IEEE IES Generative AI Hackathon Registration Form

Welcome to the registration for the IEEE IES Generative AI Hackathon! We're excited to bring together bright minds to innovate and create solutions using generative AI. This form is your first step towards participating in an event designed to challenge, inspire, and push the boundaries of what's possible with AI.
By filling out this form, you'll provide us with the information needed to ensure you have a seamless and productive hackathon experience. Please complete all sections accurately and thoroughly. Your journey to making a significant impact starts here!
Introduction
Before you dive into filling out the form, here are a few important notes:

- **Eligibility:** Participation is anyone older than age 18.
- **Team Registration:** If you're participating as a team, please designate one member to fill out this form on behalf of the entire team. Ensure you have all necessary information from each team member.
- **Deadline:** The registration closes on 15th February 2024. Make sure to submit your form before this date to secure your spot.

Privacy Notice
Your privacy is important to us. The information collected through this form will be used solely for the purposes of organizing and conducting the hackathon. It will not be shared with third parties without your consent.
Instructions for Completion

- Take your time: Read through each section carefully to ensure you understand what's required.
- Be thorough: Provide detailed and accurate information to avoid delays in your registration.
- Review before submitting: Double-check your responses for completeness and accuracy.

Participant Information

1. Full Name *

Demuni Anjula Ananda de Silva

2. Your Email *

anjula2001ananda@gmail.com

3. Phone Number (With country code) *

+94 767409724

4. IEEE Membership Number

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5. IEEE Membership Grade

- ○ Student
- ○ Graduate Student
- ○ Member
- ○ Senior Member

6. Are you an IEEE IES Member? *

- ○ Yes
- ◉ No

7. Country of residence *

Sri Lanka

Affiliation Details

8. Affiliation (University/Company/Organization) *

University of Peradeniya

9. Position/Role *

Undergraduate

10. Department (if applicable) *

Electrical and Electronic Engineering

Team Composition

11. Team Name

NeuralNest

12. Number of Team Members

2

13. Names of Team Members with IEEE membership numbers (if applicable)

1.W.R.A Fernando
2.H.H. Weerasinghe

Project Description

14. Project Title *

A Self-Stabilizing Spoon for Parkinson's Patients

15. Brief Description of the Project *

Our project involves creating a self-stabilizing spoon tailored for individuals with Parkinson's disease. Hand tremors, common among Parkinson's patients, often hinder their ability to eat independently. Our spoon incorporates sensors and actuators to stabilize its position in real-time, ensuring steady and controlled movements during meals. With a modular design, intuitive interface, and embedded intelligence for data analysis, our spoon aims to enhance user autonomy, reduce caregiver burden, and contribute to long-term health monitoring.

16. Problem Domain (More information on domains can be found in https://ai.ieee-ies.org) *

- [ ] Human-Machine Collaboration
- [ ] Anomaly Quality Control and Defect Detection
- [ ] Process Optimization and Decision Support
- [x] Generative Design
- [ ] Predictive Maintenance
- [ ] Supply Chain Efficiency
- [ ] Sustainable Manufacturing

17. What problem does your project aim to solve? *

Our project aims to address the challenge faced by individuals with Parkinson's disease who experience hand tremors, particularly during activities such as eating. These tremors can significantly impact their ability to eat independently and with dignity, leading to a loss of autonomy and reduced quality of life. By developing a self-stabilizing spoon, we aim to provide these individuals with a solution that enables them to regain control over meal times, promoting independence, confidence, and improved well-being. The spoon's real-time compensation for hand tremors ensures stable and controlled movements, allowing users to eat with greater ease and comfort. Overall, our project seeks to enhance the daily lives of individuals living with Parkinson's disease by addressing a fundamental challenge in their ability to perform essential activities of daily living.

18. What technologies/equipments will be used/developed during the hackathon? *

Our project for the IEEE IES Generative AI Hackathon involves the development of a self-stabilizing spoon aimed at improving the quality of life for individuals with Parkinson's disease. To achieve this, we will utilize a combination of technologies, equipment, and AI techniques:

Hardware Components and Sensors:

We will integrate microcontrollers such as Arduino or ESP32 along with sensors like accelerometers and gyroscopes to detect hand tremors and movements accurately.
Software Development and AI Algorithms:

Programming languages like Python and C/C++ will be used for microcontroller programming and high-level logic. AI algorithms, including machine learning and reinforcement learning, will be implemented to analyze sensor data and adjust the spoon's position in real-time based on user tremor patterns.
Data Processing and Analysis:

Python libraries such as NumPy, SciPy, and Pandas will aid in processing and analyzing sensor data collected during testing. Machine learning algorithms will be trained on this data to detect tremor patterns and personalize the spoon's behavior for individual users.
Communication and Collaboration:

Version control systems like Git and collaboration platforms such as GitHub will facilitate collaborative development, allowing team members to manage code, track changes, and coordinate efforts effectively. Communication tools like Slack or Discord will enable real-time communication among team members.
Testing and Prototyping:

Prototyping of the spoon's design components will be facilitated using 3D printing technology, allowing for rapid iteration and testing. Breadboards and testing equipment like multimeters will aid in prototyping and testing electronic circuits and sensor integration.

Documentation and Presentation:

Documentation tools such as LaTeX, Markdown, or Google Docs will be used for documenting project progress, design specifications, and technical details. Presentation software like PowerPoint or Google Slides will help in creating visually engaging presentations for showcasing our project during the hackathon.
AI Integration for Personalization and Optimization:

AI algorithms will analyze sensor data to personalize the spoon's behavior for individual users, adapting to their unique tremor patterns and preferences. Reinforcement learning techniques will optimize the spoon's control policies in real-time, ensuring stability and comfort during meal times.
Predictive Maintenance and Health Monitoring:

AI-driven predictive maintenance algorithms will monitor the spoon's hardware components and predict potential issues based on usage patterns. Data analytics techniques will be applied to sensor data for health monitoring, providing insights into the user's condition and disease progression.
By integrating these technologies, equipment, and AI techniques, we aim to develop an innovative self-stabilizing spoon that not only assists individuals with Parkinson's disease in eating independently but also adapts to their needs, enhances their quality of life, and contributes to their long-term health monitoring and management.

19. Expected Outcome of the Project *

The expected outcome of our project is the successful development and implementation of a self-stabilizing spoon tailored for individuals with Parkinson's disease.

20. Do you require reimbursement for electronic equipment ($200 USD maximum)? *

- ○ Yes
- ◉ No

21. If Yes, please specify the equipment and estimated costs (up to $200 USD maximum)

Enter your answer

Consent and Agreement

22. I agree to the terms and conditions of the IEEE IES Generative AI Hackathon. *

- (●) Yes
- ( ) No

23. I consent to my data being used for the purposes of this hackathon. *

- (●) Yes
- ( ) No