

ViBox



Motivation

Problem

- Devices are unaware of the activity and energy levels of rooms. They cannot accurately or adequately respond to the environment and cater to their users
- Continuous, manual adjustment is needed to match the intensity of music to the Vibe of a room

Solution

- Create an intelligent hardware and software system that can automatically analyze a social space in order to determine the Vibe of the room.
- Use VibeScore to create a music player that will continually update the intensity of music as the Vibe changes over time

Extensibility

- Install multiple ViBox devices in each room of a household or building to create a more holistic and accurate picture of the social environment of a physical space
- Create a VibeScore API to allow any system to leverage a user's ViBox network to customize and control their environment

State of the Art



Music Players

- iTunes
- Pandora
- Spotify



HVAC

- Nest
- Occupancy states from building-temperature wavelet analysis



Automation & Security

- IFTTT
- People tracking using anonymous binary sensors

Methodology

VibeScore Algorithm

Supervised Learning

- We gathered data over the weekend to train an algorithm to map motion, temperature, and noise data to Vibe
- We tried building linear regression and decision tree models before settling on using logistic regression
- Tests indicate that our algorithm can accurately compute VibeScore

ViBox Implementation

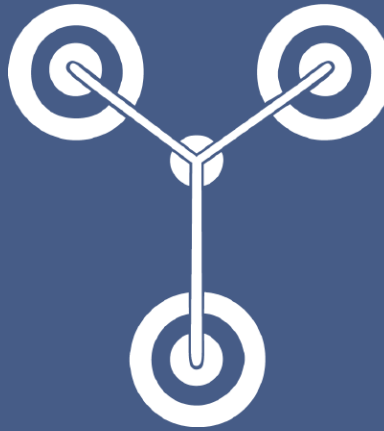
Galileo

- Array of motion, temperature, and noise sensors
- Filtering raw values and computing VibeScore
- Running the webserver

Website

- Get current VibeScore from Galileo that is locally connected (because Harvard's WiFi is annoying) to the computer running ViBox website
- Play music based on preset mapping of genres to different VibeScores and user preference

Results



- VibeScore algorithm continues to improve as we gather more data to use in training
- We are currently using three Vibe classes: LowVibe, MidVibe, and HighVibe
- We have achieved ~80% accuracy using this method

Intellectual Value



Determining the Vibe of a room allows for smarter systems. Are there two people sitting and reading or are there ten having a good time at a party? Our approach of using low-cost and non-intrusive sensors could allay many of the price and privacy concerns that surround traditional occupancy and sentiment analysis systems. We feel our approach will allow IoT devices to differentiate between different activity levels in an appropriately private, secure, and cost-effective manner, which will ultimately lead to a better user experience.

Thank You

