Sound Effects Integration Model - CTJ AI Voice Assistant

Context

The Flutter voice assistant "CTJ AI" has 34+ sound effect files available in `assets/sounds/`. These should be intelligently used to enhance user engagement, create emotional resonance, and provide audio feedback for various interaction contexts.

Available Sound Effects Inventory

Animal/Creature Sounds

- `dog-bark.mp3`, `dog-pant.mp3` - Enthusiasm, excitement
- `cat-meow.mp3`, `puppy-whimpering.mp3` - Cuteness, playfulness
- `lion-roar.mp3` - Power, authority, impact
- `monkey.mp3` - Chaos, fun, playfulness
- `bird-sound.mp3` - Lightness, joy, freedom
- `horse-snort.mp3`, `pig-squeak.mp3`, `pig-squeak.mp3` - Surprise, humor
- `goat-sound.mp3` - Stubbornness, humor
- `tiger-roar.mp3` - Intensity, danger
- `wolf-howl.mp3` - Mystery, sadness
- `rooster-cry.mp3` - Wake-up, morning energy
- `owl-hoot.mp3` - Wisdom, calmness
- `bear-growl.mp3` - Seriousness, caution
- `sniffing-animal.mp3` - Curiosity, investigation

Human/Emotion Sounds

- `crowd-cheer.mp3` - Celebration, success, victory
- `congratulations-message-notification.mp3` - Achievement, milestone
- `right-ans.mp3` - Correct answer, success
- `wrong-ans.mp3` - Incorrect answer, mistake
- `applause.mp3` - Praise, good performance
- `heart-beat-10sec-timer.mp3` - Tension, anticipation, urgency
- `dream-sound.mp3` - Imagination, wonder, idea generation
- `scary-sound.mp3` - Fear, suspense, caution

- `wow.mp3` - Amazement, surprise, awe

Environmental/Action Sounds

- `air-horn.mp3` - Alert, attention-grabbing
- `bell-ring.mp3` - Notification, completion
- `rain-and-thunder-32sec.mp3` - Calm, relaxation, atmosphere
- `setting-statement.mp3` - Configuration, importance
- `whoosh.mp3` - Quick action, transition
- `going-in-reverse.mp3` - Undo, backward action
- `keep-quite.mp3` - Silence, focus mode
- `hmmm-sound.mp3` - Thinking, consideration
- `fart-voice.mp3` - Humor, lightheartedness
- `going-in-reverse.mp3` - Undo/mistake recovery

Sound Effect Use Cases & Engagement Model

1. Greeting & Welcome Context

When user first starts or proactive greeting triggers:

- `congratulations-message-notification.mp3` - For first interaction milestone
- `dream-sound.mp3` - Before personalized greeting (sense of wonder)
- `bell-ring.mp3` - Session start notification
- Animal persona sounds - If using Fun personas (dog bark, cat meow)

When to Use: App startup, after long idle period, welcome messages

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2. Success & Achievement Engagement

When user accomplishes something (answers right, wins game, milestone):

- `right-ans.mp3` - **Primary** for correct answers
- `applause.mp3` - **Secondary** for major achievements
- `crowd-cheer.mp3` - **Celebration level** for big wins
- `congratulations-message-notification.mp3` - Milestone messages

- Animal sounds (lion roar, tiger roar) - For "dominant" persona in games

When to Use: Game victories, trivia correct answers, long conversation milestones, user achievements

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3. Error/Failure Feedback

When something goes wrong or mistake happens:

- `wrong-ans.mp3` - **Primary** for incorrect answers
- `bear-growl.mp3` - Warning/caution feedback
- `scary-sound.mp3` - For serious errors only
- `going-in-reverse.mp3` - Undo/correction action
- `goat-sound.mp3` - Light humor for minor mistakes (non-frustrating)

When to Use: Wrong answers, API errors, connectivity issues, failed game rounds

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4. Attention & Curiosity Triggers

When AI wants to grab user focus or spark interest:

- `air-horn.mp3` - **Strong alert** for important updates
- `heart-beat-10sec-timer.mp3` - **Suspense/urgency** for time-limited games
- `hmmm-sound.mp3` - Thinking sound during deliberation
- `wow.mp3` - Amazement at user's input
- `bird-sound.mp3` - Light curiosity trigger
- Animal curiosity sounds (monkey.mp3, sniffing-animal.mp3)

When to Use: Idle prompts, game start countdowns, interesting trivia reveals, shocking answers

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5. Emotion-Specific Engagement

Contextual to detected emotion:

Happy/Excited Emotion:

- `dog-bark.mp3` / `dog-pant.mp3` - Matching enthusiasm
- `crowd-cheer.mp3` - Shared celebration
- `applause.mp3` - Reinforcement

Sad/Calm Emotion:

- `rain-and-thunder-32sec.mp3` - Atmospheric comfort
- `owl-hoot.mp3` - Wisdom/thoughtful
- `dream-sound.mp3` - Inspirational

Angry Emotion:

- `lion-roar.mp3` / `tiger-roar.mp3` - Matching intensity
- `whoosh.mp3` - Action-oriented response

Curious Emotion:

- `monkey.mp3` - Playful investigation
- `bird-sound.mp3` - Exploration
- `hmmm-sound.mp3` - Thinking together

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6. Game-Specific Engagement

Different games have their "signature" sounds:

20 Questions:

- `hmmm-sound.mp3` - When generating questions
- `heart-beat-10sec-timer.mp3` - As questions progress
- `wow.mp3` / `right-ans.mp3` - On correct guess

Roast Battle:

- `crowd-cheer.mp3` - After good roast
- `fart-voice.mp3` - Humorous, anti-roast
- `whoosh.mp3` - Quick comeback

Trivia Challenge:

- `right-ans.mp3` - Correct answers
- `wrong-ans.mp3` - Incorrect answers
- `heart-beat-10sec-timer.mp3` - Waiting for answer
- `applause.mp3` - High score

Story Time:

- `dream-sound.mp3` - Story beginning
- `scary-sound.mp3` - Danger/twist moments
- `wow.mp3` - Plot surprises
- `whoosh.mp3` - Scene transitions

Compliment Generator:

- `applause.mp3` - After giving compliments
- `heart-beat-10sec-timer.mp3` - Emotional buildup
- `congratulations-message-notification.mp3` - Self-worth milestone

Debate Mode:

- `air-horn.mp3` - Strong counter-argument
- `whoosh.mp3` - Logic strikes
- `lion-roar.mp3` / `tiger-roar.mp3` - Power moves

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7. Persona-Specific Sound Integration

Fun: Dog Persona:

- Primary: `dog-bark.mp3` (start/emphasis)
- Secondary: `dog-pant.mp3` (excitement, end of speech)
- Trigger: Exclamation marks, excitement keywords
- Usage frequency: High (30-40% of responses)

Fun: Cat Persona:

- Primary: `cat-meow.mp3` (end sound, aloof)
- Secondary: `puppy-whimpering.mp3` (for sarcasm)
- Trigger: Sarcastic remarks, independence shown
- Usage frequency: Medium (20-30%)

Fun: Lion Persona:

- Primary: `lion-roar.mp3` (start for impact)

- Secondary: `bear-growl.mp3` (authority moments)
- Trigger: Bold statements, leadership
- Usage frequency: Medium (15-25%)

Fun: Monkey Persona:

- Primary: `monkey.mp3` (chaos, excitement)
- Secondary: `bird-sound.mp3` (playfulness)
- Trigger: Jokes, rapid-fire responses
- Usage frequency: High (35-45%)

Gen-Z Personas:

- Primary: `crowd-cheer.mp3` (slang moments, validation)
- Secondary: `wow.mp3` (reactions to user)
- Trigger: Slang usage, "slay" moments
- Usage frequency: Medium (25-35%)

Professional Personas (Coach, Therapist, Teacher):

- Primary: `bell-ring.mp3` (milestone moments)
- Secondary: `congratulations-message-notification.mp3` (achievement)
- Trigger: Advice given, goals met
- Usage frequency: Low-Medium (15-25%)

Implementation Architecture

Sound Effect Trigger System

```
Trigger Source → Sound Selection Logic → Probability Check → Play Sound
```

Decision Tree for Sound Selection

1. **Is active game running?** → Use game-specific sounds
2. **Has emotion been detected?** → Use emotion-matched sounds
3. **Is user interacting positively?** → Use reward/engagement sounds

4. **Is current persona animal?** → Use persona-specific sounds
5. **Is message a system alert?** → Use attention sounds
6. **Default:** Use contextual ambient sounds (rain, dreams, etc.)

Best Practices for Sound Engagement

DO:

✅ Play sounds **AFTER** speech starts (100-300ms delay) to not disrupt voice ✅ Keep volume **low (0.3-0.6)** to enhance not overpower TTS ✅ Use sounds **opportunistically** (30-50% of interactions) not constantly ✅ Match sound **tone with response tone** (happy response → celebratory sound) ✅ Layer sounds intelligently (main sound + subtle ambient) ✅ Allow users to **disable** sound effects in settings ✅ Use shorter sounds (<2s) for inline interactions ✅ Use longer sounds (2-10s) for ambient/atmospheric moments

DON'T:

❌ Play loud sounds during sleep/calm modes
❌ Spam multiple sounds in quick succession
❌ Use scary sounds for regular interactions
❌ Override user preferences
❌ Play sounds when device is in silent mode (check beforehand)
❌ Use attention-grabbing sounds for every message

Code Integration Checkpoints

Areas to Modify:

1. **VoiceController.speak()** - Add post-speech sound delays
2. **Game state updates** - Trigger game-specific sounds
3. **Emotion detection** - Play emotion-matched sounds
4. **Persona application** - Use persona sounds
5. **Message success/failure** - API/game sounds
6. **User achievements** - Milestone celebration sounds
7. **Idle prompts** - Attention-grabbing sounds
8. **Settings menu** - Toggle sound effects on/off

New Methods to Add:

- `_playContextualSound(SoundContext context)` - Main dispatcher

- `_selectBestSound(String trigger, String emotion, String persona)` - AI sound selection
- `_checkSoundPreferences()` - User preference check
- `_playSoundWithDelay(String file, int delayMs)` - Timed playback
- `_soundVolumeSafety()` - Ensure volume doesn't exceed safe levels

Engagement Model Summary

Sound effects should serve as "audio props" that:

1. **Reinforce correct responses** without being annoying
2. **Celebrate user achievements** to boost dopamine
3. **Add personality** to AI persona through consistent sound signatures
4. **Create emotional connection** through matched tone
5. **Provide audio feedback** for state changes
6. **Maintain engagement** during idle/waiting moments
7. **Never interrupt** the primary listening experience (voice)
8. **Enhance not dominate** the interaction

Example Scenarios

Scenario 1: User answers trivia correctly

```
User: "The capital of France is Paris"
AI Response: "That's correct! You're doing amazing!"
Timeline:
  → Start TTS speech (0ms)
  → Play right-ans.mp3 (300ms delay, 0.4 volume)
  → Speech continues naturally
  → On completion: Play applause.mp3 (0.3 volume)
```

Scenario 2: Dog Persona greeting user

```
AI: "Woof woof! Good morning Mr. Shourav!"
Timeline:
  → Start dog-bark.mp3 (50ms early, 0.5 volume)
  → Begin TTS speech
  → Punctuation detected (!) → play dog-bark.mp3 (0.4 volume)
  → End speech → play dog-pant.mp3 (0.35 volume)
```

Scenario 3: Long idle period

```
No interaction for 20 seconds
→ Play attention sound: air-horn.mp3 (0.3 volume) OR heart-beat.mp3
→ Speak proactive greeting with momentum
→ Reinforces app is alive and waiting for input
```

Scenario 4: Story game with twist reveal

```
AI: "And suddenly... the door burst open!"
→ Start TTS
→ On "suddenly": play wow.mp3 (0.4 volume)
→ On exclamation: play whoosh.mp3 (0.5 volume)
→ Story continues with atmosphere sounds
```

Prompt for Claude Sonnet 4.5

Use this prompt with Claude Sonnet 4.5:

```
I have a Flutter voice assistant app (CTJ AI) with 34+ sound effect files.
I need you to:

1. Create an enum/class `SoundContext` that categorizes all sound effects
2. Build a `SoundEffectManager` class that intelligently selects sounds based on:
   - Current emotion detected
   - Active persona type
   - Game state (if in game)
   - Message content/keywords
   - User interaction type
3. Add methods to `VoiceController` to trigger contextual sounds
4. Integrate sound playback into existing flow:
   - After user correct answers
   - During game transitions
   - Emotion-matched responses
   - Persona-specific moments
   - Achievement milestones
5. Add sound preference toggle in settings
6. Ensure sounds never interrupt TTS (use delays)
7. Keep volume levels safe (0.3-0.6 range)

Reference: I've provided detailed sound effect categories, use cases, and implementation guidelines above.
```

Success Metrics for Sound Integration

After implementation, measure:

- ✅ **Engagement**: Users spend 15%+ more time in app
- ✅ **Feedback**: Users mention sounds positively
- ✅ **Game wins**: Higher completion rates due to positive reinforcement
- ✅ **Retention**: Returning user rate increases
- ✅ **No annoyance**: Minimal sound disable requests
- ✅ **Natural flow**: Sounds feel organic, not robotic

Ready to generate code? Share this prompt with Claude Sonnet 4.5 and you'll get a complete, production-ready sound effect integration system!