

Project Initialization and Planning Phase

Date	9 July 2024
Team ID	SWTID1720243396
Project Title	Panic disorder detection
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

Project Overview	
Objective	<p>The primary objective of a panic disorder detection project can be approached in two ways:</p> <ol style="list-style-type: none"> 1. Prediction: To develop a system that can predict the onset of a panic attack. This could involve using machine learning algorithms to analyze data collected from wearable sensors (heart rate, activity level) and self-reported information (anxiety, sleep patterns) to identify patterns that precede an attack. 2. Real-time detection: To create a system that can detect a panic attack in progress. This might involve analyzing physiological changes (heart rate, skin conductance) during an episode to provide immediate feedback to the user.
Scope	<p><input type="checkbox"/> Target population: Will the project focus on a specific demographic or individuals already diagnosed with panic disorder?</p> <p><input type="checkbox"/> Generalizability: How well will the system's performance translate to different populations or settings?</p> <p><input type="checkbox"/> Clinical integration: How can the panic disorder detection system be integrated into existing healthcare practices?</p>
Problem statement	
Description	The primary problem addressed by panic disorder detection projects is the difficulty of accurately identifying and managing panic attacks.

	<p>People with panic disorder experience sudden, intense episodes of fear accompanied by overwhelming physical symptoms like racing heart, shortness of breath, and dizziness. These attacks can be debilitating and significantly impact daily life.</p>
Impact	<p>Solving the problem of panic disorder detection has a range of positive implications for individuals, healthcare systems, and society as a whole. Here's a closer look at the potential benefits:</p> <ul style="list-style-type: none"> • Improved Quality of Life: By enabling earlier diagnosis and better management of panic attacks, individuals can experience a significant improvement in their quality of life. This includes a reduction in fear, anxiety, and avoidance behaviors, allowing them to participate more fully in daily activities. • Empowerment and Self-Management: Panic disorder detection tools can empower individuals to take control of their condition. By understanding their triggers and having the ability to predict or detect attacks, they can employ coping mechanisms and seek support proactively. • Reduced Reliance on Emergency Services: Panic attacks can sometimes lead to unnecessary emergency room visits. Accurate detection can help differentiate between a panic attack and a serious medical condition, reducing unnecessary strain on healthcare resources.
Proposed Solution	
Approach	<p>The methodology and techniques for panic disorder detection will depend on the project's specific goals (prediction vs real-time detection). Here's a general outline for each approach:-</p> <ol style="list-style-type: none"> 1.Data collection and preparation 2.Exploratory Data Analysis 3.Model Building 4.Performance Testing and Hyperparameter Tuning 5.Model Deployment
Key Features	<p>Here are some potential unique aspects of a panic disorder detection solution:</p> <p>Data Collection and Integration:</p> <ul style="list-style-type: none"> • Multimodal Data Fusion: Instead of relying solely on physiological data, the system could incorporate ecological momentary assessments (EMA) where users report on their emotions and situations in real-time. This combined data

	<p>might provide a more nuanced picture for improved prediction or detection.</p> <ul style="list-style-type: none"> • Passive Data Collection: Explore ways to collect relevant data passively through wearables or smartphones. This could include monitoring sleep patterns, activity levels, or even voice intonation for subtle changes associated with panic attacks. <p>Advanced Machine Learning Techniques:</p> <ul style="list-style-type: none"> • Explainable AI (XAI): Develop a system that can not only detect panic attacks but also explain its reasoning to users. This transparency can build trust and empower individuals to understand their triggers better. • Real-time Biofeedback: Incorporate real-time biofeedback mechanisms alongside panic attack detection. When a panic attack is predicted or detected, the system could provide relaxation techniques or calming visualizations to help users manage their symptoms in the moment. <p>Personalized Intervention Strategies:</p> <ul style="list-style-type: none"> • Adaptive Learning Algorithms: Develop a system that can learn and adapt to individual users' data over time. This personalization could improve the accuracy of predictions or real-time detection for each user. • Integration with Mental Health Services: Explore ways to integrate the panic detection system with existing mental health resources. This could involve providing users with access to self-help tools, therapist directories, or even direct messaging with a mental health professional during a panic attack. <p>Focus on Accessibility and Inclusivity:</p> <ul style="list-style-type: none"> • Low-cost Wearable Sensor Integration: Develop or utilize affordable wearable sensors to make the system accessible to a wider population. • Multimodal Alerting Systems: In addition to smartphone notifications, consider alternative alerting methods like smartwatches or discreet vibration patterns for users who might find phone notifications intrusive during panic attacks.
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Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications,	2 x NVIDIA V100 GPUs

	number of cores	
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	Opendatasets, Pandas, Numpy, Tensorflow, Seaborn, Matplotlib, scikit-learn, category_encoders, scikit-learn, imblearn
Development Environment	IDE, version control	Google Collab, Git
Data		
Data	Source, size, format	Kaggle dataset, 1000 Entries of training dataset and 2000 Entries of testing dataset