

Demo Poster: A Microphone Sensor-based System for Green Building Applications

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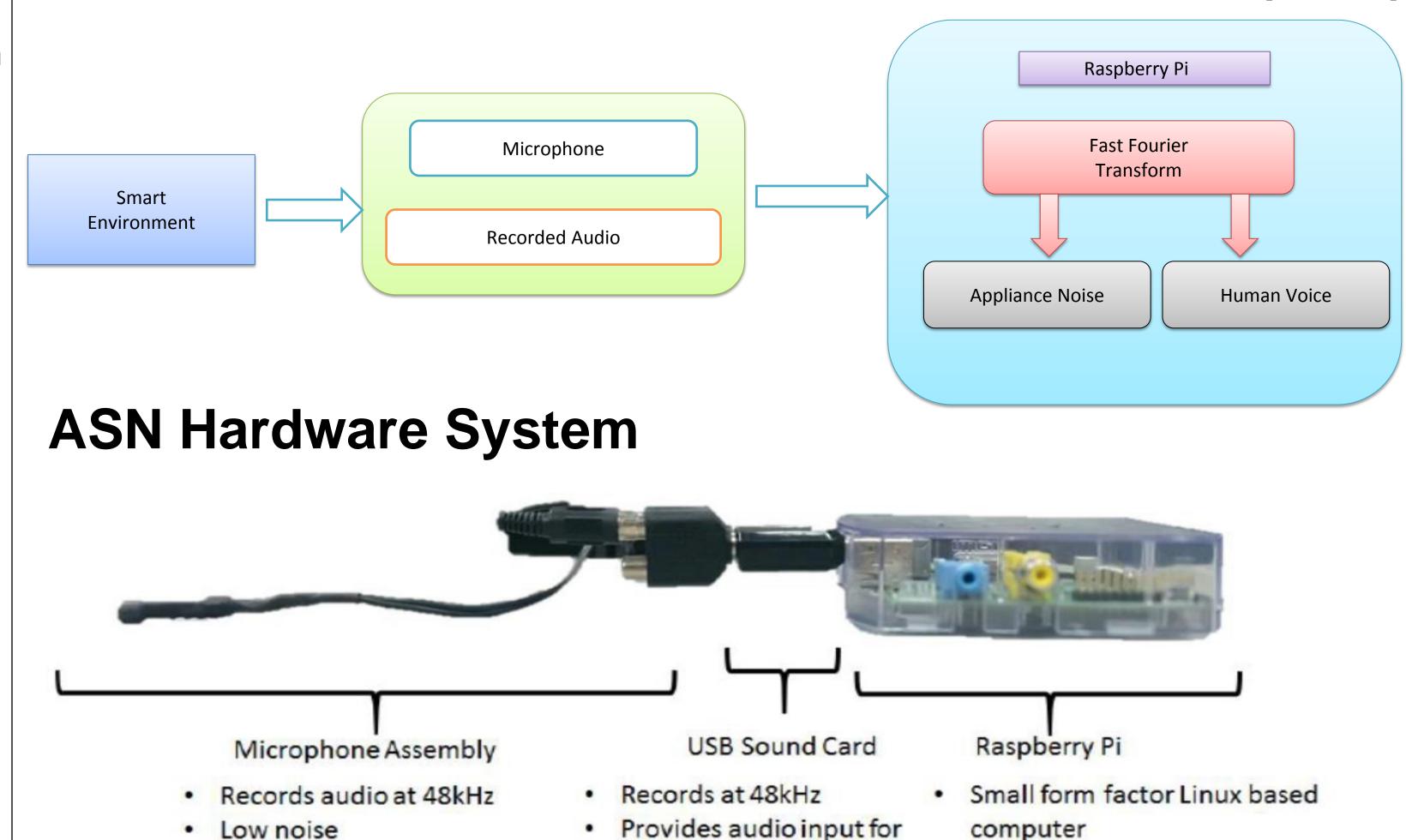
Motivation

- Building Energy Consumption Reduction
- Smartphone-based Context Sensing
 - Acoustic Signal-based Occupancy Prediction
- Energy Disaggregation
 - Multi-modal Sensing Integration
 - Appliances' State Identifications
 - ☐ Fine-grained Energy Metering

System Architecture

- ► Two Logical Components
 - Audio Signal Detector & Recorder
 - Recorded via SoX
 - Audio Stored as Wav Format
 - Sampling rate 48 kHz
 - Voice Separator
 - ☐ Fast Fourier Transform (FFT)
 - Graphics Processing Unit (GPU)
 - ☐ Human Voice Recognition (400 Hz - 3000 Hz
 - Appliance Noise Detection

Functional Overview of Acoustic Sensor Node (ASN) Human Voice Representation



Raspberry Pi

Raspberry Pi

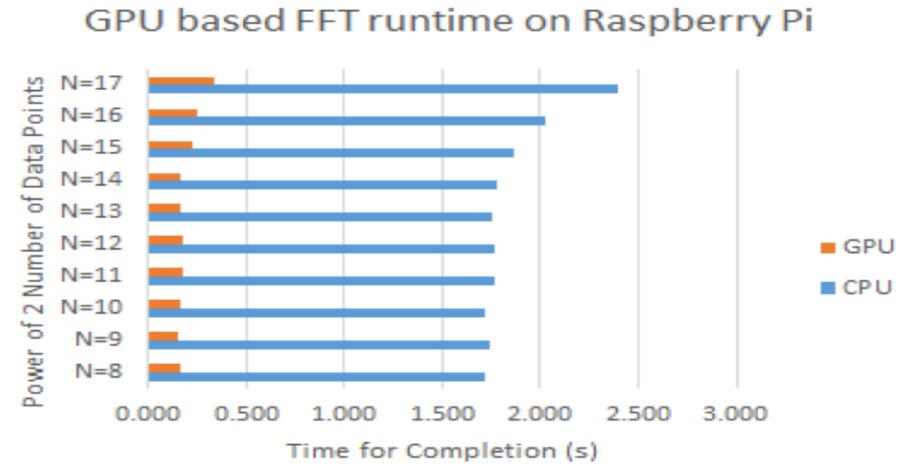


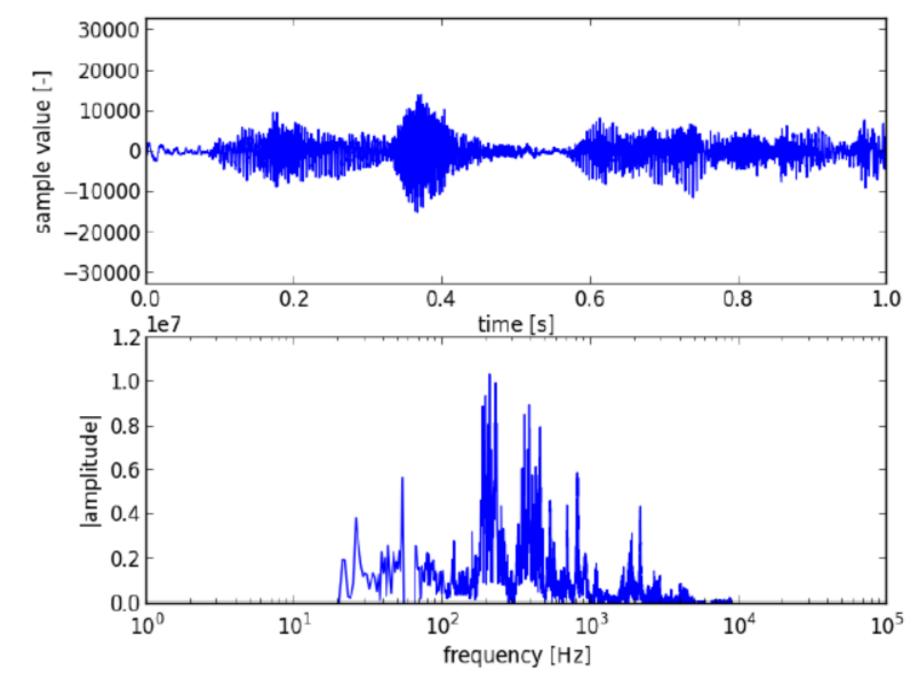
Small form factor

Computational Enhancement

Able to perform mathematically

intensive calculations in the GPU





Acknowledgements

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References

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- § Raspberry pi gpu. http://www.raspberry- projects.com/pi/pi-hardware/bcm2835
- § J. Cooley and J. Tukey. An algorithm for the machine calculation of complex fourier series. Mathematics of Computation, 19(90):297–301, 1965
- § N. Pathak, Md Abdullah Al Hafiz Khan, and N. Roy "Acoustic Based Appliance State Identifications for Fine Grained Energy Analytics" IEEE PerCom 2015



