Wireless sensor nodes for *Smart Environments*

www.st.com

Description

Study and development of an embedded system for distributed sensing over Sub-GHz wireless network in a Smart City / Smart home context. Sensors acquisition and algorithm development for events detection. Experimentation on innovative sensors such as environmental, inertial, acoustic and ranging.

Skills required

- Sensing and wireless communication system concepts
- Digital Signal Processing
- C/C++ programming

Skills acquired during the internship

- Embedded system design
- Signal processing and firmware development
- Emerging wireless technologies

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Smart city

- STM32 Microcontroller
- Sub-GHz Wireless communication
- Innovative Sensors

Contacts

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Audio and Motion DSP

www.st.com

Description

Study, design and development of Sensors processing algorithms based on MEMS microphones and inertial arrays:

- Audio DSP algorithm development (3D Source Localization, Noise Reduction, Compression, Blind Source Separation)
- Motion and sound contextual awareness
- Embedded implementation and optimization
- Sensors acquisition systems design
- Host side application development (Android, Windows)

Skills required

- C, MATLAB programming
- Basic audio DSP skills

Skills acquired during the work

- Embedded system design
- Signal processing and embedded development for innovative audio and sensing solutions
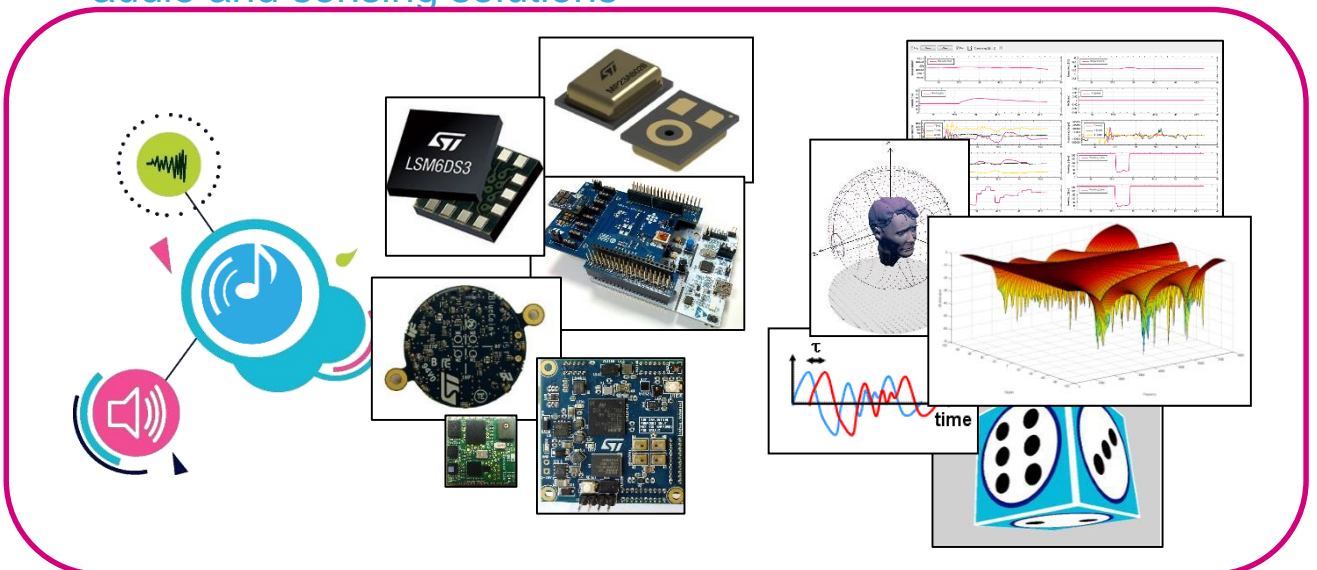
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Bluetooth Low Energy network for audio streaming applications
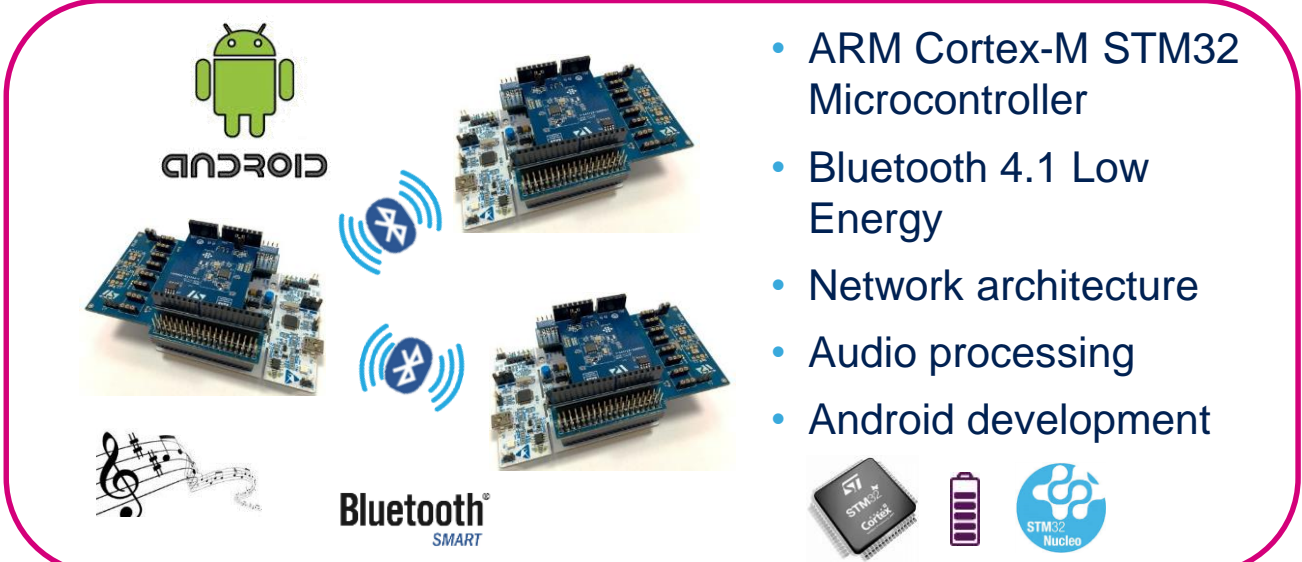
www.st.com

Description

Study and development of a multi node Bluetooth Low Energy (BLE) network for audio streaming applications in a low power scenario. The network will be composed of multiple synchronized STM32 nodes and will interface with Android\iOS ecosystem.

Skills required

- Basic knowledge of audio compression
- C, MATLAB, Android programming
- Wireless sensing and communication system concepts

Skills acquired during the work

- Embedded programming
- Signal processing and firmware development
- Emerging wireless technologies

- ARM Cortex-M STM32 Microcontroller
- Bluetooth 4.1 Low Energy
- Network architecture
- Audio processing
- Android development

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Audio compression codec optimization for audio over BLE application

www.st.com

Description

Embedded profiling, optimization and validation of different compression codecs (e.g. ADPCM, SBC, Opus..) for audio streaming over Bluetooth Low Energy (BLE) in a low power scenario. Audio quality, processing requirements and system integration feasibility evaluation.

Skills required

- C, MATLAB
- Audio compression basics
- Sensing and wireless communication system concepts

Skills acquired during the work

- Embedded programming
- Signal processing and firmware development
- Emerging wireless technologies
- Software optimization

- ARM Cortex-M STM32 Microcontroller
- Code optimization
- Compression codecs
- Audio processing

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