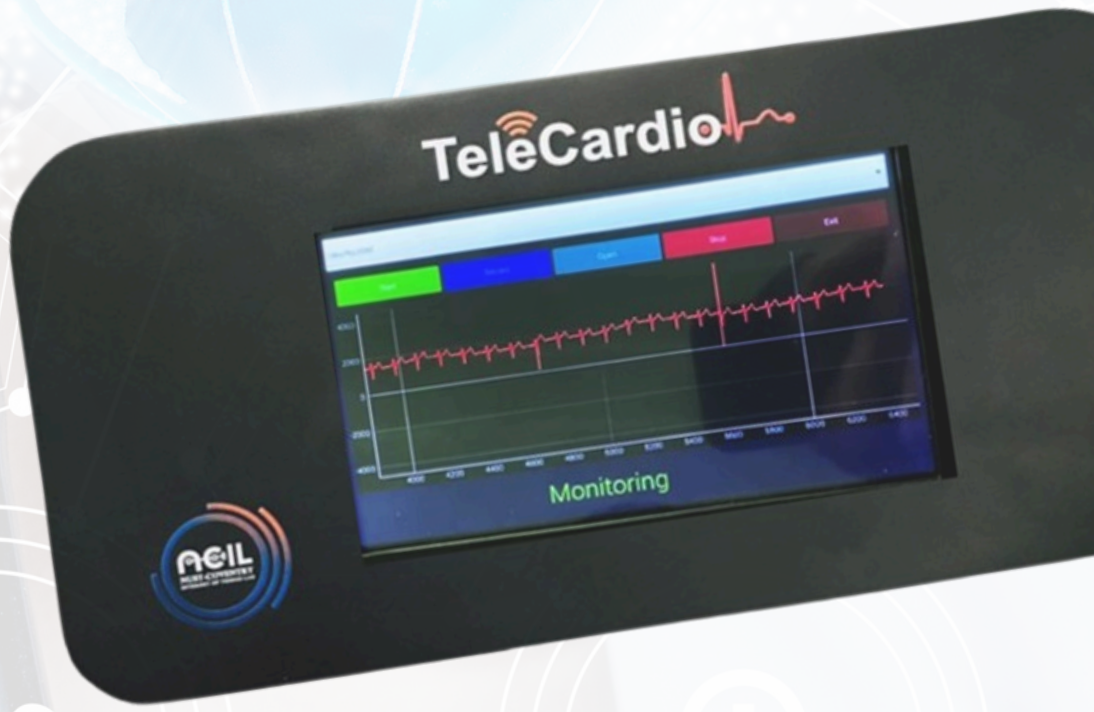
NUST-COVENTRY
INTERNET OF THINGS LAB

TELECARDIO

PROJECT FUNDED BY ERASMUS+



SEMINAR SESSION REPORT

Venue: Nust School of Health Sciences
Date: 24-4-2024

Principal Investigator
Prof. Dr. Rafia Mumtaz

Co-Principal Investigator
Prof. Dr. Syed Ali Hassan
Asst Prof. Dr. Daud Abdullah

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INTRODUCTION

NUST School of Electrical Engineering and Computer Science is actively engaged in a collaborative project under **ERASMUS+** framework aimed at transforming cardiac healthcare in Pakistan through **TeleCardio**. This innovative initiative addresses the pressing need for swift and effective diagnostic and treatment approaches for cardiovascular diseases (CVDs), which account for a significant portion of mortality in the country.

Traditional methods of electrocardiogram (ECG) analysis often suffer from limitations in speed and accessibility due to reliance on specialized skills and labor-intensive processes. TeleCardio emerges as a promising solution, integrating advanced technology and artificial intelligence (AI) to revolutionize cardiac care by offering real-time monitoring and AI-driven analysis of heart rhythms

The seminar serves as a platform to share TeleCardio's advancements with a diverse audience, including medical practitioners, clinicians related to cardiology, and medical doctor faculty at NUST School of Health Sciences, along with cardiologists from Polyclinic Hospital, actively involved in providing technical feedback during the project's development phase.

TELECARDIO OVERVIEW

TeleCardio introduces a state-of-the-art ECG monitoring device developed using Raspberry Pi 4 and ESP-32, representing a significant leap forward in preventive healthcare. Beyond simple real-time ECG signal visualization and recording, TeleCardio's advanced device offers instant AI-driven analysis of heart rhythms, enhancing diagnostic accuracy and efficiency.

At its core lies an AI system trained on a comprehensive dataset of digitized ECG records, achieving an impressive **94%** accuracy rate in detecting three key types of arrhythmias: Normal, Tachycardia, and Wolf-Parkinson-White Syndrome. Moreover, TeleCardio expands its capabilities with a detailed ECG annotation tool and a user-friendly web portal dashboard, empowering healthcare professionals to conduct thorough diagnostic evaluations and make well-informed clinical decisions.

SEMINAR OBJECTIVES

The primary objective of the seminar is to disseminate TeleCardio's research findings and technological advancements to a diverse audience comprising medical practitioners, clinicians related to cardiology, and medical doctor faculty at NUST School of Health Sciences. Additionally, the seminar seeks to elicit feedback and suggestions from collaborating cardiologists from Polyclinic Hospital, aiming to enhance TeleCardio's efficacy, usability, and relevance in the clinical setting. Key areas of discussion include the device's potential for advanced patient care, strategies for commercialization, and opportunities for further enhancement to meet the evolving needs of healthcare professionals and patients alike.

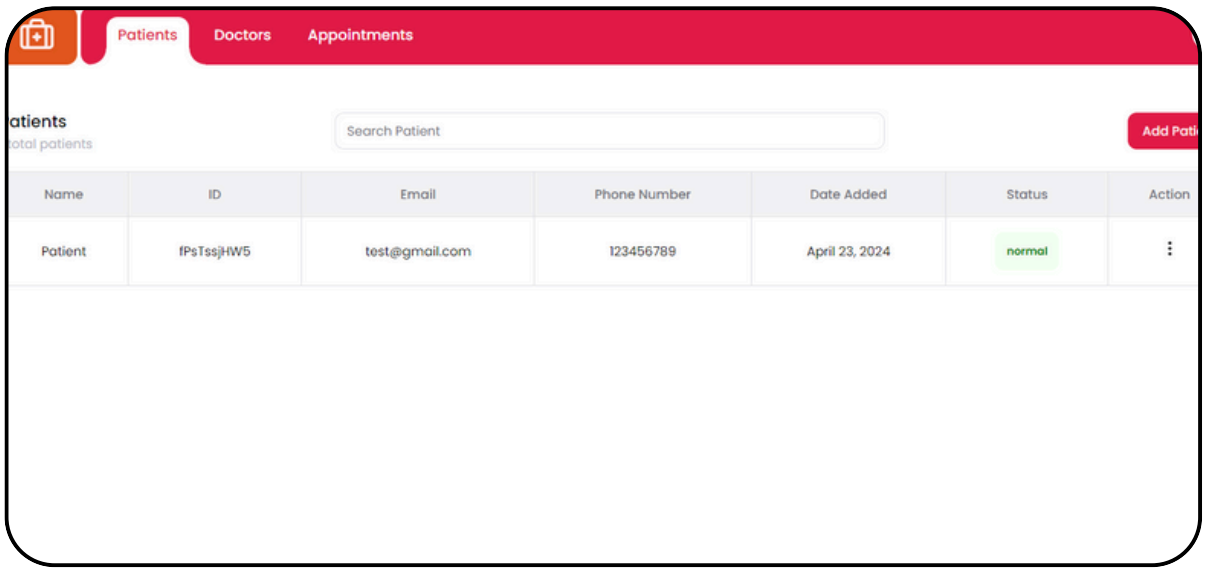
SEMINAR PRESENTATION

The seminar commences with a comprehensive presentation on TeleCardio, providing an overview of its objectives, key components, and technological innovations. Collaborative efforts with **ERASMUS+** partners are highlighted, emphasizing the project's interdisciplinary nature and global impact potential. A detailed demonstration of TeleCardio's features and functionalities follows, showcasing its intuitive user interface, real-time monitoring capabilities, and AI-driven diagnostic capabilities.

An integral part of TeleCardio, the web portal, is introduced, elucidating its role in facilitating telemedicine through IoT technology.

SEMINAR PRESENTATION

The web portal enables real-time transmission of data over the cloud, providing remote access for both doctors and patients. Additionally, TeleCardio's intelligent device, equipped with AI capabilities, enhances accessibility and streamlines processes, contributing to the advancement of cardiac care standards in Pakistan and beyond.



The presentation underscores TeleCardio's potential to redefine cardiac care standards in Pakistan and beyond, setting the stage for an engaging discussion and exchange of ideas.

FEEDBACK RECEIVED

Participants actively engage in the seminar, providing valuable feedback and insights into TeleCardio's potential applications and areas for improvement. Medical practitioners, clinicians related to cardiology, and educators from NUST School of Health Sciences commend TeleCardio's innovative approach and its potential to bridge the diagnostic gap for CVDs in Pakistan.

Collaborating cardiologists from Polyclinic Hospital offer constructive feedback, emphasizing the importance of enhancing the device's form factor, commercialization strategies, and the addition of features to further enhance its efficiency and usefulness. The feedback received underscores the importance of ongoing collaboration and refinement to ensure TeleCardio's successful integration into clinical practice and its ability to deliver meaningful impact on patient outcomes.

CONCLUSION AND NEXT STEPS

In conclusion, the seminar serves as a testament to TeleCardio's potential to revolutionize cardiac healthcare in Pakistan and beyond. The valuable feedback and insights gathered during the seminar will inform the next steps in TeleCardio's development journey, guiding efforts to refine the device, expand its reach, and maximize its impact on patient care.

Moving forward, continued collaboration with healthcare stakeholders, technological advancements, and strategic partnerships will be key to realizing TeleCardio's vision of delivering fast, precise, and easily accessible cardiac care to communities in need.

PROJECT TEAM

Principal Investigator
Prof. Dr. Rafia Mumtaz

Co-Principal Investigator
Asst Prof. Dr. Daud Abdullah

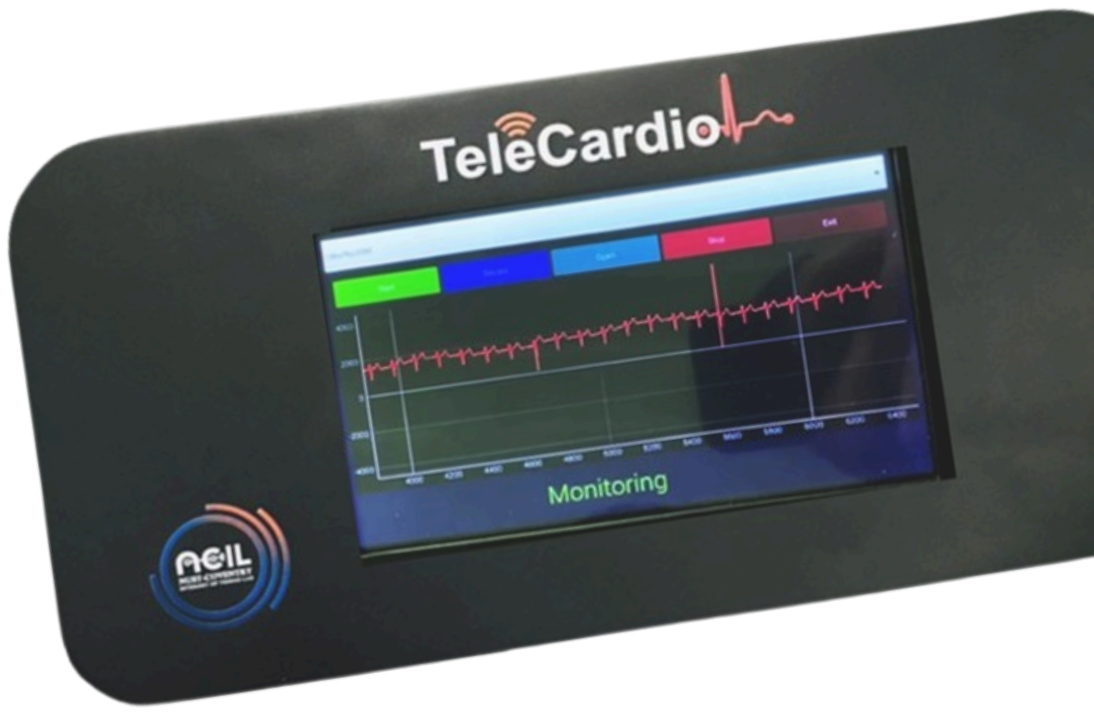
Co-Principal Investigator
Prof. Dr. Syed Ali Hassan

Embeded System and AI Engineer
Muhammad Mahad Khaliq

Web Developer
Muhammad Usama

ACKNOWLEDGMENTS

The success of the TeleCardio seminar would not have been possible without the active participation and contributions of all attendees, including medical practitioners, clinicians related to cardiology, educators, and collaborating cardiologists from Polyclinic Hospital. Special thanks are extended to ERASMUS+ partners and the faculty at NUST School of Health Sciences for their unwavering support and collaboration throughout the TeleCardio project. Together, we remain committed to advancing TeleCardio's mission of transforming cardiac healthcare and improving patient outcomes in Pakistan and beyond.



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