VibeQueue

Lab 1 Outline

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1. Introduction

1.1 Ecosystem Context

1.1.1 Industry: hospitality – small cafes, coffee shops, and local restaurants

1.1.2 Atmosphere directly affects customer satisfaction, dwell time, and per-visit spending (Milliman, 1982; North et al., 1999)

1.1.3 Music genre and tempo are among the top controllable environmental factors in food service settings

1.2 Problem Scope

1.2.1 ~1 million independent food and beverage locations operate in the U.S. (National Restaurant Association [NRA], 2023)

1.2.2 Majority of small venues (<50 seats) cannot afford proprietary music management hardware ($500–$1,500+ upfront cost)

1.2.3 Staff interruptions: baristas field 10–15 verbal song requests per morning rush, reducing service efficiency

1.2.4 Owners lose control of intended atmosphere when staff manually honor off-brand requests

1.2.5 Estimated ~600,000 independent U.S. cafes and restaurants in the under-50-seat segment represent an underserved addressable market (NRA, 2023)

1.3 Current Solutions and Drawbacks

1.3.1 TouchTunes (TouchTunes, n.d.)

- Proprietary jukebox hardware required; $500–$1,500+ upfront cost
- Designed for large bars/restaurants; inaccessible to small businesses
- No customer-facing digital interface; staff-mediated only

1.3.2 Rockbot (Rockbot, n.d.)

- Dedicated hardware recommended; medium-to-high cost

- Targets medium-to-large businesses; limited mobile/web-only interface

1.3.3 Manual Staff Requests

- Customers verbally request songs; interrupts staff 10–15 times per morning rush
- Inconsistent outcomes; venue atmosphere compromised when staff accommodate off-brand requests

1.3.4 Generic Personal Streaming (e.g., Spotify Free/Personal)

- Illegal for commercial use without a commercial license (Spotify, 2023)
- No customer interaction feature; owner cannot manage request queue

1.4 Market Gap

1.4.1 No real-time, affordable, staff-free, legally compliant music management tool exists for small venues

1.4.2 Customers have no digital channel to influence venue atmosphere

1.4.3 Owners lack a secondary revenue stream from music engagement

1.4.4 Gap represents ~600,000 under-50-seat U.S. venues with no viable current solution (NRA, 2023)

1.5 Requirements a Solution Must Address

1.5.1 Low cost – viable on a small business budget (target: <$50/month subscription)

1.5.2 No proprietary hardware requirement

1.5.3 Customer-facing interaction without interrupting staff

1.5.4 Legal commercial music licensing compliance (ASCAP, BMI, SESAC)

1.5.5 Owner/staff control over final song selection to protect venue atmosphere

1.6 Proposed Solution: VibeQueue

1.6.1 Web-based, hardware-agnostic, subscription jukebox platform for local spaces

1.6.2 Tagline: “Your Vibes, Managed”

[Figure 1: Current Process Flow > customer has song request > staff intervention > decision: capable of playing specific song? > decision: acceptable to business? > song played or not played]

2. Product Description

2.1 Overview

2.1.1 Software-only solution; no proprietary or dedicated hardware required

2.1.2 Replaces manual staff processes with a seamless digital music ecosystem

2.1.3 Deployable on devices the business already owns

2.2 Goals and Objectives

2.2.1 Customer: frictionless way to influence venue music via personal smartphone

2.2.2 Owner/Staff: complete control over requestable song pool and queue

2.2.3 Revenue: optional pay-to-request secondary income stream

2.2.4 Compliance: all music playback legally licensed for commercial use

2.2.5 Deployment: zero new hardware purchase required

2.3 Key Differentiators vs. Competition

2.3.1 Software-only – runs on devices the business already owns

2.3.2 Subscription-based low monthly cost vs. high upfront hardware investment

2.3.3 Customer-facing QR interface vs. staff-mediated requests

2.3.4 Legally compliant via SoundMachine (ASCAP/BMI/SESAC) vs. unlicensed personal streaming

[Figure 2: VibeQueue Solution Process Flow (MFCD) – customer scans QR > song request > Vibe Engine validates against Venue Database > validated song sent to Local Server > SoundMachine plays audio]

2.4 Key Features

2.4.1 QR Code Access – customers scan table QR code; portal opens in browser; no app download required

2.4.2 Song Browsing & Requests – Soundcharts API metadata; real-time constraint filtering

2.4.3 Vibe Engine – proprietary algorithm validating genre, tempo, mood, and explicit content against venue constraints

2.4.4 Business Control Center – owner/staff dashboard for queue management, constraint configuration, and analytics

2.4.5 Dynamic Vibe Moderation – automatic system-wide enforcement of owner-defined rules

2.4.6 Pay-to-Request – optional $0.99–$1.99 song boost; 5% platform revenue cut

2.4.7 Licensed Streaming – SoundMachine provides ASCAP/BMI/SESAC compliant audio playback

2.4.8 Hardware-Agnostic – runs on any internet-connected device the venue already owns

2.5 Major Components

2.5.1 Hardware: no proprietary hardware; uses existing venue tablet, phone, or laptop + speaker system

2.5.2 Software Architecture (ref. Figure 2)

- Web App UI – customer-facing responsive portal; QR-linked; Soundcharts-connected search
- Vibe Engine – custom validation logic; queries Soundcharts → checks Venue Database → approves/rejects
- Soundcharts API – commercially safe music metadata (genre, tempo, mood, popularity, explicit flag)
- SoundMachine – third-party licensed streaming; ASCAP/BMI/SESAC compliant audio playback
- Local Server – audio routing, playback status, Vibe Engine ↔ SoundMachine communication
- Venue Database – stores vibe settings, queue state, and transaction/revenue data
- Business Control Center Dashboard – owner/staff real-time management interface

2.6 Technology Stack

2.6.1 LAMP: Linux, Apache, MySQL, PHP

2.6.2 Soundcharts API – music analytics and metadata (Soundcharts, n.d.)

2.6.3 SoundMachine API – licensed commercial audio streaming (SoundMachine, n.d.)

2.6.4 QR code generation library – venue-specific portal linking

2.6.5 Web-based front end – mobile-first responsive design

2.6.6 Note: Pivoted from Spotify API due to strict commercial-use licensing restrictions (Spotify, 2023)

3. Case Study

3.1 WHO: "Brewpoint Café"

3.1.1 Single-location independent coffee shop

3.1.2 Owner (Jamie) + 2 barista staff; ~30 seats

3.1.3 Primarily serves morning commuters and remote workers (7 AM–2 PM)

3.2 WHAT PROBLEM

3.2.1 Baristas interrupted 10–15 times per morning rush by verbal song requests

3.2.2 Owner loses control of intended "acoustic/lo-fi" atmosphere when staff accommodate off-brand requests

3.2.3 No revenue generated from music engagement

3.3 FEATURES TESTED

3.3.1 QR Code Access (table cards at each seat)

3.3.2 Song Browsing & Requests (Soundcharts-powered search)

3.3.3 Business Control Center (genre: acoustic, indie, lo-fi; explicit content blocked; max tempo: 120 BPM)

3.3.4 Dynamic Vibe Moderation (automatic genre and tempo enforcement)

3.3.5 Pay-to-Request ($0.99 boost option)

3.4 SCENARIO (Step-by-Step)

3.4.1 Customer "Alex" sits down; notices QR card on table; scans with phone

3.4.2 VibeQueue portal opens in browser – no download required; Alex sees current queue and search bar

3.4.3 Alex searches "Golden Hour" by JVKE; Vibe Engine validates: genre = pop/indie (pass), explicit = no (pass), tempo = 98 BPM (under 120 BPM limit, pass) → song added to queue

3.4.4 Alex pays $0.99 to boost song to top of queue; payment processed automatically

3.4.5 Staff receive zero interruption; song plays through SoundMachine on café speakers

3.4.6 Owner Jamie logs into Control Center on counter tablet; reviews queue and analytics; adjusts genre allowlist for afternoon shift

[Figure 3: Case Study Scenario Flow – Alex scans QR > searches song > Vibe Engine validates > song queued > SoundMachine plays > staff uninterrupted]

3.5 FUTURE EXPANSION

3.5.1 Scale to small café chains (5–10 locations) with centralized Control Center and per-location vibe profiles

3.5.2 Adjacent markets: college dining halls, hotel lobbies, fitness studios, barbershops

3.5.3 B2B SaaS licensing model for venue management companies

3.5.4 Loyalty/gamification: customers earn “vibe points” for requests that remain in queue

4. Glossary

4.1 API (Application Programming Interface) – set of protocols allowing software applications to communicate with each other

4.2 ASCAP (American Society of Composers, Authors and Publishers) – U.S. performing rights organization licensing music for commercial use

4.3 BMI (Broadcast Music Inc.) – U.S. performing rights organization managing commercial music licensing on behalf of songwriters and publishers

4.4 Business Control Center – VibeQueue’s owner-facing web dashboard for configuring vibe constraints, managing the song queue, and viewing analytics

4.5 Hardware-Agnostic – software designed to run on any existing device without requiring specific or proprietary hardware

4.6 LAMP – open-source web development stack: Linux (OS), Apache (web server), MySQL (database), PHP (scripting language)

4.7 MFCD (Major Functional Component Diagram) – visual representation of a system’s major components and data flows between them (CS 410 definition)

4.8 QR Code (Quick Response Code) – two-dimensional barcode scanned by smartphone camera to open a URL or application

4.9 SESAC (Society of European Stage Authors and Composers) – U.S. performing rights organization providing commercial music licensing

4.10 SoundMachine – third-party commercial music streaming service holding ASCAP/BMI/SESAC licenses; used by VibeQueue for legal audio playback in venues

4.11 Soundcharts API – third-party music analytics API providing commercially safe song metadata: genre, tempo, mood, popularity, and explicit content flags

4.12 Vibe Engine – VibeQueue's proprietary algorithm evaluating customer song requests against venue-configured constraints before queuing them

5. References

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