PROJECT PROPOSAL

Gait Recognition System for Healthcare: Video Analysis and Recognition Algorithms.

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1. Summary

The "Gait Recognition System for Healthcare" project endeavors to transform healthcare assessments by deploying advanced video analysis and recognition algorithms to tackle critical challenges related to gait patterns. With a primary focus on enhancing patient care, fall prevention, and personalized healthcare interventions, particularly for the elderly, the project aims to bridge existing gaps in precise gait analysis and posture monitoring within healthcare systems. By addressing issues such as limited fall prevention, privacy concerns, and variability in gait patterns, the project seeks to develop a comprehensive and user-friendly system. Key goals include creating tailored gait recognition algorithms, seamless integration with clinical workflows, and replacing the Short Physical Performance Battery (SPPB) with a more advanced gait assessment tool. The project's procedures and scope encompass system architecture design, data collection, algorithm development, validation, and user training, ensuring the creation of a robust and scalable Gait Recognition System that addresses specific needs and challenges in the healthcare domain.

2. Introduction

Our project, "Gait Recognition System for Healthcare," aims to harness video analysis and recognition algorithms to address key healthcare challenges related to gait patterns. Focusing on the significance of gait as a vital health indicator for observing stability, balance and mobility especially for the elderly (age >65), our goal is to create an efficient system for healthcare professionals.This project seeks to provide valuable insights into stability, balance, and potential mobility issues using advanced video analysis. Key components include data collection, video acquisition using depth cameras, feature extraction (step length, duration, etc.), and recognition algorithms like CNNs and RNNs.Our system targets applications such as fall prediction and gait analysis for neurological disorders. We prioritize user-friendly interfaces for healthcare professionals and adhere to ethical standards to protect user privacy.In summary, our Gait Recognition System for Healthcare strives to leverage technology to improve patient care, early detection of mobility issues, and personalized healthcare interventions, with a particular focus on enhancing the well-being of the elderly.

3.   Needs

- Current healthcare systems lack comprehensive tools for precise gait analysis and assessments of mobility, stability, and fall risk.

- Gap in proactive measures for predicting falls, especially in elderly populations.

- One of the way is continuous posture monitoring, especially in chronic conditions like low back pain and limiting insights into postural control and related challenges.

- Variability in Gait Patterns: Individual variations in gait patterns require a tailored approach in gait recognition algorithms to ensure accurate and inclusive assessments.

4. Problems

- Unavailability of data set.

5. Goals/Objectives

- Develop Comprehensive Gait Analysis: Create a Gait Recognition System that offers detailed and accurate analysis of gait patterns, encompassing parameters such as step length, duration, and walking speed.

- Enhance Fall Detection Capabilities: Implement gait recognition algorithms to improve fall detection accuracy, particularly focusing on early identification of fall risk factors in elderly individuals.

- Continuous Posture Monitoring: Enable continuous monitoring of posture, addressing deficiencies in current healthcare systems by providing insights into postural control, especially for individuals with chronic conditions.

- Replace SPPB for Elderly Assessment: Develop a validated and reliable gait assessment tool within the Gait Recognition System with the aim of replacing the Short Physical Performance Battery (SPPB) as a more advanced and efficient method for elderly individuals.

- Tailored Gait Recognition Algorithms: Develop algorithms that account for individual variations in gait patterns or other specific conditions, to enhance the inclusivity and accuracy of assessments.

6. Procedures/Scope of Work

- System Architecture Design: Define the architecture for the Gait Recognition System, emphasizing scalability.

- Data Collection and Preparation: Curate a diverse dataset for training recognition algorithms.

- Video Acquisition Setup: Configure depth cameras for detailed gait information.

- Feature Extraction Algorithms: Develop accurate algorithms for key gait features.

- Recognition Algorithm Development: Implement CNNs and RNNs for insightful analysis.

- Model Training and Validation: Train models on diverse datasets, ensuring generalization.

- User Interface Design: Create an intuitive interface for seamless integration.

- Privacy and Security Measures: Implement robust measures for healthcare data security.

- Biomechanical Integration: Explore biomechanical insights, especially in prosthetic rehabilitation.

- Validation and Testing: Thoroughly validate the system in real healthcare scenarios.

- Replace SPPB Assessment Tool: Develop and validate a gait assessment tool for elderly individuals.

- Documentation and Knowledge Transfer: Provide comprehensive documentation for system understanding.

- User Training and Adoption: Develop training programs for effective system utilization.

The scope includes designing, implementing, and validating the Gait Recognition System, with a focus on replacing the SPPB for elderly assessments.

7. Timetable

Phase/Month	1	2	3	4	5	6	7	8	9	10	11	12
Data Collection	▓	▓	▓									
Database Development	▓	▓	▓	▓								
Feature Extraction		▓	▓	▓	▓	▓	▓					
Recognition Algorithm Development					▓	▓	▓	▓	▓	▓	▓	
Evaluation							▓	▓	▓	▓	▓	▓