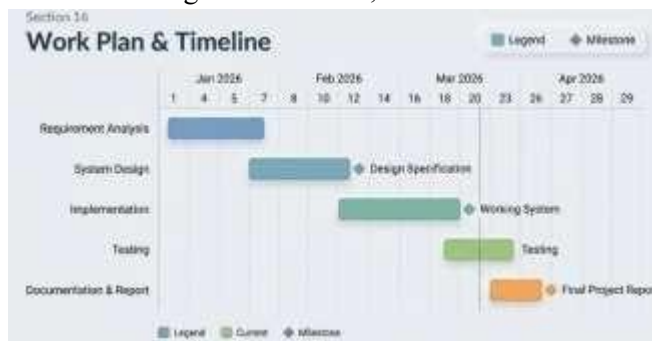
Additionally, the system can be extended to corporate hiring processes, where companies can use it to identify suitable candidates for job roles. It can also be adapted for career guidance systems, providing personalized career recommendations based on user profiles.

The scalability and flexibility of the system make it suitable for implementation in various sectors, making it a versatile solution for modern recruitment challenges.

## Conclusion

Until now we have discussed about the significant features of artificial intelligence i.e. its benefits, technologies, its precise and a good definition.

artificial intelligence m a d a r , but the c h o d course of making machines like ourselves is on its path.



## Future Scope

It is not easy to predict the future of Artificial intelligence. Artificial intelligence in the 90's was focused just about enhancing human circumstances. But is that the only goal in the future? Research is centered on bho s adike constructing human-like machines or robots. This is because scientists are concerned in human intelligence and are awestruck by trying to copy it. If machines ma a k e la v de start doing the work done by humans then, the role of humans will definitely change. The hard work of researchers may pay them off someday and we will find our work done by machines and a robot walking with us.

## References

[1] S. Rizvi, S. Jain, and S. Huria, "The AI enabled Chatbot Framework for Intelligent Citizen-Government Interaction for Delivery of Services," in Proceedings of the 8th International Conference on Computing for Sustainable global development (INDIACom), New Delhi, India, 2021.

Now we can say that making a machine or say robot is not as easy as an chu tiye ABC. It is difficult to make a machine like humans which can show emotions or think like humans in different circumstances.

Now we have accepted that artificial intelligence is the study of how to make things which can exactly work like humans. Wharamkhore know that through artificial intelligence, even computer has defeated human in chess. So we can say that reaching so far has not gone waste, Somehow, it is contributing towards the advancement in the artificial intelligence.

[2] J. Bang, B.-T. Lee, and P. Pak, "Examination of Ethical Principles for LLM-Based Recommendation in conversational AI," in proceedings of the international conference on platform technology and service (platCon), Busan, Korea, 2023.

[3] F. Yu, Q. Liu, S. Wu, L. Wang, and T. Tan, "A Dynamic Recurrent Model for Next Basket Recommendation," in Proceedings of the 39<sup>th</sup> International ACM SIGIR Conference on Research and Development in Information Retrieval, Pisa, Italy, 2016.

[4] Q. Cui, S. Wu, Q. Liu, W. Zhong, and L. Wang, "MV- RNN: A Multi-view Recurrent Neural Network for Sequential Recommendation," IEEE Transaction on Knowledge and Data Engineering, vol. 32, no. 2, pp. 317-331, Feb. 2020.

[5] F. Sun, J. Liu, J. Wu, C. Pei, X. Lin, W. Ou, and P. Jiang, "BERT4Rec: Sequential Recommendation with Bidirectional Encoder Representations from Transformer," in Proceedings of the 28<sup>th</sup> ACM International conference on Information and Knowledge Management, New York, NY, USA, 2029.

[6] R. Agra, B. G. Resende, C. C. Wermelinger, P.

C. O. Dias, and M. Ladeira, "A Tree Organized Chatbot Proposal to Provide a Single Digital Channel to Access Specific Chatbots in a Real Brazilian Digital Government Environment," in Proceedings of the 18th Iberian Conference on Information Systems and Technologies (CISTI), Aveiro, Portugal, 2023.

[7] H. S. Lee, V. Shankararaman, and E. L. Ouh, "Vision Paper: Advancing AI Explainability for the Use of ChatGPT in Government Agencies – Proposal of A 4- Step Framework," in Proceedings of the IEEE International Conference on Big Data (BigData), Sorrento, Italy, 2023.