Mobile Non-Contact Vital Sign Monitoring

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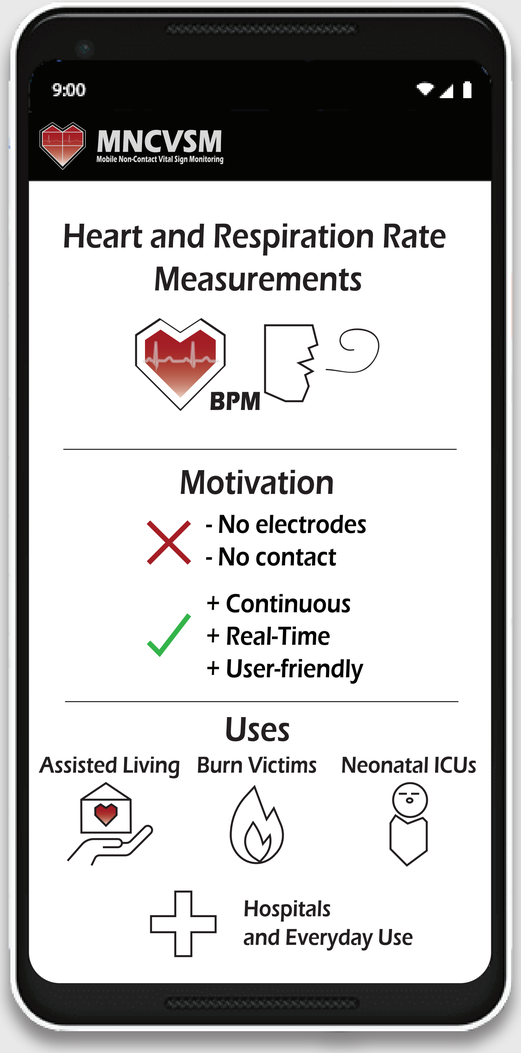
Key Features



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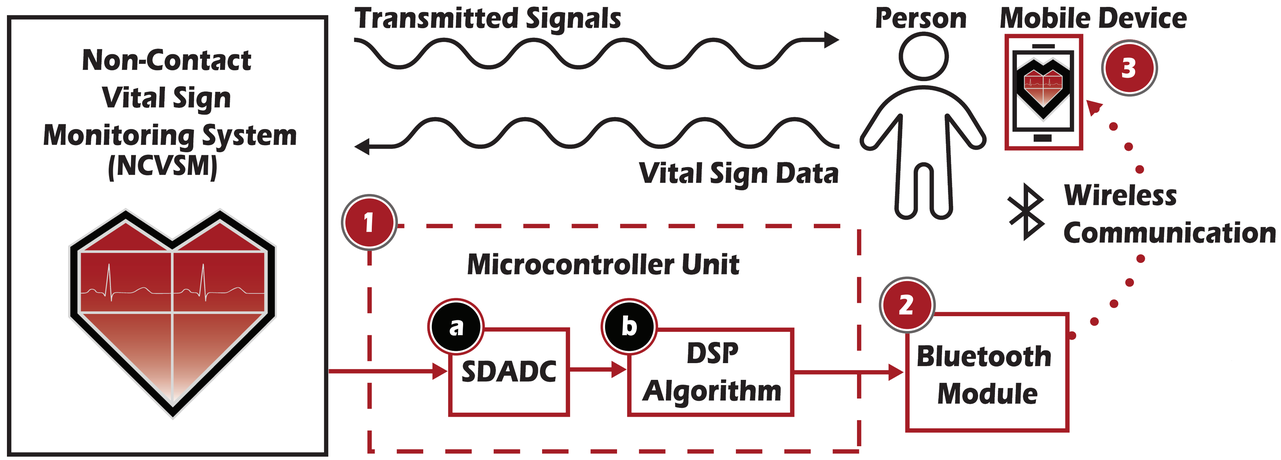
Mobile Non-Contact Vital Sign Monitoring, or MNCVSM, interfaces with a Doppler radar system to calculate and display vital signs on a mobile device.

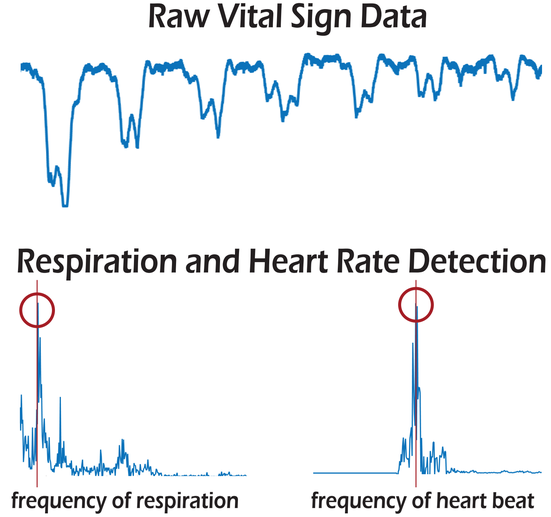
System Design



1 STM32F373VCT6 MCU
Receives and processes vital sign data from the NCVSM

a SDADC - Sigma-Delta ADC
16-bit resolution

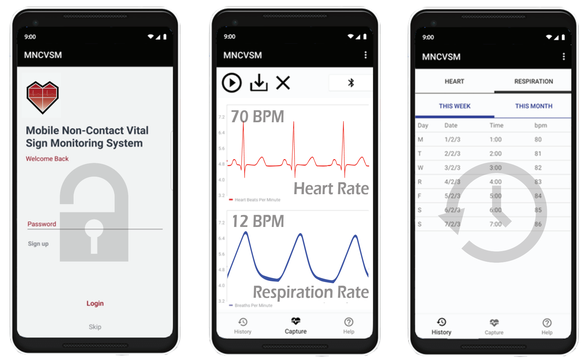
b DSP - Digital Signal Processing



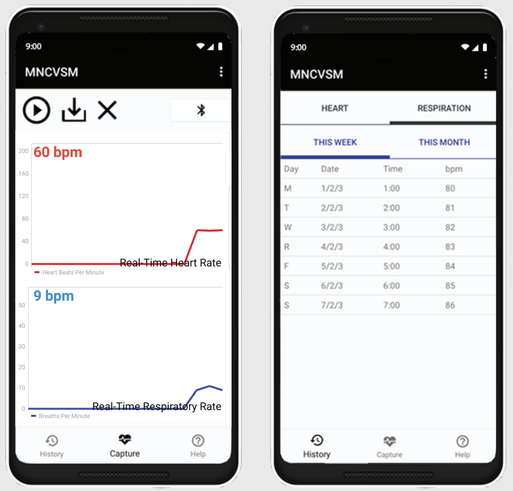
2 RN-41 Class 1 Bluetooth Module
Wireless Communication from MCU to mobile device

UART connection from MCU to serially-connected mobile device
- Achieves up to 1.5 Mbps sustained data rates
- Attains HIPAA compliance by using secured passwords/PINs and blocking unknown devices

3 Android Versions 5.0 or Greater
Displays password-protected vital sign data



Results



- Interfaced with the NCVSM and received vital sign data
- Processed vital sign data using an MCU with an SPI data rate of18 Mbps, powered by 5 VDC
- Wirelessly transmitted data once every 30 seconds via Bluetooth with a bandwidth of 1.5 Mbps and a peak power consumption of 30 mA
- Developed a mobile application to present vital sign data, compatible with Android versions 5.0 or greater
- Stored vital sign data in an encrypted local database
- Maintained accuracy of vital sign measurements within 0.916 BPM with a 35 second start-up time

Future Work

- Conduct usability tests for the mobile application
- Utilize an MCU with more working memory
- Incorporate a real-time operating sytem
- Implement algorithms to reduce noise
- Process other signals from the body, e.g. EMG
- Incorporate the MNCVSM system into a custom PCB