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| <b>SECTION I: To Be Completed By Student</b>  |   |
| Student Name (Mr/Ms):   |   |
| Student Number:   | Candidature Load (Full-Time/Part-Time): Full-time |
| NUS Email Address:  | Contact (Hp): 84053447                            |
| Please indicate the specialisation (ie. General, DCT, CHI or MIA) based on the declaration during APAD in current semester.<br>Student's Specialisation: MIA  |   |
| <b>Declaration by Student</b><br>1. I hereby submit this application form in consultation with the main project supervisor.<br>2. I have discussed and have an understanding with the project supervisor on the type of project to work on and will be able to complete the project by the stipulated deadline set by ECE Dept, in time for the examination and grading process.<br>3. I confirm that the project scope is relevant to Computer Engineering and is within my opted area of specialisation as indicated above to fulfil the requirements of the MSc (Comp Eng) degree with specialisation.<br>4. I understand that if I do not meet the requirement as stated at item (3), by default, I will be fulfilling the MSc (Comp Eng) degree without specialisation.<br>5. I understand and accept the terms and conditions as set by ECE Dept for the MSc (Comp Eng) programme.  |   |
| <b>Student's Enrolment Instructions to ECE Dept:</b><br>6. The period of enrolment will be Academic Year 2024/2025 Semester 1<br>7. I hereby would like to enrol project course:<br>[Tick one only]<br><input type="checkbox"/> CEG5001 Computer Engineering Project (Minor) I (4 Units)<br><input type="checkbox"/> CEG5002 Computer Engineering Project (Minor) II (4 Units)<br><input checked="" type="checkbox"/> CEG5003 Computer Engineering Project (8 Units)<br>8. Course(s) to be dropped in current semester in replacement for project course (if any):<br>[Indicate Course Code and Title]<br>Course 1:<br>Course 2:  |   |
| <b>SECTION II: To Be Completed By Student Together With Main Supervisor</b>   |   |
| 1. Name of Main Supervisor (Dr/Assoc Prof/Prof): WANG XINCHAO<br>2. Dept/Institute of Main Supervisor: Department of Electronical and Computer Engineering<br>3. Name of Co-Supervisor (Dr/Assoc Prof/Prof) [if any]:<br>4. Dept/Institute of Co-Supervisor:<br>5. Project Title: Reconstructing Visual Stimuli from Brain Recordings<br>[Project title must be unique to student.]<br>6. Description of Project:<br>[Attach a separate sheet if necessary. Refer to Appendix A for template.]<br>The objective of this project is to decode visual stimuli from brain recordings to enhance our understanding of the human visual system and establish a foundation for bridging human and computer vision through Brain-Computer Interface (BCI) technologies. The challenge lies in reconstructing high-quality images with accurate semantics from brain signals, due to the complexity of brain signal representations and the limited availability of annotated data. ## Background Numerous methods have been developed to predict various features of visual stimuli— such as color, depth, and semantics—from brain recordings for reconstruction purposes. These methods, however, yield varying degrees of prediction accuracy across different features. Consequently, simply combining the predictions of multiple features does not necessarily enhance the overall reconstruction quality. ## Project Goals 1. Performance Evaluation of Predictive Models: Utilize machine learning techniques to automatically assess the performance of various models in predicting different classes of features from brain signals. 2. Feature Selection for Reconstruction: Identify the best predictive features that can be used for reconstructing visual stimuli, thereby improving the overall performance of the reconstruction model. 3. Integration with Multimodal Generation Models: Experiment with multimodal generation models, such as Stable Diffusion, to integrate and enhance the reconstruction process. |   |
| Signature of Student  | Date  |

| SECTION III: To be completed by Main Supervisor, Co-Supervisor (if any) and Examiner  |   |   |                                      |   |   |  |  |   |                  |   |
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| <b>Declaration by Supervisor:</b><br>1. I have discussed with the student and agreed on the suitability, availability of data and equipment, timeline and target scheduled for completion of the project.<br>2. I agree to supervise the project and confirmed that the facilities, resources, and data for the project are available.<br>3. I have nominated an ECE faculty member and obtained his/her agreement to be the examiner for the project.  |   |   |                                      |   |   |  |  |   |                  |   |
| <b>Details of the Project:</b><br>4. <b>Specialisation Area of Project</b><br><i>[Multiple ticks allowed]</i><br><div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Digitalization and Communication Technologies (DCT)<br/> <input type="checkbox"/> Computing Hardware Infrastructure (CHI)<br/> <input checked="" type="checkbox"/> Machine Intelligence and Applications (MIA)               </div> <div style="width: 45%;"></div> </div>   |   |   |                                      |   |   |  |  |   |                  |   |
| 5. <b>Research Area of Project</b><br><i>[Tick one only]</i><br><div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Communication &amp; Network (CN)<br/> <input type="checkbox"/> Control, Intelligent Systems &amp; Robotics (CISR)<br/> <input type="checkbox"/> Integrated Circuits &amp; Embedded Systems (ICES)<br/> <input type="checkbox"/> Microelectronic Technologies &amp; Devices (MTD)               </div> <div style="width: 45%;"> <input type="checkbox"/> Microwave &amp; Radio Frequency (MWRF)<br/> <input type="checkbox"/> Power and Energy Systems (PES)<br/> <input checked="" type="checkbox"/> Signal Analysis &amp; Machine Intelligence (SAMI)               </div> </div> |   |   |                                      |   |   |  |  |   |                  |   |
| 6. <b>Applicable to students enrolling CEG5003 (8 Units), to state the nature of the project.</b><br><i>[Tick one only.]</i><br><input type="checkbox"/> Experimental<br><input checked="" type="checkbox"/> Non-Experimental (eg. Design/Theoretical/Modelling)  |   |   |                                      |   |   |  |  |   |                  |   |
| 7. <b>Please state if the project will be carried out at ECE Laboratory.</b><br><i>[Tick one only]:</i><br><input checked="" type="checkbox"/> No<br><input type="checkbox"/> Yes      If yes, please specify the name of the laboratory:   |   |   |                                      |   |   |  |  |   |                  |   |
| <b>Nomination of Examiner:</b><br>8. Name of Examiner:<br>9. Email Address of Examiner:<br>10. Contact No of Examiner:  |   |   |                                      |   |   |  |  |   |                  |   |
| _____<br>Signature of Main Supervisor   | _____<br>Date   |   |                                      |   |   |  |  |   |                  |   |
| _____<br>Signature of Co-Supervisor   | _____<br>Date   |   |                                      |   |   |  |  |   |                  |   |
| _____<br>Signature of Examiner  | _____<br>Date   |   |                                      |   |   |  |  |   |                  |   |
| SECTION IV: To be completed by ECE Department   |   |   |                                      |   |   |  |  |   |                  |   |
| Decision by MSc Coordinator, or Graduate Associate Head, or Graduate Deputy Head.   |   |   |                                      |   |   |  |  |   |                  |   |
| <b>Checks:</b><br><table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"><input type="checkbox"/> Semester Load</td> <td style="width: 33%;"><input type="checkbox"/> New Student</td> <td style="width: 33%;"><input type="checkbox"/> Passed Courses =</td> </tr> <tr> <td><input type="checkbox"/> Max Candidature Load</td> <td><input type="checkbox"/> Current Student GPA =</td> <td><input type="checkbox"/> Failed/IC Courses =</td> </tr> <tr> <td><input type="checkbox"/> Preclusion Condition</td> <td>As at Semester =</td> <td><input type="checkbox"/> Current Enrolled Courses =</td> </tr> </table>   |   | <input type="checkbox"/> Semester Load              | <input type="checkbox"/> New Student | <input type="checkbox"/> Passed Courses = | <input type="checkbox"/> Max Candidature Load | <input type="checkbox"/> Current Student GPA = | <input type="checkbox"/> Failed/IC Courses = | <input type="checkbox"/> Preclusion Condition | As at Semester = | <input type="checkbox"/> Current Enrolled Courses = |
| <input type="checkbox"/> Semester Load  | <input type="checkbox"/> New Student  | <input type="checkbox"/> Passed Courses =           |                                      |   |   |  |  |   |                  |   |
| <input type="checkbox"/> Max Candidature Load   | <input type="checkbox"/> Current Student GPA =                                  | <input type="checkbox"/> Failed/IC Courses =        |                                      |   |   |  |  |   |                  |   |
| <input type="checkbox"/> Preclusion Condition   | As at Semester =  | <input type="checkbox"/> Current Enrolled Courses = |                                      |   |   |  |  |   |                  |   |
| The application for project course is:<br><div style="display: flex; justify-content: space-around;"> <input checked="" type="checkbox"/> <b>Approved</b> <input type="checkbox"/> <b>Not Approved</b> </div>   |   |   |                                      |   |   |  |  |   |                  |   |
| Comments (if any):  |   |   |                                      |   |   |  |  |   |                  |   |
| _____<br><b>Name and Signature</b>  | <div style="text-align: center;"> <br/>           _____<br/> <b>Date</b> </div> |   |                                      |   |   |  |  |   |                  |   |

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| <b>Name of Student:</b>   |  |
| <b>Project Title:</b><br><i>[Project title must be unique to student]</i> |  |

**Project Description:**

**Project Timeline for Completion:**