



Measurement and Monitoring of Vital Signs using mmWave sensors

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INTRODUCTION

Utilizing mmWave sensors for measuring and monitoring vital signs in healthcare presents significant advantages. These sensors offer non-invasive and contactless monitoring, ensuring patient comfort. With real-time data collection, they provide accurate and precise measurements, even in dynamic environments. Integration of mmWave sensors into healthcare systems allows for remote monitoring and proactive interventions, leading to improved patient outcomes and proactive healthcare practices. Embracing mmWave sensor technology holds great promise in revolutionizing vital signs monitoring, enabling early detection and preventive measures.

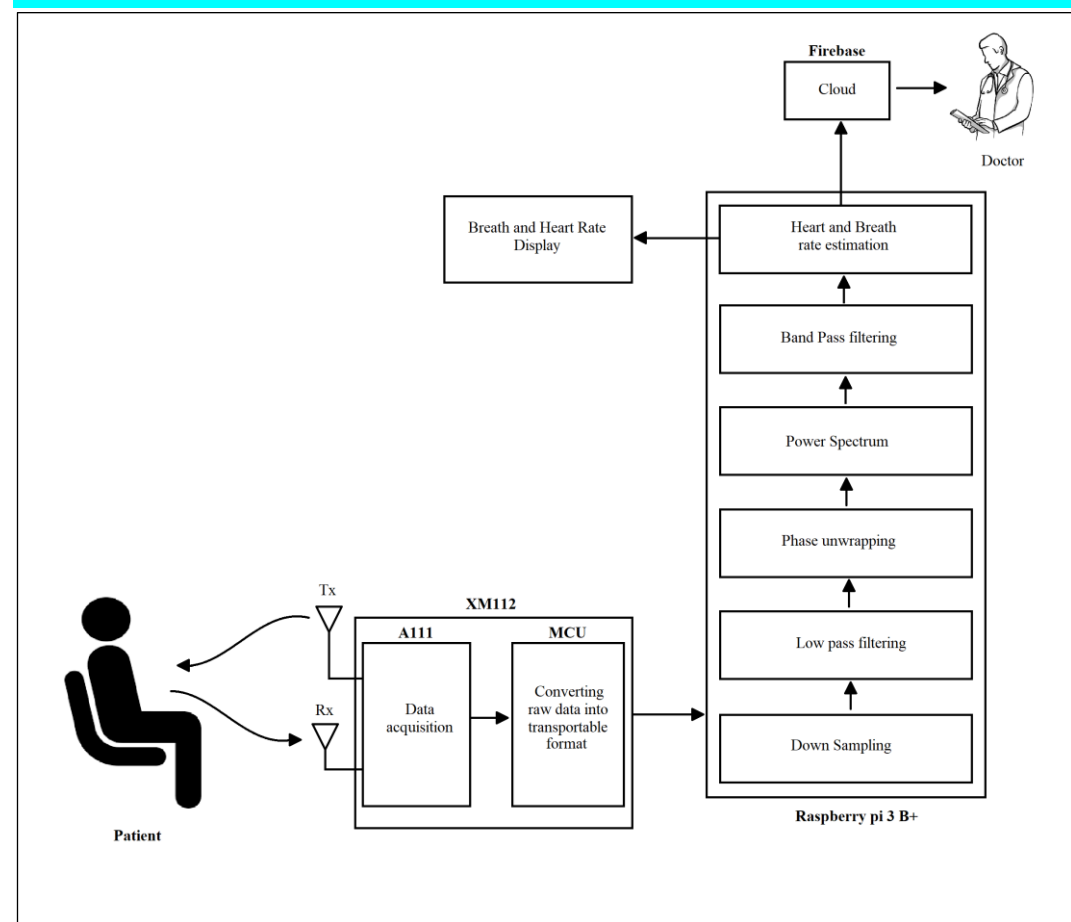
OBJECTIVES

The objectives of utilizing mmWave sensors for vital signs measurements include non-contact, non-invasive monitoring, continuous measuring, ensuring accuracy and reliability, enabling real-time monitoring, versatile integration into healthcare settings, and facilitating early detection and prevention of health issues.

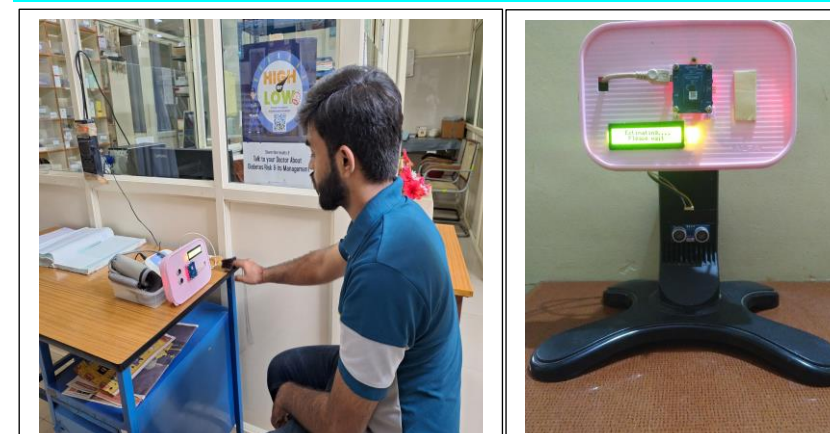
METHODOLOGY

- 1) The Acconeer XM112 sensor emits 60GHz radar pulses and measures the reflections from the body to capture chest movements.
- 2) Signal processing techniques are applied to remove noise and interference, isolating the desired signals related to heart and breath movements.
- 3) Peaks in the filtered signal are detected to extract the heart rate, while amplitude or frequency variations determine the breath rate.
- 4) The extracted heart and breath rates are further analyzed, displayed, or used for monitoring purposes, such as real-time display, data recording, or triggering alerts.

BLOCK DIAGRAM



RESULTS AND DISCUSSION



The measured readings from our mmWave sensor-based vital signs monitoring project align with traditional measurement methods, confirming accuracy and reliability.

CONCLUSION

The project uses an Acconeer XM112 radar sensor operating at 60GHz to estimate heart rate and breathing rate and an Ultrasonic sensor for presence detection. On an LCD panel and on Firebase, the collected data is shown. This makes it possible to monitor patients remotely via a website and get real-time vital sign monitoring. The use of mmWave sensors enables precise, non-invasive assessments that improve patient care and make vital sign data more

REFERENCES

- 1) Heart Rate Measurement using a 60 GHz Pulsed Coherent Radar Sensor by Linn Gromert & Melina Alnasser 2022
- 2) Thorström M, Anderson G. Presence detectors and remote heartbeat sensing using radar technology. Lund (Sweden): Lund University, 2020.
- 3) Gromert, L. and Alnasser, M., Heart Rate Measurement using a 60 GHz Pulsed Coherent Radar Sensor , 2022.

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