

Project Details	
Project Code	MRCNMH25Ex Mansoubi
Title	AI-Powered Fatigue Solutions: Transforming Care for Neurological Conditions
Research Theme	Neuroscience & Mental Health
Summary	Fatigue is a major issue for individuals with neurological conditions, often leading to lower quality of life. This project aims to empower these individuals through an AI-powered fatigue management tool using data fusion from wearable technologies that track physiological data, such as heart rate, sleep patterns, and physical activity, combined with an app to log symptoms. A machine learning algorithm will be developed to predict fatigue patterns, allowing users to plan activities and rest proactively. This tool will help organise tasks and energy management, send personalised reminders, and support better fatigue management while assisting healthcare professionals in making informed decisions.
Description	<p>Fatigue is a significant issue for individuals with neurological conditions, often resulting in lower quality of life and social isolation. Currently, no system utilises data fusion to predict fatigue based on individual data, hindering effective symptom management. To address this, the project aims to empower these individuals by leveraging wearable technologies to monitor physiological data (such as heart rate, sleep patterns, and physical activity) and AI-driven apps to log symptoms and track fatigue levels. This approach provides tailored advice based on specific conditions and daily routines, fostering a sense of control and independence in managing health and monitoring fatigue in real time. The collected data will be used to develop AI algorithms capable of predicting periods of high fatigue, enabling proactive activity and rest planning. By analysing patterns, identifying triggers, and correlating factors that exacerbate fatigue, these algorithms will assist both individuals and healthcare providers in managing fatigue more effectively. The predictive model will be instrumental in foreseeing high-fatigue periods, allowing for better activity planning and rest. As part of the PhD program, an AI-powered tool will be co-developed to assist individuals with neurological conditions in organising and prioritising tasks and energy management. This tool will focus on essential activities, predict fatigue risk, and send personalised reminders to take breaks, perform relaxation exercises, or engage in low-intensity activities based on personalised data. This proactive approach promotes better fatigue management throughout the day. Additionally, this tool will aid healthcare professionals by analysing patient data to identify trends, suggest interventions, and personalise treatment plans, enhancing fatigue management and consultation effectiveness. Integrating AI-driven insights into everyday health management will improve the quality of life for individuals with neurological conditions by providing real-time support and personalised care strategies.</p> <p>Key Research Question</p> <p>The project's primary research question is: How can wearable technologies and AI-driven applications be integrated to predict and manage fatigue in individuals with neurological conditions, thereby enhancing their quality of life and independence?</p>

	<p>Specific Objectives</p> <p>The studentship will focus on the following specific objectives:</p> <ol style="list-style-type: none"> 1. Data Collection and Integration: <ul style="list-style-type: none"> • Implement wearable technologies to continuously monitor physiological data such as heart rate, sleep patterns, and physical activity. • Develop methods to integrate this data into a central system for analysis seamlessly. 2. AI Algorithm Development: <ul style="list-style-type: none"> • Create AI algorithms to analyse the collected data to identify patterns and predict periods of high fatigue. • Develop predictive models to understand triggers and correlating factors that exacerbate fatigue. 3. Symptom Tracking and Management: <ul style="list-style-type: none"> • Design AI-driven applications that help individuals log their symptoms and track real-time fatigue levels. • Provide tailored advice and personalised recommendations based on the individual's specific conditions and daily routines. 4. Proactive Fatigue Management: <ul style="list-style-type: none"> • Develop an AI-powered tool to assist in organising and prioritising tasks, focusing on essential activities. • Implement personalised reminders for breaks, relaxation exercises, and low-intensity activities to manage fatigue proactively throughout the day. 5. User Experience and Feedback: <ul style="list-style-type: none"> • Conduct user testing to gather feedback on the effectiveness and usability of the AI-driven applications and tools. • Iterate and refine the tools based on user feedback to ensure they effectively meet the needs of individuals with neurological conditions. <p>By achieving these objectives, the project aims to provide a comprehensive, AI-powered solution that empowers individuals with neurological conditions to manage their fatigue more effectively, enhancing their quality of life and independence. Integrating predictive modelling and personalised health management tools will help healthcare professionals deliver more informed and tailored care.</p>
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