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Mobility Report

Dr. Dost Muhammad Khan

Visit of The University of West of Scotland

November 19 – 23, 2022



Name of Participant: Dost Muhammad Khan

Affiliation: The Islamia University of Bahawalpur, Pakistan

Host Institute: The University of West of Scotland

Visit Dates: November 19 – 23, 2022

Title of the Project: Sensing, Artificial Intelligence and Edge Networking towards Rural Health Monitoring (SAFE-RH)

Erasmus+ Project Reference Number: 619483-EPP-1-2020-1-UK-EPPKA2-CBHE-JP

I participated in the SAFE-RH meeting and training session at the University of West of Scotland, UK, from November 19 – 23, 2022, as a key member of the project team. This event provided a platform to present, evaluate, and discuss the project's overall progress, challenges, and key deliverables.

During the meeting, I presented the performance from the start of the project to-date review and explain the future work. The IUB was assigned the project for Infant Health Monitoring, developing technology lab and dissemination of project in rural health centers in district Bahawalpur.

1. Courses Approved for MS and PhD Programs

Following courses are approved through the statutory bodies of the IUB and offered at MS and PhD level:

- i. Introduction to Health-Care Analysis
- ii. Data Mining for Health-Care Analysis
- iii. Applied Health-Care Statistics
- iv. Health-Care Data Acquisition and Management
- v. Quantitative Methods and Decision Analysis.
- vi. Applied Biotechnology
- vii. Topics in Information Technology

2. Dissemination Activity

- i. ONE DAY SEMINAR on February 25, 2022 at The Islamia University of Bahawalpur.
- ii. International Workshop Organized by CUST on SAFE – RH.

I along with Dr. Najia Saher and Mr. Muhammad Suleman, we also presented the updated status of fund utilization and the project budget to Prof. Naeem Ramzan. During the discussion, Prof. Naeem emphasized the importance of utilizing the project budget effectively within the allocated deadlines to avoid any financial discrepancies.

Additionally, I actively assisted the students involved in the project with the installation of all relevant devices for testing and demonstration purposes, ensuring that all technical components were functional for the project's ongoing research and development activities

Overall, the meeting proved to be highly productive, fostering stronger collaboration with both international and local partners while significantly advancing the objectives of the SAFE-RH project. It provided valuable opportunities for knowledge sharing, problem-solving, and aligning efforts toward achieving the project's key goals.



Mobility Report

Dr. Najia Saher

Visit of The University of West of Scotland

November 19 – 23, 2022



Name of Participant: Najia Saher

Affiliation: The Islamia University of Bahawalpur, Pakistan

Host Institute: The University of West of Scotland

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Development of Training Modules

Following training modules are designed and discussed for the doctors, paramedics, healthcare workers, and patients

1. Introduction to Basic ICT to identify the relevant components of a computer
2. Introduction to basic technology the basic computers and mobile technology
3. Introduction to SAFE-RH healthcare system to describe the feature of the SAFE-RH healthcare System
4. Introduction to diagnostic equipment, the use of peripheral diagnostic equipment and sensors

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Muhammad Suleman
Visit of The University of West of Scotland
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Name of Participant: Muhammad Suleman

Affiliation: The Islamia University of Bahawalpur, Pakistan

Host Institute: The University of West of Scotland

Visit Dates: November 19 – 23, 2022

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Development

Offline MIS

In initial stage of the project, IUB proposed an offline module of MIS due lack of information technology infrastructure in rural areas. The developers of MIS (CUST) propose an executable edition of MIS and all other members agreed on it. IUB required to develop a synchronization app that upload and download the data from online MIS.

Infant Monitoring Patch

To complete the Infant Monitoring pilot, IUB proposed a health monitoring patch. This would be a wearable device that will attach to infant body and capture the vital readings from body and also from environment. This patch will be only available admitted patients. Following are the important features of proposed patch.

Sensors

- **Body Temperature Sensor:** A clinical grade temperature sensor that measures the heat level directly from patient.
- **SpO₂ Sensor:** Measure the oxygen level of body.
- **Heart Rate:** This sensor will measure the heart rate per minuet from patient body.
- **Environmental Temperature:** Infants are highly sensitive from environment, so we must have to find environment temperature.
- **Environment Humidity:** This sensor will find the humidity in environment.

Micro Controller

All sensors will be directly attached to micro controller that collect data from all sensors, arrange it and transmit to offline MIS.

Communication Module

WiFi is an easy method to transmit data over the network so the micro controller also equipped with WiFi card that use local hotspot to transmit data. Micro controller has code to maintain the connection between patch and local hotspot and transmission will perform on standard TCP/IP protocol.

Housing

All sensors, micro controller and communication equipment will be enclosed inside a housing. We want to make the patch is wearable and wireless that independently work. Housing should be water proof and communication friendly.

Power Supply

The patch should be wearable and must be easy to use for infants. We have decided to make it wireless and all components power requirements should be available in patch housing. The power supply must have charging-port and rechargeable battery.

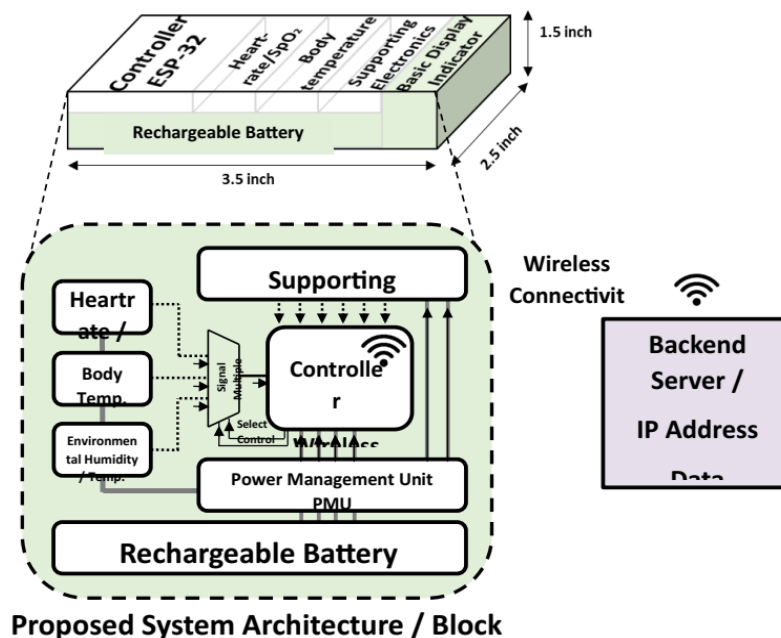
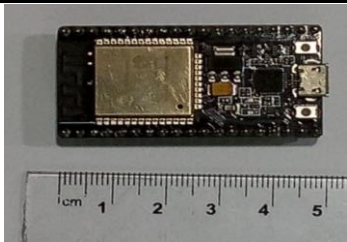
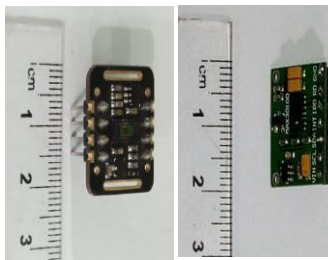
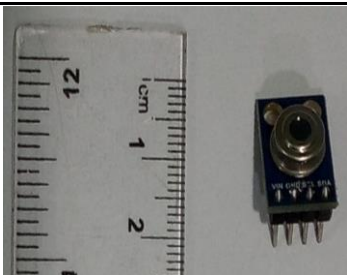
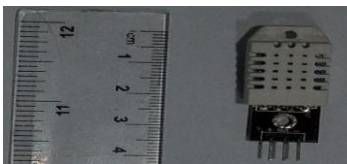


Figure 1: Block Diagram of Patch

Table 1: List of the components as following

Items	Model / Components	Picture and Dimensions	Description / Justification
Controller	ESP8266MOD (nodeMCU)*		Controller for sensors data processing and wireless data Transmission
Heart rate sensor Oxygen saturation level sensor	MAX30100* MAX30102*		MAX30100 / MAX30102 is a highly integrated pulse oximeter and heart-rate sensor module, which is capable of providing accurate and reliable measurements of blood oxygen saturation (SpO2) and heart rate. It is commonly used in wearable fitness devices, medical monitoring equipment, and other applications that require real-time tracking of vital signs.
Human Body temperature sensor	MLX90614*		MLX90614 is a non-contact infrared temperature sensor that can accurately measure object temperatures without touching them, making it a useful tool in various applications such as medical devices.
Environmental temperature sensor and Environmental humidity sensor	DHT22*		DHT22 is a more advanced version of the DHT11 sensor, featuring higher accuracy, wider measurement range, and better resolution, making it a preferred choice for more demanding applications where precise temperature and humidity readings are critical.

Prof. Naeem Ramzan instructed all team members to complete these tasks within stipulated time and he will check all tasks during his next visit to Pakistan. This concludes a week-long training under SAFE-RH project.

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