**I. The EchoHeart**

The EchoHeart project is a pioneering initiative that aims to develop an empathetic AI system, capable of detecting and responding to human emotions. The project combines cutting-edge artificial intelligence, biometric sensors, and computer vision to create a holistic emotional intelligence system.

**II. Independent Study Course Description** - **Math**

**Course Title:** Biometric Signal Processing for Empathetic AI

**Course Description:** This independent study explores the mathematical foundations of biometric signal processing, focusing on the analysis and interpretation of physiological signals for empathetic AI systems.

**Learning Objectives and Outcomes:**

* Develop a deep understanding of biometric signal processing techniques and their applications in empathetic AI.
* Implement algorithms for heart rate variability analysis and machine learning models for emotional state classification.
* Design a biometric sensor interface and data acquisition protocol.

**III. Independent Study Course Description** - **Design**

**Course Title:** Empathetic AI System Design and Integration

**Course Description:** This independent study focuses on the design and integration of an empathetic AI system, incorporating biometric sensors, computer vision, and natural language processing.

Learning Objectives and Outcomes:

* Design a user-centered interface for the empathetic AI system.
* Develop a system to integrate biometric sensor data, computer vision, and natural language processing.
* Implement emotional intelligence capabilities and response strategies.

**IV. Project Integration and Collaboration**

The Math Independent Study and Design Independent Study courses will work together to achieve the EchoHeart project's goals. Key integration points and milestones include:

MAT will focus on developing the emotional intelligence algorithms and biometric signal processing techniques.

DES will concentrate on designing the user-centered interface, writing reports, and conducting tests to evaluate the system's performance.

Regular meetings and updates will ensure that both courses are aligned and working towards the same goals.

**Key integration points and milestones**

**Week 4:** Biometric sensor interface and data acquisition protocol design

**Week 6:** Emotional intelligence algorithm development and integration

**Weeks 8-10:** System testing and iteration

**Week 12:**  Final project presentation and demo

**V. Project Timeline and Milestones**

Weekly Check-Ins : TBD

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| --- | --- | --- |
| Week 1-2 | Week 3-4 | Week 5-6 |
| * Project introduction * Goal setting * Literature review | * Biometric sensor interface * Data acquisition protocol design | * Emotional intelligence algorithm development * Discord API and initial system integration |
|  | Biometric sensor interface design review (Week 4) | Emotional intelligence algorithm review (Week 6) |
| Week 7-8 | Week 9-10 | Week 11-12 |
| * Unit testing and integration testing * System-level testing for seamless interaction between components * Identify and address any issues or bugs that arise during testing * Refine the system's performance and accuracy based on testing results | Final project refinement and preparation:   * Polish the system's user interface and user experience * Ensure all components are fully integrated and functioning as expected * Prepare the final project presentation and demo * Complete any remaining tasks or deliverables | Final project presentation and demo:   * Showcase the fully functional EchoHeart system * Demonstrate its capabilities and features * Receive feedback and evaluation from instructors and peers |
| System testing and iteration review (Week 8) |  | Final project submission (Week 12) |