



## Mental IQ Detection Using Machine Learning

PROF.J.T.PATIL<sup>1</sup>, SWALIHA SUTAR<sup>2</sup>, ANJALI BANSODE<sup>3</sup>, SAMRUDDHI FASE<sup>4</sup>,  
SAMRUDDHI SAVAIKAR<sup>5</sup>

*Dept of Information Technology, Dr. J. J. Magdum College of Engineering*

**Abstract :** Mental IQ of the user with their age, ensuring transparency and security of each user. It will also give recommendation A Mental IQ Detection using the ML technology is software based application which is designed to detect the mental IQ with their age. Mental IQ assessment plays a pivotal role in understanding cognitive abilities and predicting academic and professional success. We have used Logistic Algorithm, Linear Algorithm, etc. It starts with getting information from registration form using java on android studio, where each user will have to give test series provided by the developer. After user gives test series, that's where ML comes in where we need to process the data using different libraries and algorithms to detect the based on their IQ level. The proposed research holds promise for facilitating more accessible, objective, and personalized evaluations of cognitive abilities, thereby aiding in educational, clinical, and organizational settings.

**Keywords -** mental IQ detection, cognitive evaluation, mental health, clinical evaluations.

### I. INTRODUCTION

IQ measures intelligence based on a person's ability to reason using logic. Intelligence testing asks participants questions that tests their memory, pattern recognition, and problem-solving capabilities The test ultimately measures where an individual falls on a scale of intelligence based on other people in that age group. Formally referred to as "intellectual quotient" tests, IQ tests come in many forms. They can help diagnose intellectual disabilities or measure someone's intellectual potential [1]. They are designed to measure the global mental capacities of an individual in terms of verbal comprehension, perceptual organization, reasoning, and so on.[2] The goal is generally to assess the subject's aptitude for a certain vocation or academic study. A set of exercises meant to evaluate the ability to construct abstractions, learn, and deal with unexpected situations comprise intelligence testing[3].

Experimental evaluations conducted on a large dataset demonstrate the efficacy of the proposed approach in accurately detecting mental IQ scores. Comparative analyses with existing methods showcase superior performance in terms of accuracy, efficiency, and scalability.

Also, some apps use clever computer programs to suggest things that can help improve mental health. All these findings show that the "Mental IQ Detection" project is on the right track, as it aims to combine these ideas and use technology to help people understand their mental health and thinking skills better.[5] IQ test continue to be one of most reliable tools to measure intelligence skills of the human. The Intelligence Quotient (IQ) tests and the corresponding psychometric explanations dominate both the scientific and popular views about human intelligence.[9] The proposed framework integrates a diverse array of features extracted from cognitive tasks, psychometric assessments, and physiological signals to infer an individual's mental IQ score.

### II. RELEVANCE OF WORK

Detecting mental IQ using machine learning is a complex and challenging task, and it's a topic that has generated extensive research and discussion in the field of psychology and artificial intelligence.

IQ detection can be administered and used for a number of reasons. The most common reason why a parent would be seeking to find out their child's IQ is to 'diagnose' poor school performance. For adults, the most common reason for wanting an intelligence quotient test is for career guidance or to determine job suitability.

**Early Detection and Intervention:** ML algorithms can analyze patterns in cognitive data to detect signs of intellectual disabilities or developmental delays at an early age, allowing for timely intervention and support.

**Personalized Learning:** ML models can adapt educational materials and approaches based on an individual's mental IQ, catering to their specific strengths and weaknesses for more effective learning outcomes.

**Clinical Diagnosis and Monitoring:** ML algorithms can assist clinicians in diagnosing conditions such as intellectual disability, autism spectrum disorder, or attention deficit hyperactivity disorder (ADHD) by analyzing cognitive assessments and behavioral data.

**Predictive Analytics:** ML models trained on cognitive data can predict future academic or occupational success based on an individual's mental IQ, aiding in career guidance and decision-making.

### III. LITERATURE REVIEW

Detecting mental IQ or intelligence using machine learning is a complex and challenging task, and it's a topic that has generated extensive research and discussion in the field of psychology and artificial intelligence. While I can't provide a comprehensive literature review, I can offer an overview of some key studies and approaches related to this topic. Be aware that the field is rapidly evolving, and new research is published regularly.

Predicting IQ from Brain Imaging Data[11]. Cognitive Assessment and Educational Technology [2]. Improving fluid intelligence with training on working memory. Proceedings of the National Academy of Sciences [3]. The correlation between general intelligence (g), a general factor of personality (GFP), and social desirability. Personality and Individual Differences [6].The hierarchical structure of psychopathology: An in-the-wild internet study. Journal of Abnormal Psychology [10]. Fairness and Machine Learning. Cambridge University Press.[4]. "Tests of intelligence. The Cambridge handbook of intelligence" [20]. Inherent trade-offs in the fair determination of risk scores[5]. Intelligence Quotient Classification from Human MRI Brain Images Using Convolutional Neural Network. In 2020 12th International Conference on Computational Intelligence and Communication Networks IEEE. [13].Mobile phone enabled mental health monitoring to enhance diagnosis for severity assessment of behaviours: a review. [14]. Mental health prediction using machine learning: taxonomy, applications, and challenges. [15]. "Who is the" human" in human-centered machine learning: The case of predicting mental health from social media." [16] ."Machine learning model to predict mental health crises from electronic health records." [17].

### IV. PROPOSED METHODOLOGY

Process flow for a machine learning-based mental IQ detection project proposed:

The first stage is to collect a collection of various types of question (e.g. logical, mathematical, grammar). To ensure the machine learning model can generalize to new data, use a large and diverse dataset.

To train the machine learning model to identify different types of questions , it's necessary to categorize the collected data. This can be accomplished through supervised learning or manual labor.

Train the machine learning model: After selecting an algorithm, it must be trained on the labelled or unlabeled data. To ensure accurate generalization to new data, the model should be trained on a large dataset, which may take some time.

After training, the machine learning model should be tested on a hold-out set to determine its effectiveness. This will help to determine any areas in which the model requires.

Machine learning models can be deployed once they have been evaluated and deemed sufficient. This could include integrating the model into a web service, smartphone app, or other software.

Consider these additional factors while implementing a machine learning project for mental IQ detection:

- **Ethical Considerations:** Address ethical considerations related to privacy, fairness, and bias throughout the development process.

Ensure transparency and accountability in model development, deployment, and interpretation.

- **Data quality:** The success of any machine learning project is determined by the quality of its data. Ensuring accurate and correctly labelled data is vital.

- **Model interpretability:** The machine learning model's predictions must be understandable.

This will ensure that the model is delivering correct predictions and help locate any potential biases.

### V. OBJECTIVES

**Objective 1:** To collect data in the form of questions as per their age category and put them into respective category To implement the dataset.

**Objective 2:** The Pre-processing of Data.

**Objective 3:**Trained Model creation using logistic regression.

**Objective 4.** Create a user friendly interface through android studio .

**Objective 5.** Maintain users privacy and security through SHA-256 Algorithm.

**Objective 6.:** To Calculate the accuracy.

**Objective 7:** Mental IQ Detection of users with recommendation.

### VI. METHODOLOGY

The primary objective of the "Mental IQ Detection" project is to develop an Android application that combines machine learning-based recommendation systems with cognitive and mental health assessments.

The experimental work for the "Mental IQ Detection" project involving machine learning-based recommendation systems for mental health assessment and cognitive enhancement will require careful planning and consideration. By using KNN, linear & logistic algorithm we can recommend the user with the mental IQ.

6.1.1. Data Collection: Gather a diverse dataset of cognitive assessments, including standardized IQ tests.

Ensure the dataset covers a wide range of demographic characteristics (e.g., age, gender, education level) and cognitive abilities.

6.1.2. Feature Engineering: Select relevant features that are likely to be predictive of mental IQ, such as performance on specific cognitive tasks, educational attainment, socio-economic status, and health history.

6.1.3. Model Evaluation: Evaluate the trained models using appropriate evaluation metrics such as mean squared error (MSE), mean absolute error (MAE), or R-squared for regression tasks.

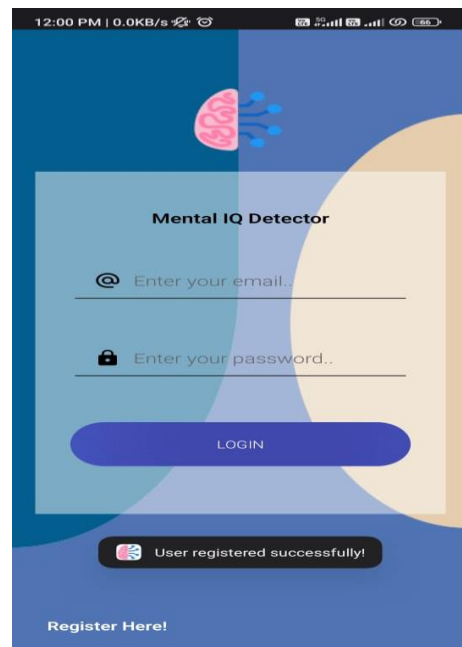
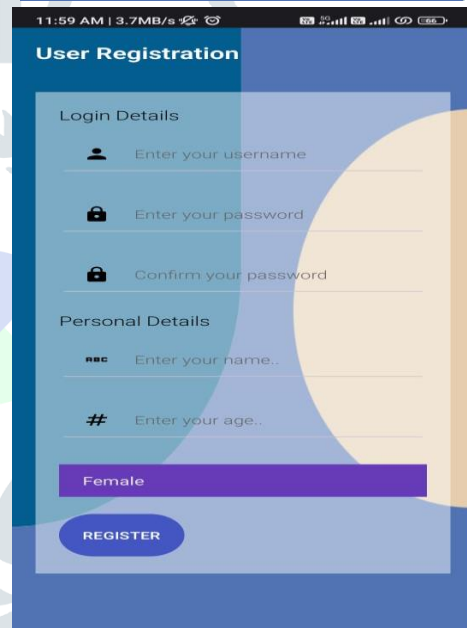
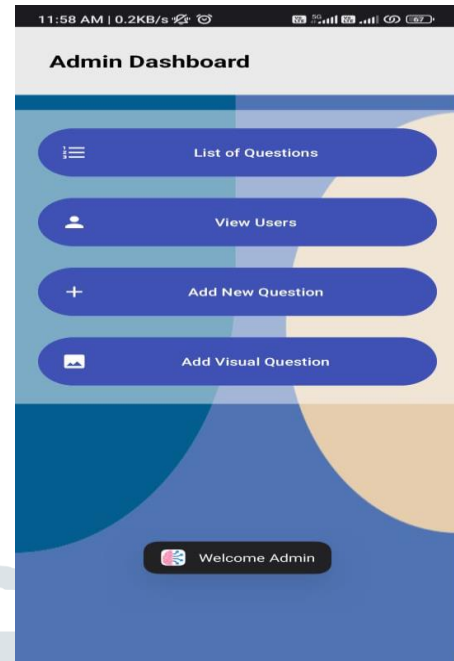
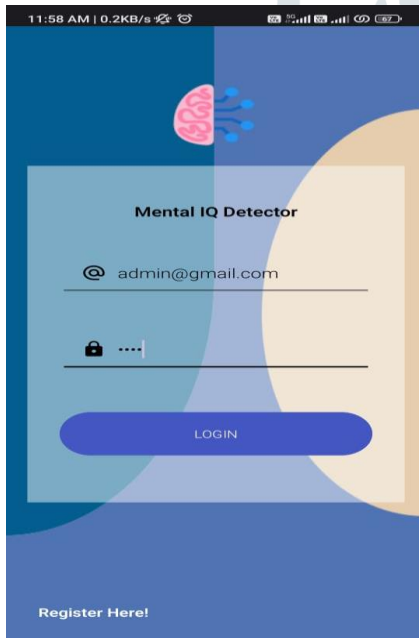
6.1.4. Explainability: Ensure that stakeholders can understand and trust the model's decisions, especially in sensitive applications like mental IQ assessment.

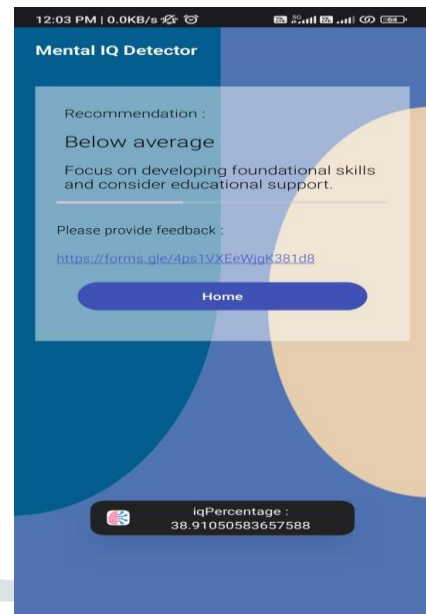
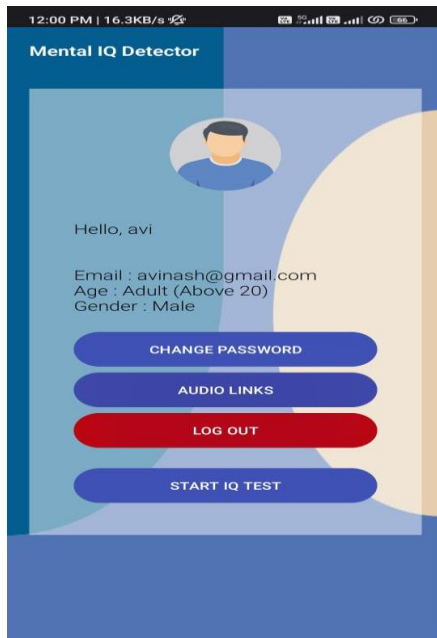
6.1.5. Ethical Considerations: Address ethical considerations related to data privacy, fairness, transparency, and accountability throughout the ML pipeline.

6.1.6. Deployment and Monitoring: Deploy the trained model in real-world settings, such as clinical practice or educational institutions, while ensuring compliance with regulatory requirements.

Monitor model performance over time and update as necessary to adapt to changing data distributions or emerging insights.

### VII. RESULTS





## VIII. CONCLUSION

In conclusion, the application of Machine Learning (ML) in the detection and assessment of mental intelligence quotient (IQ) holds great promise for advancing our understanding of human cognition and emotional well-being. ML algorithms have the potential to provide valuable insights into an individual's mental abilities, strengths, and weaknesses.

Moreover, the accuracy and reliability of ML models in mental IQ detection need to be rigorously tested and validated to ensure their effectiveness and fairness across diverse populations.

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