Lab 1 Outline - Team Sapphire

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1. Introduction

1.1. Societal Problem

Living in shared buildings such as apartments, dormitories, and townhomes can be difficult when noise becomes a source of conflict. Excessive noise from neighbors, whether it's loud music, late-night gatherings, or even regular activities, is a leading cause of tenant complaints.

- Noise complaints are typically based on personal accounts, making them subjective and often unreliable.
- Property managers struggle to resolve these complaints fairly without neutral evidence.
- The American Public Health Association states that *“chronic noise, even at low levels, can cause annoyance, sleep disruption, and stress that contribute to cardiovascular disease, psychological disorders, and premature mortality”* (APHA, 2021).
- Tenants face a lack of tools to protect themselves from false accusations or to prove that they’ve been disturbed.
- There is a growing demand for objective, privacy-respecting noise monitoring solutions to improve tenant experiences and conflict resolution.

1.2. Solution - Sapphire Sound Monitor

Sapphire Sound Monitor is a software-enabled solution that empowers tenants and property managers with objective, automated noise tracking and reporting. It fills the gap between personal accusations and verifiable data by providing a privacy-conscious, user-friendly monitoring system.

- Uses a noise sensor to track decibel levels without recording audio to respect privacy
- Automatically logs noise events that exceed a threshold for a set duration
- Generates timestamped reports sent directly to property managers for unbiased resolution
- Tenants can access their own noise history through a mobile or web app
- Real-time alerts notify tenants when they're being too loud, encouraging self-correction
- Optional reward system promotes quiet behavior and positive reinforcement

2. X Product Description

Provide a top-level description of CS 410 product for the average reader. Provide a summary of the solution –- and its goals and objectives. This section should be one paragraph minimum.

2.1 Key Product Features and Capabilities

What does it do? What is significant/unique/innovative about it? What does it accomplish? Describe how this solves the problem.

2.2. Major Components (Hardware/Software)

Provide an overview of the hardware needed to support the solution. Describe how it is structured based on CS 410 MFCD. Define and describe the software to be developed.

3. Identification of Case Study

For whom is this product being developed? Why? Who else might use this in the future?

4. Glossary

- dB (Decibel): A unit to measure the intensity of sounds.
- Noise Event: An occurrence when decibel thresholds are reached for a specific duration. Used for reporting.
- Noise Sensor: A physical device that monitors sound levels without recording audio.
- Report: A structured report generated by the system, detailing the noise event.
- Threshold: A predefined decibel level, which if exceeded, will trigger a noise event
- Tenant: A resident or occupant of a shared or multi-unit housing space using the system to manage and monitor noise activity.

5. References

American Public Health Association. (2021, October 25). *Noise as a public health hazard*. https://www.apha.org/policy-and-advocacy/public-health-policy-briefs/policy-database/2022/01/07/noise-as-a-public-health-hazard

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