JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY
WAKNAGHAT, P.O. – WAKNAGHAT,
TEHSIL – KANDAGHAT, DISTRICT – SOLAN (H.P.)
PIN – 173234 (INDIA) Phone Number- +91-1792-257999
(Established by H.P. State Legislature vide Act No. 14 of 2002)

Department of Computer Science & Engineering and Information Technology

Major Project Proposal (2024-25)

Group No.	27

1. **Project Title** (*mention your project title which clearly defines the purpose and scope of your work. Capitalize first and major words of your project title.*)

Integrative Multimodal Analysis for Schizophrenia Cause Identification

2. **Team Members**

S. No.	Roll No.	Name	Mobile No.	Proficiency
1.	211420	Sarthak Kurothe	7723945225	Data Sciences
2.	211392	Aryam	6230707124	Data Sciences
3.	211308	Shivansh Kushwaha	9910330329	Data Sciences

3. **Name of Supervisor (s)** (*mention the name and designation of your supervisor. If there is any co-supervisor, please mention the department as well.*)

Dr. Gopendra Vikram Singh – **Department of Computer Science and Information Technology**

4. **Work Distribution** (*clearly state the distribution of work among team members.*)

S. No.	Roll No.	Work Distribution
1.	211420	• Implement the integrative framework for combining data modalities. • Validate the results using cross-validation and statistical methods. • Create visualizations for the analysis results. • Lead the documentation process, including report writing and preparation of the final presentation.
2.	211392	• Conduct literature review on Schizophrenia and its causes. • Collect and preprocess multimodal data. • Feature extraction and selection from raw data.

		• Assist in the design of the data pipeline for integration.
3.	211308	• Develop a machine learning model for analysing the multimodal data. • Develop a machine learning model for analysing the multimodal data. • Integrate the results from various modalities using data fusion techniques. • Analyse the performance metrics and optimize the models.

5. Problem Statement (*serves as a basis of your project and should comprise of max. 500 words spread over at least two paragraphs*)

Schizophrenia is a complex and chronic mental disorder characterized by disturbances in thought processes, perceptions, emotional responsiveness, and social interactions. Despite significant advances in understanding the disorder, the exact causes of schizophrenia remain elusive, posing a significant challenge for early diagnosis and effective treatment. Traditional methods of identifying schizophrenia have primarily relied on subjective clinical assessments, which can be inconsistent and prone to error. Moreover, the heterogeneity of the disorder suggests that multiple factors, including genetic, neurobiological, and environmental influences, contribute to its manifestation. Therefore, there is a critical need for more objective, integrative approaches that can accurately capture the multifaceted nature of schizophrenia.

This project aims to address this gap by developing an integrative multimodal analysis framework to identify the underlying causes of schizophrenia. By leveraging a combination of audio, visual images, and voice data, this approach seeks to create a comprehensive model that can analyze different aspects of the disorder simultaneously. The audio data may include speech patterns, tone, and rhythm, which can reveal cognitive and emotional states. Visual images, such as MRI scans or facial expressions, can provide insights into structural and functional abnormalities in the brain, as well as emotional responses. Voice data, capturing features like pitch and cadence, can further enhance the understanding of communication impairments associated with schizophrenia. By integrating these modalities, the project aims to develop a robust, data-driven framework that can improve the accuracy of schizophrenia diagnosis and contribute to the identification of potential causal factors, ultimately paving the way for personalized treatment strategies.

6. Main Objectives (*mention at least three objectives*)

1) Develop an integrative multimodal framework for analyzing audio, visual images and voice data to identify potential causes of schizophrenia.
2) Enhance the accuracy of schizophrenia diagnosis by combining multiple data modalities for a comprehensive analysis.
3) Contribute to the identification of biomarkers and causal factors associated with schizophrenia for personalized treatment approaches.

7. Resources Required (*mention software, hardware, and other resources*)

Category	Description	
Software Resources	• Python • TensorFlow / PyTorch • OpenCV • Pandas / NumPy	Version: 3.8 or later Version: 3.8 or later Version: 4.x Version: 1.3 or later / 1.21 or later
Hardware Resources	• High Performance GPU • Large Storage (SSD/HDD)	
Others	• YouTube • Annotation Tools	

8. Project Plan (*please update the provided Gantt Chart according to your project work plan, breaking down the proposed work into phases and tasks along with their timelines for the entire academic year 2024-25.*)

Activity	Year 2024										Year 2025									
	Aug.		Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.		May	
Literature Review																				
Analysis and Requirements																				
Project Design and Architecture																				
Implementation																				
Testing and Validation																				
Documentation and Write-up																				

Signatures (*please also mention the name of team members and supervisor (s) with date*)

Sarthak Kurothe	**Aryam**	**Shivansh Kushwaha**
(Name of Member 1)	(Name of Member 2)	(Name of Member 3, if any)

Dr. Gopendra Vikram Singh
(Name of Supervisor)

Date of Submission: 21 August 2024