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Ambulant: The Medically Advanced Electric Helper

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Abstract: ***Over the years, the challenges faced by senior citizens and disabled individuals highlight a significant issue—limited access to essential medical and emotional assistance. Our project presents a cost-effective, medically advanced electric mobility helper, integrating joystick, phone, and gesture control for movement, communication aids for the hearing and speech impaired, real-time health monitoring, AI-powered diagnostic tools, and entertainment functionalities. It aims to significantly improve quality of life by offering both mobility and emotional support.***
Keywords: Accessibility, Mobility Assistance, Emotional Support, AI Healthcare, Elderly Care

I. INTRODUCTION

This project aims to empower senior citizens and individuals with disabilities by restoring their independence through a versatile electric helper. Conventional mobility aids are often unaffordable or limited in capability. Ambulant is an all-in-one solution integrating modern controls and AI-assisted frameworks to address multiple disabilities at once, making mobility, communication, safety, and well-being more accessible.

II. FRAMEWORKS AND FUNCTIONAL MODULES

A. Walking Aid Framework (W.A.F)

This framework offers three modes of control to ensure users with varying degrees of disability can navigate the helper easily. The joystick-based control mimics gaming controls for intuitive movement. Phone-based control allows caregivers or users to control the device remotely. Gesture control helps those with severe paralysis; movements like head tilts can control the direction of the helper, enabling independence for even fully paralyzed users.

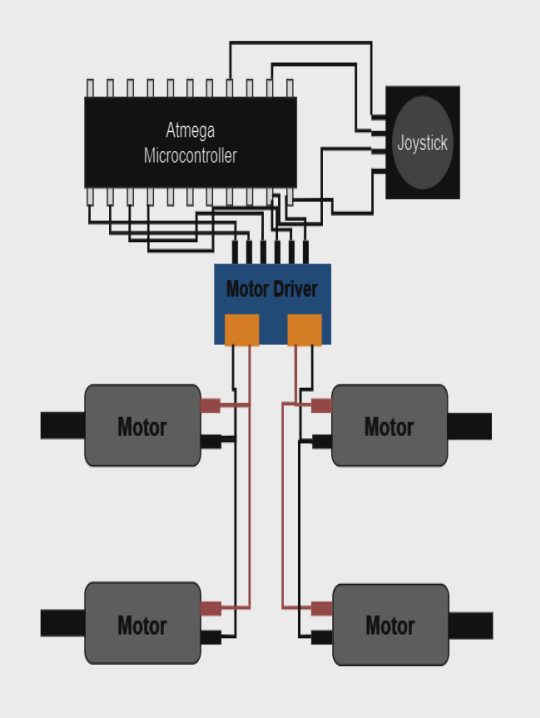

Fig -1: Block-Diagram for *Joystick system*

B. Hearing Aid Framework (H.A.F)

Designed for those who are deaf or hard of hearing, this module enables two-way communication. By scanning a QR code, users or caregivers access a mobile interface where text or speech can be entered. The input is instantly displayed on an LCD attached to the helper, enabling real-time, silent communication. AI-enhanced translation ensures accurate interpretation of different accents and languages.

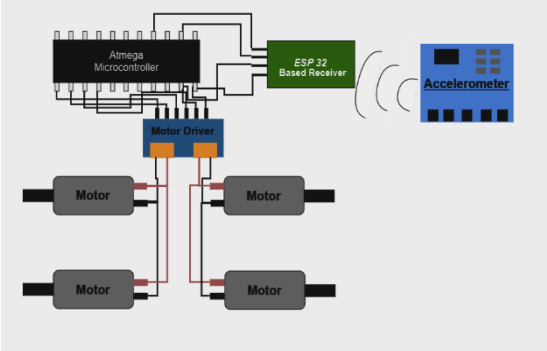

Fig -2: Block-Diagram Gesture system

C. Speaking Aid Framework (S.A.F)

This helps mute or speech-impaired users express themselves through a Nokia-style keypad. The system displays typed text on a screen and, with time, uses AI to learn typing habits, suggesting predictive text for faster communication. It's particularly helpful for users with memory or cognitive issues like dementia.

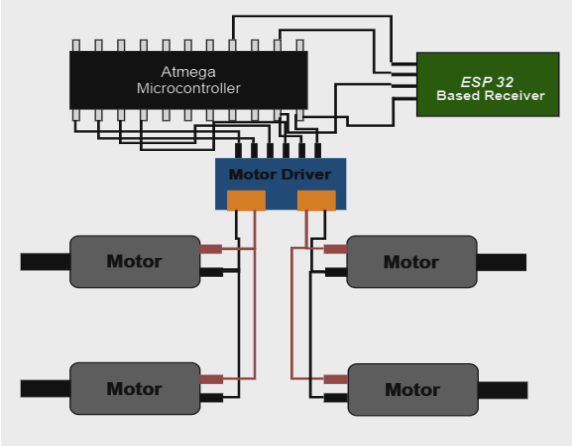

Fig -3: Block-Diagram for *Phone controlled system*

D. Visual Aid Framework (V.A.F)

This framework supports the visually impaired. Ultrasonic sensors are placed around the helper to detect nearby obstacles. Upon detecting a hazard, the system vibrates to alert the user. If ignored, AI slows down and eventually stops the helper to prevent accidents. This ensures both active alerts and passive safety mechanisms.

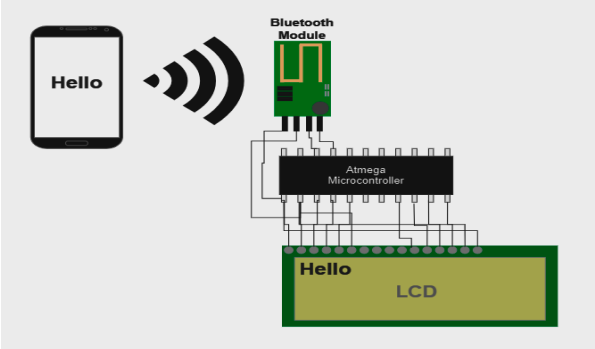

Fig -4: Block-Diagram for *Hearing Aid Framework*

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E. HealthCare Framework (H.C.F)

Pulse and ECG sensors monitor the user's heart rate and record health metrics in real time. Data is saved to an Excel file and analyzed for anomalies. When irregularities like high pulse or arrhythmia occur, alerts are sent automatically to a registered family member's phone, helping enable rapid response in emergencies.

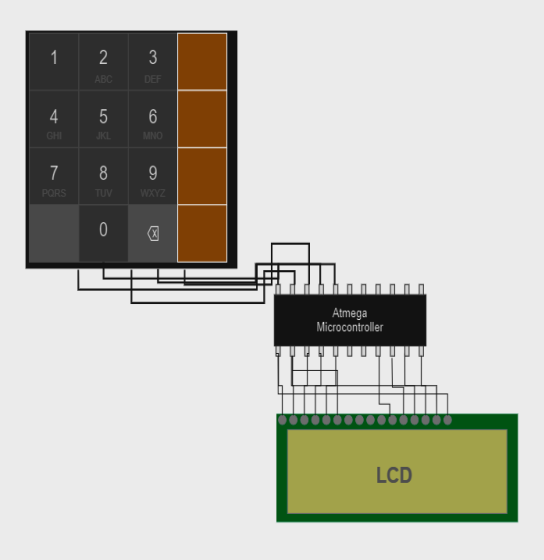

Fig -5: Block-Diagram for Speaking Aid Framework

F. AI/ML Aid Framework (A.M.A.F)

This framework uses an onboard camera and computer vision to diagnose potential health issues. It detects:

• Skin Diseases: Uses image analysis to compare anomalies with a medical database.

•Fractures: Identifies swelling or visible injury for fracture detection.

• Posture/Fall Detection: Analyzes body posture and triggers alerts in case of falls.

Each diagnosis is logged and sent to a family doctor. This enables early detection and supports preventive healthcare.

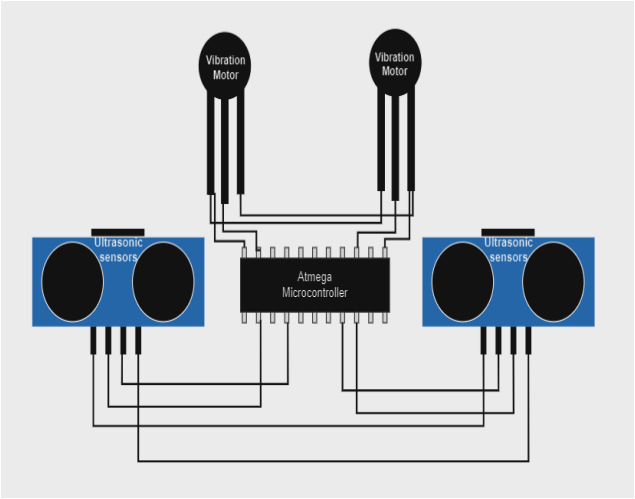

Fig -6: Block-Diagram for Visual Aid Framework

G. Entertainment Framework (E.T.F)

Emotional well-being is just as important as physical health. This module features a voice assistant integrated with services like Google Assistant. It plays music, reads news, and allows users to call relatives. It reduces loneliness and brings emotional comfort through interactive entertainment.

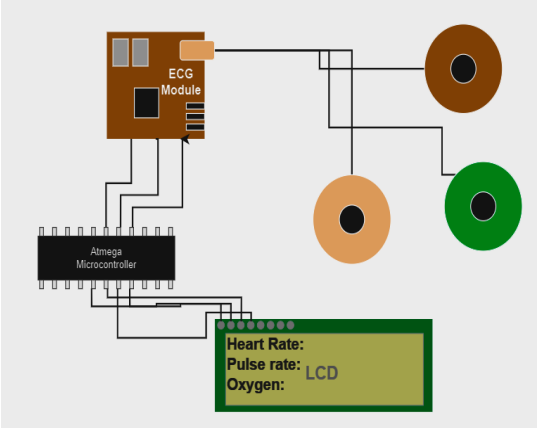

Fig -7: Block-Diagram for Health Care Framework

III. CONCLUSION

Ambulant introduces a new paradigm in assistive technology by integrating various frameworks into one compact, affordable unit. It supports independent mobility, proactive health monitoring, and emotional support, making it a transformative tool for improving the lives of elderly and disabled individuals.

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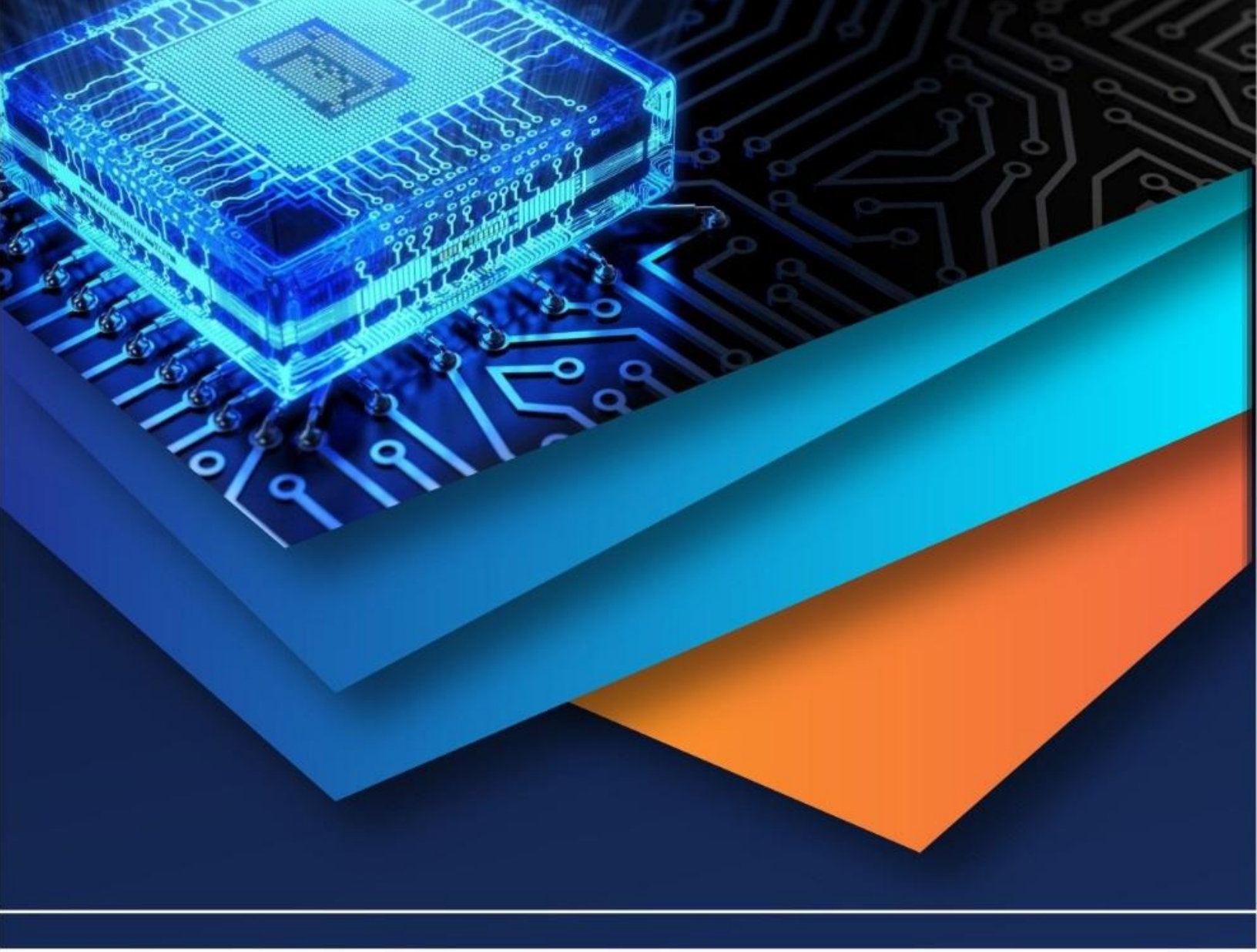

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