



# A WEB-BASED RECRUITMENT PLATFORM INTEGRATING MACHINE LEARNING FOR PERSONALITY PREDICTION

Anjana K.A<sup>1</sup>, Arathi Chandran R.I<sup>2</sup>

Department of Computer Science, Christ Nagar College, Maranalloor, Thiruvananthapuram, Kerala, India<sup>1,2</sup>

**Abstract:** The Personality Prediction System is a web-based recruitment platform that leverages machine learning to enhance the hiring process by predicting candidate personalities and recommending suitable job roles. Developed using ASP.NET for the frontend, the system incorporates a Gradient Boosting Machine (GBM) model to analyze responses from a multiple-choice personality test and generate predictions. The platform is structured into three main modules: Admin, Company, and Candidate. Admins can manage and communicate with both companies and candidates, view test results, and oversee system activity. Companies can create and manage job vacancies, initiate personality assessments for applicants, and view the resulting predictions to aid in selection. Candidates can update their profiles, generate resumes using ASP.NET Web API and iTextSharp, take personality tests when requested by companies, and receive tailored job recommendations based on their predicted personality type. The system includes a messaging feature across all modules for effective communication, making it a comprehensive, intelligent, and user-friendly solution for modern recruitment.

**Keywords:** Personality Prediction, Recruitment System, Machine Learning, Gradient Boosting Machine, Job Recommendation

## I. INTRODUCTION

Personality prediction is an emerging area in artificial intelligence and psychology that focuses on analyzing individual traits and behaviors to determine personality types. It plays a significant role in various domains such as education, healthcare, and especially recruitment, where understanding a candidate's personality can be crucial to determining their suitability for a specific role. General personality prediction involves collecting responses to structured questionnaires, analyzing patterns, and classifying individuals into personality categories such as the Big Five traits (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). By applying machine learning techniques, personality prediction can be automated and scaled, offering faster, consistent, and data-driven insights.

The Personality Prediction System aims to utilize this concept in the context of recruitment by offering a platform where companies can assess not only the qualifications of candidates but also their personalities. The system is developed as a web application using ASP.NET for the frontend and integrates a Gradient Boosting Machine (GBM) model to perform personality prediction. Candidates take a multiple-choice test consisting of 10 questions, each with four options. Their responses are processed by the GBM model, which then classifies their personality and suggests job roles that best match their traits. This approach ensures that candidates are not only technically fit for a job but also psychologically aligned with the company culture and role expectations, improving employee satisfaction and retention.

The system is divided into three main modules: Admin, Company, and Candidate. The Admin module handles approval, monitoring, and communication with both companies and candidates. The Company module allows recruiters to manage job vacancies, request personality tests, and view the results to make informed hiring decisions. The Candidate module enables users to update their profiles, apply for jobs, take personality tests, and generate PDF resumes using ASP.NET Web API and iTextSharp. A built-in messaging system supports communication across all modules. By integrating general personality prediction with recruitment workflows, the system provides a comprehensive, intelligent, and efficient solution for modern hiring challenges.

## II. OBJECTIVES

The main objective of the Personality Prediction System is to enhance the recruitment process by integrating personality analysis using machine learning to help employers select candidates who are not only technically qualified but also



psychologically suitable for specific job roles. The system aims to provide a user-friendly web application where companies can assess candidate personalities through a structured multiple-choice test, analyzed by a Gradient Boosting Machine (GBM) model. It seeks to streamline hiring by recommending roles that match a candidate's personality, thereby improving job satisfaction and reducing turnover. Additionally, the system facilitates easy management of candidates, companies, and vacancies through dedicated modules, while offering features like resume generation, personality-based job recommendations, and internal messaging to support efficient communication and decision-making among all users.

### **III. LITERATURE REVIEW**

Recent advancements in personality prediction systems have shown significant potential in improving traditional recruitment processes. Most studies adopt the Big Five Personality Traits (OCEAN) model as the foundation for assessing personality, while others utilize the MBTI framework. These systems aim to automate personality evaluation using machine learning and deep learning techniques for more accurate, data-driven decision-making in fields like HR, marketing, and mental health.

Several studies, such as papers 1, 2, and 3, have proposed automated systems using questionnaire data combined with machine learning algorithms like Random Forest, Logistic Regression, and SVM. These models have demonstrated improved accuracy over traditional methods, enabling fair and scalable personality assessments. Paper 4 enhances this further by integrating video resume analysis with personality tests, streamlining recruitment through a full electronic human resource (E-HR) system.

Other research, such as papers 5, 6, and 7, focuses on using text data from CVs or online responses, employing NLP techniques like TF-IDF, NLTK, and clustering algorithms to predict personality. Papers 8 to 12 explore deep learning models such as BERT, RoBERTa, and LSTM for analyzing social media content, highlighting the effectiveness of using large datasets and contextual language models to predict traits from online behavior.

In papers 13 to 17, hybrid approaches are presented, combining aptitude or psychometric tests with machine learning models, or using Facebook and Twitter data to identify personality traits. These studies report promising accuracies, suggesting that personality-job fit can be significantly improved through such methods.

Lastly, papers 18 to 25 explore advanced and hybrid deep learning techniques, such as Graph Convolutional Networks (GCNs), BERT-based architectures, and even multi-modal approaches combining text and facial image data. These models show high accuracy and scalability, reinforcing the role of artificial intelligence in enhancing recruitment, psychological evaluation, and personalized services.

### **IV. EXISTING SYSTEM**

Many existing personality prediction systems focus on using machine learning models to analyze questionnaire responses or text data from social media, resumes, or online forms to predict personality traits. Common approaches include using algorithms such as Random Forest, Support Vector Machines (SVM), Logistic Regression, and more recently, deep learning models like BERT and LSTM. These systems often rely on well-known personality frameworks like the Big Five (OCEAN) or MBTI models to classify candidates' personality types. Some systems also integrate natural language processing (NLP) techniques to extract features from unstructured data, such as social media posts or written responses, aiming to provide a scalable and automated solution for personality assessment.

Several platforms integrate personality prediction with recruitment by combining aptitude tests, psychometric assessments, and resume analysis to support better candidate-job fit decisions. Others incorporate multimedia data, such as video resumes or facial recognition, to enrich personality analysis and candidate profiling. These systems aim to reduce the subjectivity and time involved in traditional hiring methods like interviews and manual CV screening.

However, existing systems have several disadvantages. Many rely heavily on large datasets that may not always be available or representative, leading to biased or less accurate predictions. Text-based personality prediction from social media may raise privacy concerns and can be affected by noisy or irrelevant data. Questionnaire-based systems can be limited by the quality and honesty of candidate responses, and longer or complex questionnaires may reduce user engagement. Additionally, integrating multiple data sources (e.g., text, video, images) often increases system complexity and computational requirements, making real-time or large-scale deployment challenging. Many systems also lack an



end-to-end platform that combines personality prediction with job vacancy management, resume generation, and communication tools, limiting their practical application in recruitment workflows.

## V. PROPOSED SYSTEM

The proposed Personality Prediction System aims to create an integrated, user-friendly web platform that enhances the recruitment process by combining personality analysis with job matching. Built using ASP.NET for the frontend, the system employs a Gradient Boosting Machine (GBM) model to predict candidates' personalities based on their responses to a concise, 10-question multiple-choice test. This prediction helps recommend job roles that align with the candidate's traits, enabling companies to make more informed and objective hiring decisions. The platform is divided into three modules—Admin, Company, and Candidate—each tailored to manage their respective tasks such as approval workflows, vacancy management, personality test requests, and profile updates. Additionally, candidates can generate professional PDF resumes through an ASP.NET Web API integrated with iTextSharp, further streamlining the application process. The system also incorporates a built-in messaging feature to facilitate seamless communication among administrators, companies, and candidates. Unlike many existing solutions, this platform combines personality prediction with comprehensive recruitment functionalities, including vacancy posting, candidate management, and test result tracking. By automating personality assessments and linking them directly to job recommendations, the system reduces subjectivity in hiring and improves the chances of employee-job compatibility. Moreover, its modular design and use of machine learning ensure scalability, accuracy, and ease of use, making it a practical tool for modern recruitment challenges.

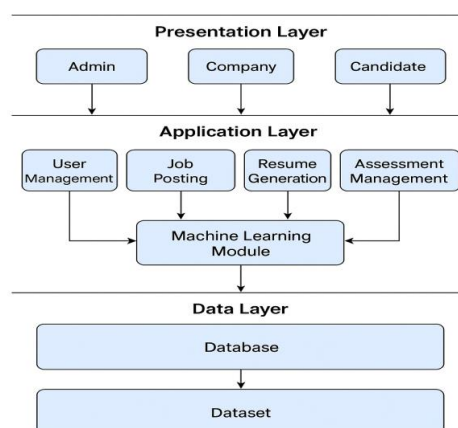


Fig 1: Architecture of the proposed system

### Gradient Boosting Machine

Gradient Boosting Machine is a powerful machine learning technique used for classification and regression tasks. It builds an ensemble of weak prediction models, typically decision trees, in a sequential manner. Each new tree is trained to correct the errors made by the previous ones, gradually improving the overall prediction accuracy. GBM works by optimizing a loss function using gradient descent, which helps minimize prediction errors step by step. Its ability to handle complex, non-linear relationships and its robustness against overfitting make GBM well-suited for personality prediction tasks, where subtle patterns in questionnaire responses need to be analyzed to accurately classify personality traits.

### Big Five personality traits

The Big Five Personality Traits, also known as the OCEAN model, represent a widely accepted framework for understanding human personality. It categorizes personality into five broad dimensions: Openness (creativity and curiosity), Conscientiousness (organization and dependability), Extraversion (sociability and assertiveness), Agreeableness (compassion and cooperativeness), and Neuroticism (emotional stability and anxiety). This model provides a comprehensive yet straightforward way to capture individual differences, making it popular in psychological assessments and applications such as recruitment. In your system, candidates' responses to personality tests are evaluated against these five traits, allowing the GBM model to predict their personality profile and recommend suitable job roles accordingly.



## VI. IMPLEMENTATION

- Requirement Analysis and Design

Define system requirements, user roles (Admin, Company, Candidate), and key functionalities. Design the overall system architecture, database schema, and user interface layouts.

- Data Collection

Gather personality questionnaire data relevant to the Big Five Personality Traits. This includes collecting responses from candidates via a structured 10-question multiple-choice test designed to capture trait-related behavior.

- Data Preprocessing

Clean the collected data by handling missing or inconsistent responses. Encode categorical answers into numerical values suitable for machine learning algorithms. Normalize or scale features if necessary to improve model performance.

- Machine Learning Model Training

Train the Gradient Boosting Machine (GBM) model using the preprocessed questionnaire data. Perform model tuning and validation to achieve optimal accuracy in predicting personality traits based on candidate responses.

- Frontend Development

Build the web interface using ASP.NET, covering all modules—Admin, Company, Candidate. Implement interactive forms for registration, profile management, vacancy posting, personality testing, and messaging.

- Backend Development

Develop server-side logic in C# to manage authentication, role-based access, database operations, and API integration with the machine learning model.

- Personality Test Integration

Integrate the personality test within the candidate module, allowing candidates to take the test upon company request. Collect responses and send them to the GBM model for prediction.

- Model Deployment and Integration

Embed the trained GBM model into the system to provide real-time personality predictions. Ensure smooth data exchange between the frontend, backend, and the prediction engine.

- Resume Generation Module

Implement PDF resume generation using ASP.NET Web API and iTextSharp library, enabling candidates to create professional resumes based on their profile data.

- Messaging System Implementation

Create an internal messaging platform allowing communication among Admins, Companies, and Candidates via inbox and compose functionalities.

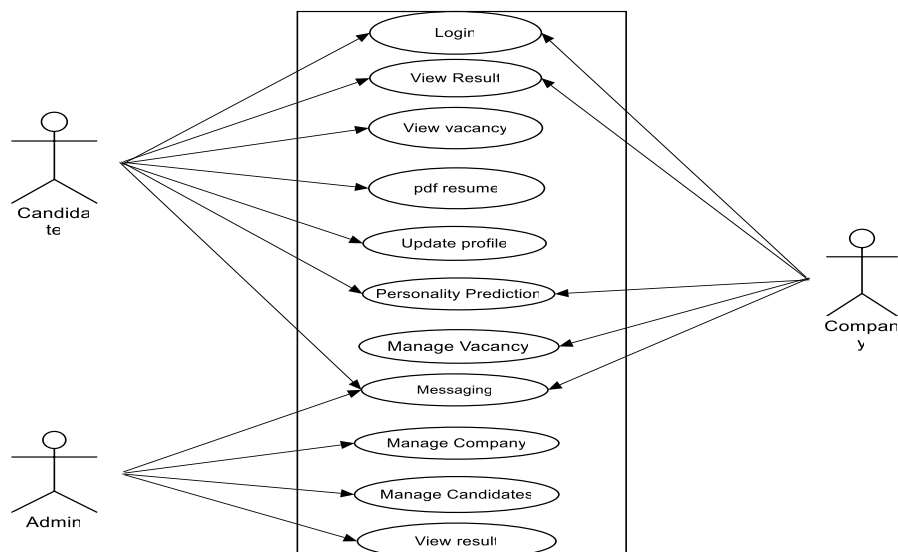


Fig 2: Use case Diagram



## VII. RESULT

**Big Five Personality Test**

Q1: I see myself as someone who is emotionally stable.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q2: I see myself as someone who remains calm in tense situations.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q3: I see myself as someone who values artistic experiences.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q4: I see myself as someone who prefers work that is routine.  
☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5

Q5: I see myself as someone who avoids philosophical discussions.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q6: I see myself as someone who gets chores done right away.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q7: I see myself as someone who perseveres until the task is finished.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q8: I see myself as someone who enjoys artistic and cultural experiences.  
☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5

Q9: I see myself as someone who often feels blue.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Q10: I see myself as someone who rarely feels anxious or afraid.  
☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Fig 3: Personality test

Your personality scores:

Openness: 3.50, Conscientiousness: 3.50, Extraversion: 4.00, Agreeableness: 4.00, Neuroticism: 4.00

Suggested Role: Sales Executive

Fig 4: Prediction and recommendation

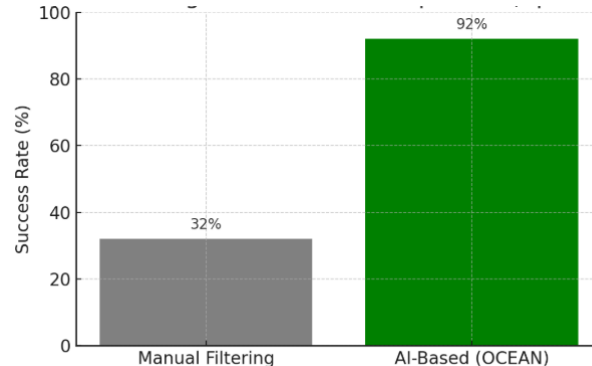


Fig 5: Success rate

This level of result analysis brings transparency and clarity to both candidates and employers. Candidates receive valuable insights into their own personality, which can help guide their career choices. Employers benefit by gaining a clearer understanding of whether a candidate fits the behavioral expectations of a role. Moreover, the system enhances traditional recruitment processes by integrating psychological evaluation and machine learning-based matching, ultimately making job recommendations more accurate, unbiased, and personalized.

## VIII. CONCLUSION

The Personality Prediction System is a web-based recruitment platform developed using ASP.NET, integrating a GBM (Gradient Boosting Machine) model to predict candidate personality based on a short multiple-choice test. The system is divided into three modules—Admin, Company, and Candidate—each with specific functionalities such as vacancy management, test results viewing, resume generation, and internal messaging. It aims to enhance the recruitment process by helping companies identify candidates who not only have the required skills but also the right personality fit for a role. While the system offers a user-friendly interface and efficient workflow, it has limitations including reliance on a limited set of test questions for personality prediction, potential bias in the ML model if not properly trained, and the need for continuous updates to maintain model accuracy and relevance to evolving job requirements.





## IX. FUTURE SCOPE

The Personality Prediction System holds significant potential for future development and real-world application, especially in enhancing recruitment accuracy and efficiency. As hiring practices evolve, integrating advanced AI models like GBM for personality prediction can streamline candidate screening and ensure better job-role alignment. In the future, the system can be expanded to support real-time video interviews with AI-driven emotional analysis, multilingual support for global recruitment, and deeper integration with third-party HR platforms like LinkedIn or Workday. Enhanced data visualization for personality analytics and predictive performance tracking post-hiring could further empower companies to make informed decisions. Additionally, improving the model's accuracy through continuous learning from new data and expanding the test set beyond MCQs can make the predictions more robust. With its modular design and scalable ASP.NET framework, this system is well-positioned to become a comprehensive, AI-powered recruitment solution

## REFERENCES

- [1]. Sakshi Shenavi, Harshada Patil, Akanksha Patil, Amruta Sathe, Akshata Chougale, Siddhi Prabhavalkar, Prof. P. R. Patil. (2024), "personality prediction system", *International Journal of Scientific Research in Engineering and Management*, 08(05), 120-125.10.55041.
- [2]. Vijayanirmala B 1, Spoorthi D , Varsha B H , Madhialagi M , Meena G.(2024), "personality prediction system", *International Journal of Advance Research and Innovative Ideas in Education*, 10(02), 4412-4422.ijariie.com.
- [3]. Siddharth Bhatt, Yash Sharma, Priyanshu Karki, Poonam Katyal. (2022), "Personality prediction through questionnaire", *International Journal of Advance Research, Ideas and Innovations in Technology*, 08(04), 105-107. [www.IJARIIT.com](http://www.IJARIIT.com)
- [4]. Ms. L. Ancy Geoflerla, A. Deepthi Sree, Murugesan Meena, Namburi Charmika, Lakshmi Nila. (2021), "personality prediction system", *International Journal of Modern Agriculture*, 10(03), 107-114.10.13005/ijma/100301.
- [5]. Dr. P.Jeevana Jyothi, Dutta Sreevalli, Gujavarthi Lokeshwa Reddy, Dhatri Gogineni, Basava Harsha, Aradala Mohan Sai.(2022), "human personality prediction by text analysis using cnn", *International journal of food and nutritional sciences*, 11(12), 1938-1947.2012 IJFANS.
- [6]. deveshagarwal, mr. m. karthikeyan.(2022), "Personality prediction using machine learning", *International research journal of modernization in engineering technology and science*, 04(04), 212-217. [www.irjmets.com](http://www.irjmets.com)
- [7]. Sandhya Katiyar, Himdweep Walia, Sanjay Kumar.(2020), "Personality Classification System using Data Mining", *International Conference on Reliability, Infocom Technologies and Optimization*, 9(12). 1020-1023. 978-1-7281-7016-9/20/\$31.00 ©2020 IEEE
- [8]. Eggi Farkhan Tsani, Derwin Suhartono. (2023), "Personality Identification from Social Media Using Ensemble BERT and RoBERTa" *Informatica*, 47(2023), 537–544. <https://doi.org/10.31449/inf.v47i4.4771>.
- [9]. Alam Sher Khan, Hussain, Muhammad Zubair, Furqan Khan, Areeba, Hassan Ali Khalid. (2020), "Personality Classification from Online Text using Machine Learning Approach", *International Journal of Advanced Computer Science and Applications*, 11(03), 460-476. [www.ijacsa.thesai.org](http://www.ijacsa.thesai.org).
- [10]. harshitasmota, dr. saumyasharma, dr. humera khan, dr. m. malathy, dr. gurwinder singh5, dr. surjeet, dr. r. rambabu. (2024), "A novel approach to predicting personality behavior from social media data using deep learning", *International journal of intelligent systems and applications in engineering*, 12(15), 539–547. [www.ijisae.org](http://www.ijisae.org).
- [11]. Dharshni, Jakeshlniyan Pon, Monisha M, Nayanthara C, Krishna Priya G. (2021), "Personality Prediction Based on User Behavior on Social Media", *International Journal of All Research Education and Scientific Methods*, 09(06), 2295-2300, [www.ijaresm.com](http://www.ijaresm.com).
- [12]. Mawadatul Maulidah , Hilman Ferdinandus Pardede .(2021), "Prediction Of Myers-Briggs Type Indicator Personality Using Long Short-Term Memory", *Jurnal Elektronika dan Telekomunikasi (JET)*, 21(02), 104-111, doi: 10.14203/jet.v21.104-111.
- [13]. Hemalatha Kallar.(2019) , "Personality Prediction Using CV Analysis", *JETIR*, 6(04), 417-418, [www.jetir.org](http://www.jetir.org)
- [14]. Suman Maloji, Kasiprasad Mannepalili, Navya Sravani. J, K. Bhavya Sri, C. Sasidhar. (2020), " Big Five Personality Prediction from Social Media Data using Machine Learning Techniques", *International Journal of Engineering and Advanced Technology (IJEAT)*, 9(04), 2412-2417. DOI: 10.35940/ijeat.D7946.049420.
- [15]. Prajwal Kaushal, Nithin Bharadwaj B P, Pranav M S, Koushik S and Anjan K Koundinya .(2021), "Myers-briggs Personality Prediction and Sentiment Analysis of Twitter using Machine Learning Classifiers and BERT", *I.J. Information Technology and Computer Science*, 13(06), 48-60, DOI: 10.5815/ijitcs.2021.06.04
- [16]. Hetal Vora, Mamta Bhamare, Dr. K. Ashok Kumar. (2020), "Personality Prediction from Social Media Text" , *International Journal of Engineering Research & Technology (IJERT)*, 9(05), 352-357, <http://www.ijert.org>.



- [17]. Mervat Ragab Bakry, Mona Mohamed Nasr, Fahad Kamal Alsheref. (2022), "Personality Classification Model of Social Network Profiles based on their Activities and Contents", (*IJACSA International Journal of Advanced Computer Science and Applications*,13(07),16-21, [www.ijacsa.thesai.org](http://www.ijacsa.thesai.org).
- [18]. Nazila Taghvaei, Behrooz Masoumi and Mohammad Reza Keyvanpour. (2021), "A Hybrid Framework for Personality Prediction based on Fuzzy Neural Networks and Deep Neural Networks",*Journal of Artificial Intelligence and Data Mining (JAIDM)*,9( 3),283-294.
- [19]. Eric Grunenber, Heinrich Peters, Matt J. Francis, Mitja D. Back and Sandra C. Matz. (2024), "Machine learning in recruiting: predicting personality from CVs and short text responses", *Frontiers in Social Psychology*, 7(10), 320-327, DOI 10.3389/frsps.2023.1290295.
- [20]. Makkena Pramod, Mikkili Raj Kumar, Pamula Anil Kumar, Nizampatnam Naga Sarath, K. Vikas. (2018), "Identifying Personality Traits using Social Media", *IRE Journals*, 1(9),186-192.
- [21]. Hans Christian, Derwin Suhartono , Andry Chowanda and Kamal Z. Zamli. (2021), " Text based personality prediction from multiple social media data sources using pre-trained language model and model averaging", *Journal of big data*,08(10),213-220, <https://doi.org/10.1186/s40537-021-00459-1>
- [22]. S. N. Zaware, Pallavi Jadhav, Priyanka Malwadkar, Bhagyashri Patwardhan, and Gargi Rai .(2022), "Personality Prediction based on Text and Image", *NeuroQuantology*,20(19), 2447-2455, doi: 10.48047/nq.2022.20.19.NQ99207
- [23]. Muhammad Waqas,Fengli Zhang1, Asif Ali Laghari ,Ahmad Almadhor Filip Petrinc, Asif Iqbal1 · Mian Muhammad Yasir Khalil .(2025), "TraitBertGCN: Personality Trait Prediction Using BertGCN with Data Fusion Technique", *Int J Comput Intell Syst*, 13(16),400-405.
- [24]. Joshua Evan Arijanto, Steven Gerald, Cyrena Tania, and Derwin Suhartono. (2021), "Personality Prediction Based on Text Analytics Using Bidirectional Encoder Representations from Transformers from English Twitter Dataset", *International Journal of Fuzzy Logic and Intelligent Systems* 21(03), 310-316, <http://doi.org/10.5391/IJFIS.2021.21.3.310>
- [25]. Esraa Abdelhamid, Sally Ismail ,Mostafa Aref. (2024), "Ontology-Based Enneagram Personality PredictionSystem",*Human-CentricIntelligentSystems*,04(08),278-285.<https://doi.org/10.1007/s44230-024-00065-3>