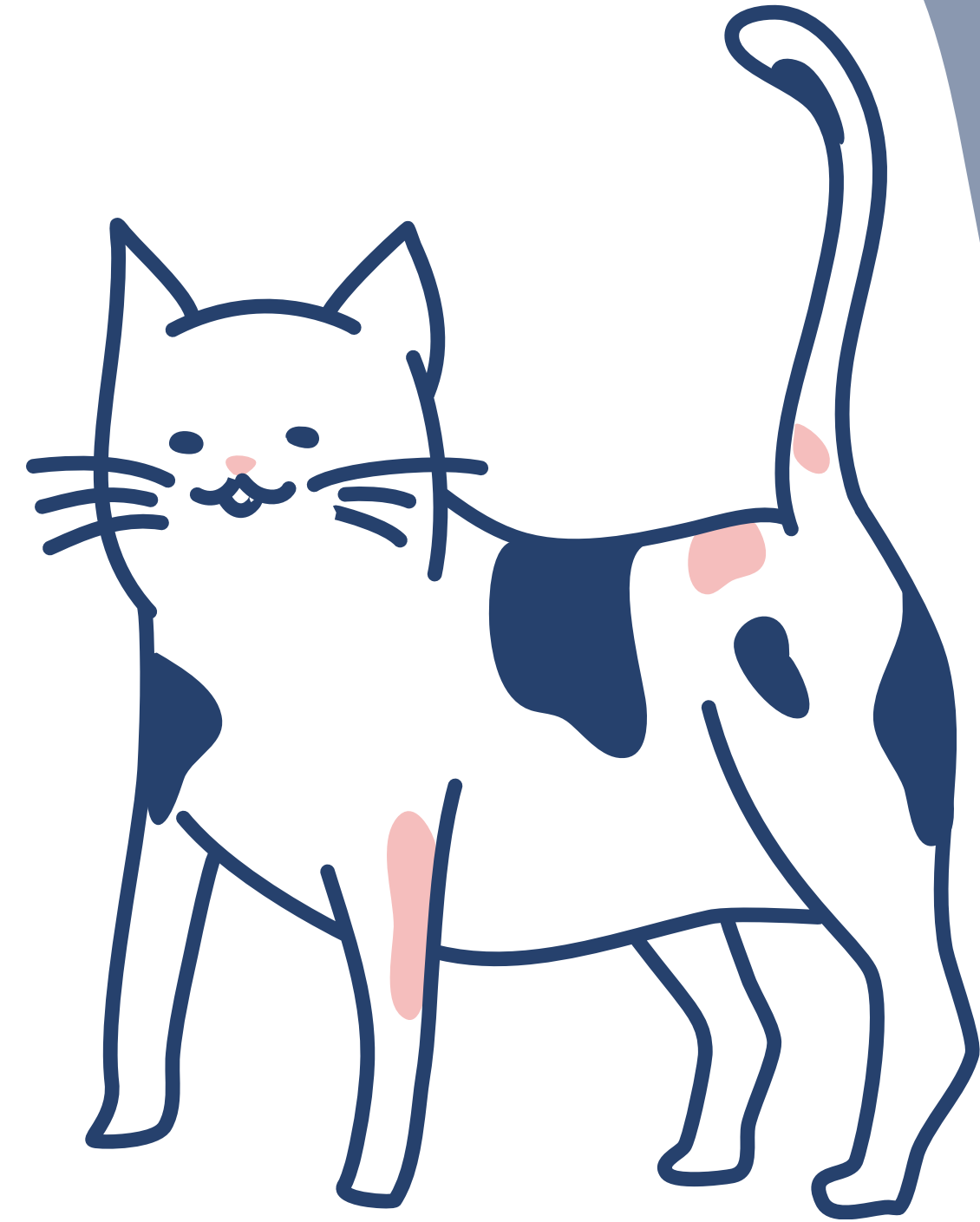


**Meow, Kate, meow!**

# **Deciphering Kitten's Meows with Neural Network-Based Audio Classification**



January 2, 2024

# TEAM



**Andrei**

**Role:**

Study Author



**Mio**

**Role:**

Kitten Vocalizer



**Kate**

**Role:**

Human Vocalizer

# AGENDA

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# BUSINESS PROBLEM



**Many people adopt kittens without understanding their needs, such as:  
play, food or other care aspects.**

- develop a model that identifies the category of a kitten's meow with high accuracy
- based on this model create a mobile app to help better understand pets

# DATA OVERVIEW

## Experimental Contexts:

- **F (Food):** Kitten recorded before mealtime
- **A (Attention):** Kitten recorded meowing in an isolated room
- **T (Thrill):** Kitten recorded while being petted
- **KAT (Human):** Human participant randomly mimicking meows

**Experiment duration:** 15 days

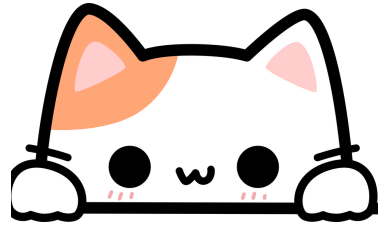
**Total:** 368 audio files

**Length of each file:** under 3 seconds

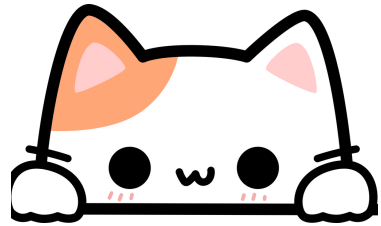
# DATA LIMITATIONS

- **Cat of a specific age, gender, and breed**
- **A particular environment**
- **The range of the kitten's behaviors**

# FINDINGS



**Tuned Neural Network Sequential** exhibited the highest accuracy of **93.2%**



**Each condition reflects unique properties:**

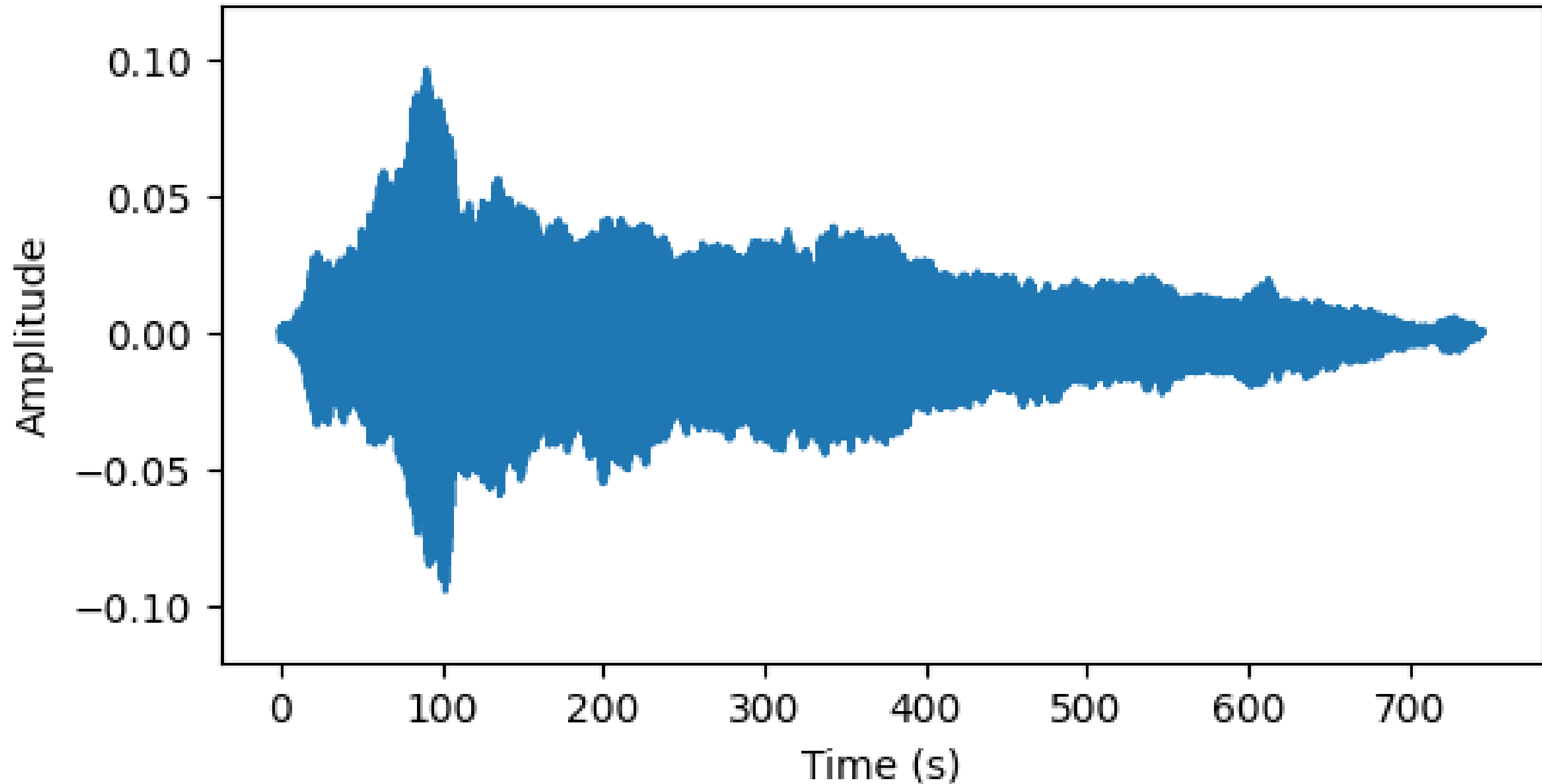
- **Food:** Varied intensity with dominant low frequencies
- **Attention:** Consistent, high-frequency sounds
- **Thrill:** Complex, wide-ranging frequency variations
- **Human:** Stable, monotone sounds, mainly low frequencies

# ANALYSIS



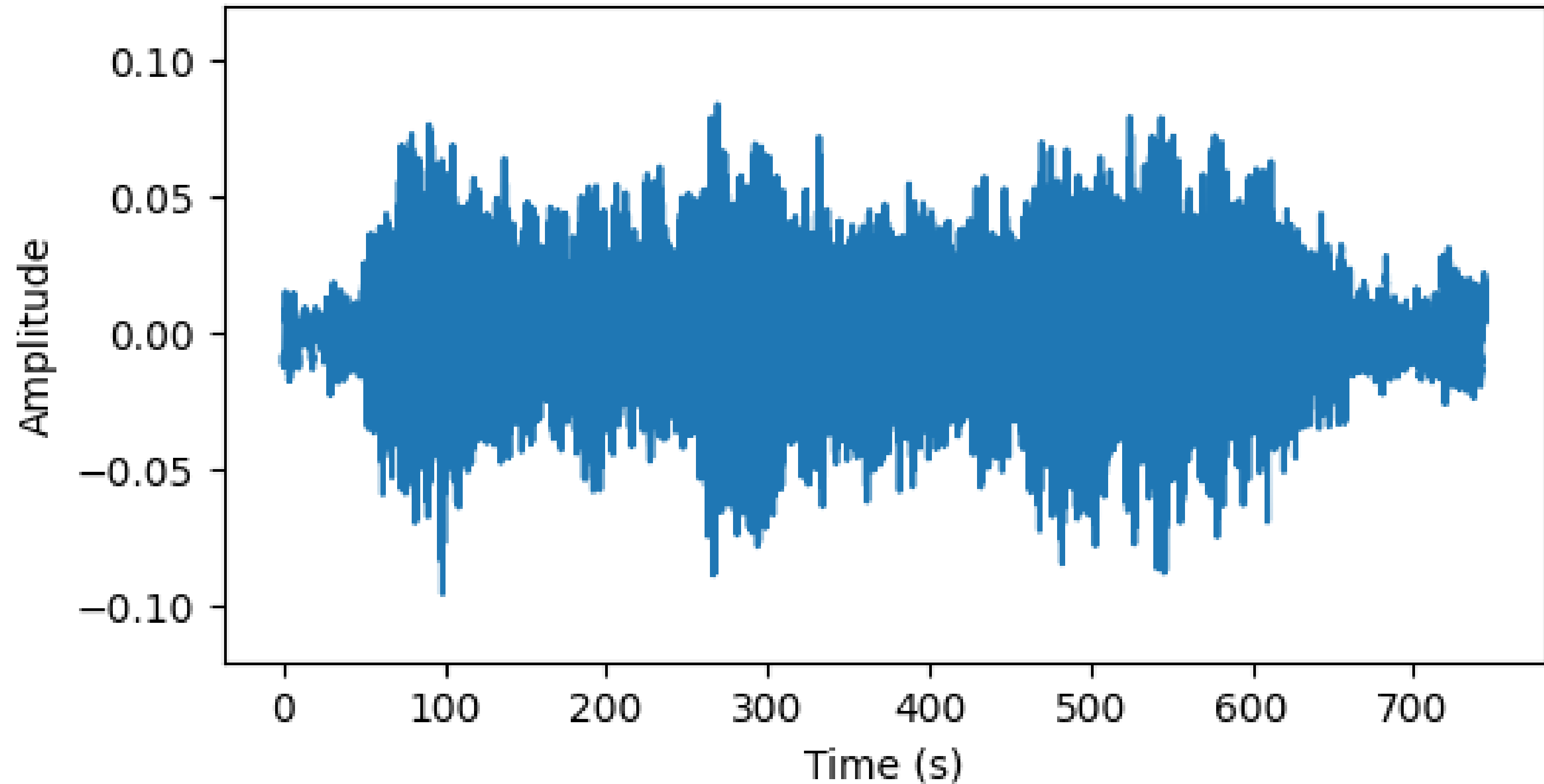
# Waveform: Food

Fluctuating intensity



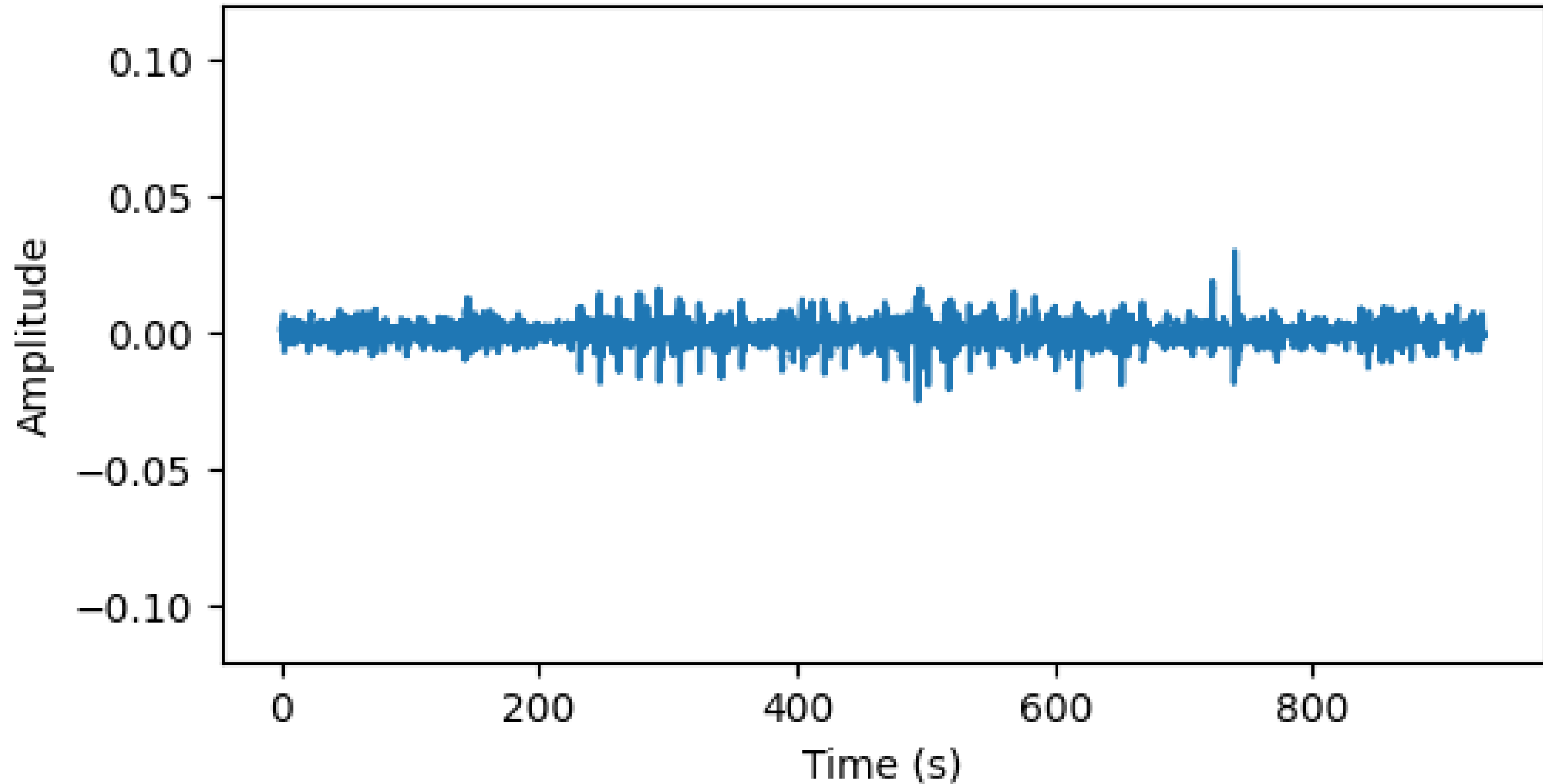
# Waveform: Attention

Uniform with Steady Amplitude



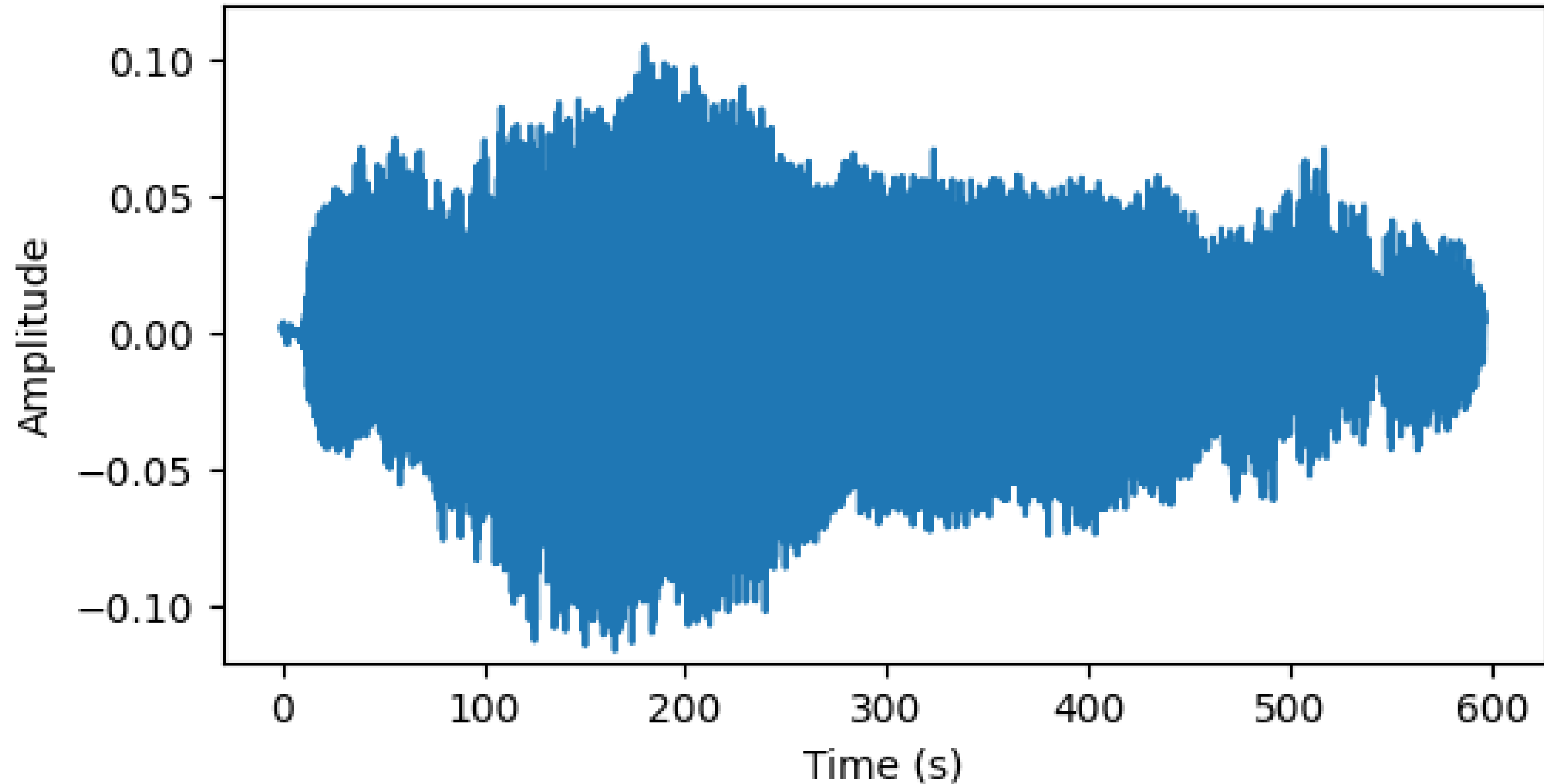
# Waveform: Thrill

Highly Variable and Complex



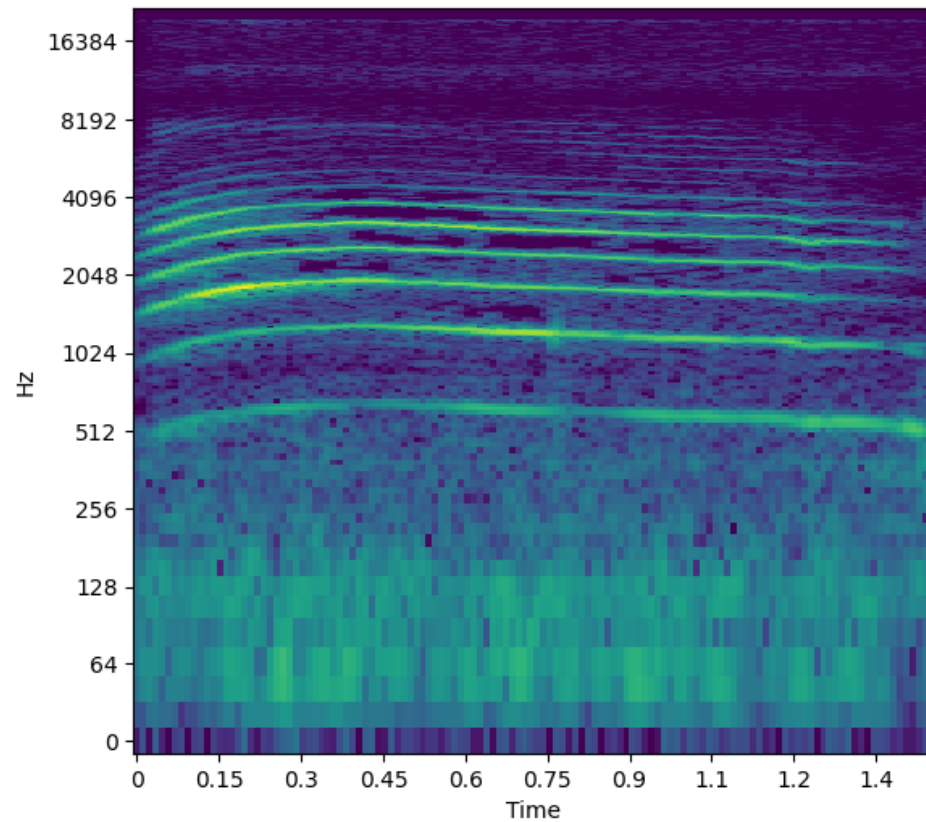
# Waveform: Human

**Monotone and Even**

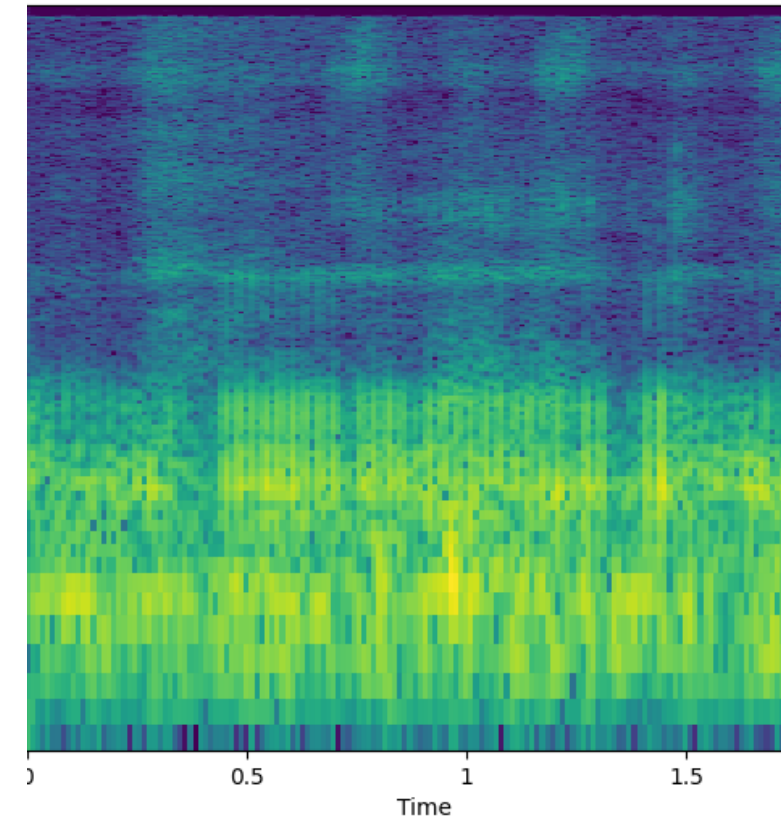


# Spectrogram

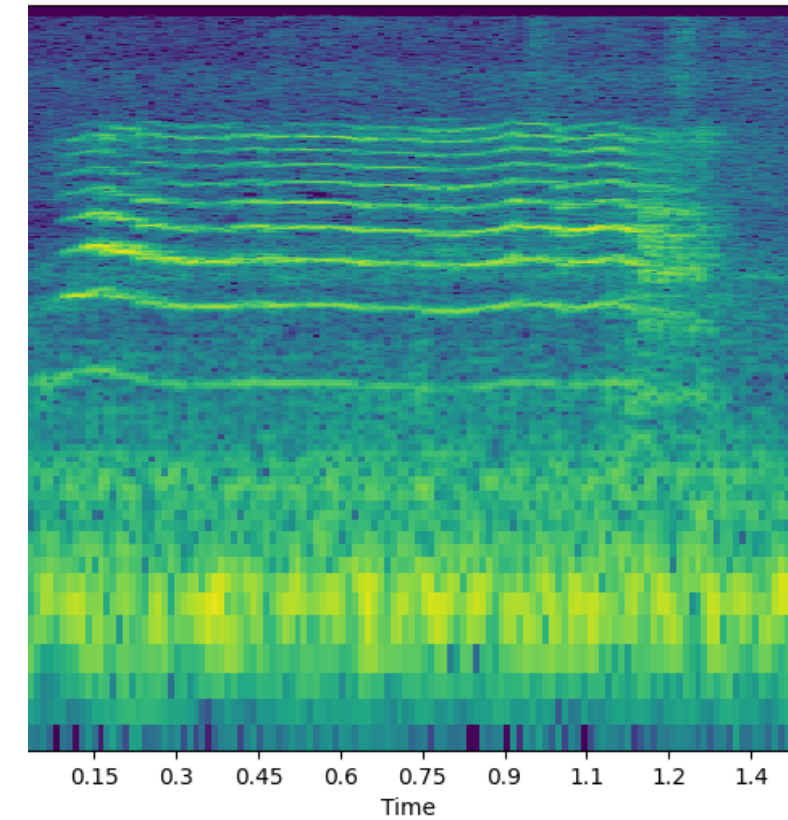
**F**



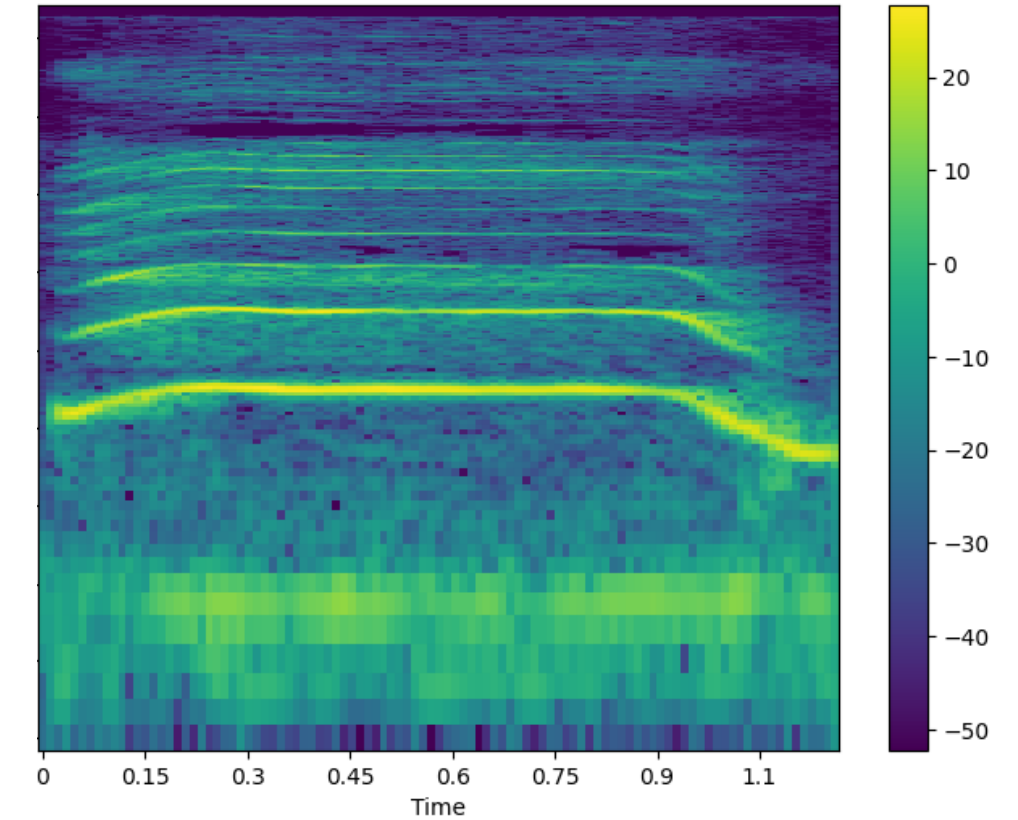
**A**



**T**



**KAT**



**Food:** Certain louder pitches pretty constant over time

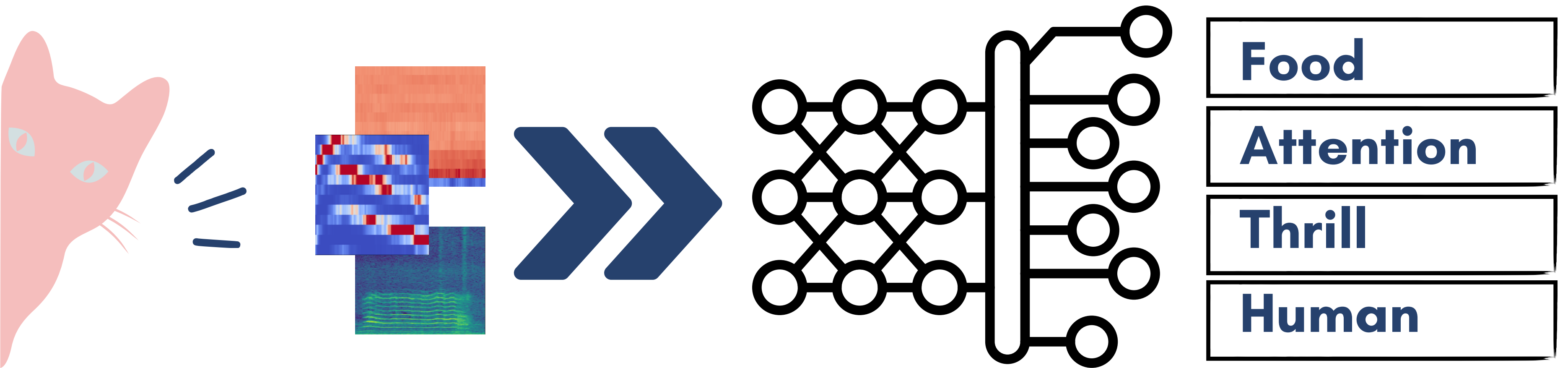
**Attention:** Many different pitches

**Thrill:** Loud, low-pitched sounds

**Human:** Certain louder pitches pretty constant over time

# MODELING

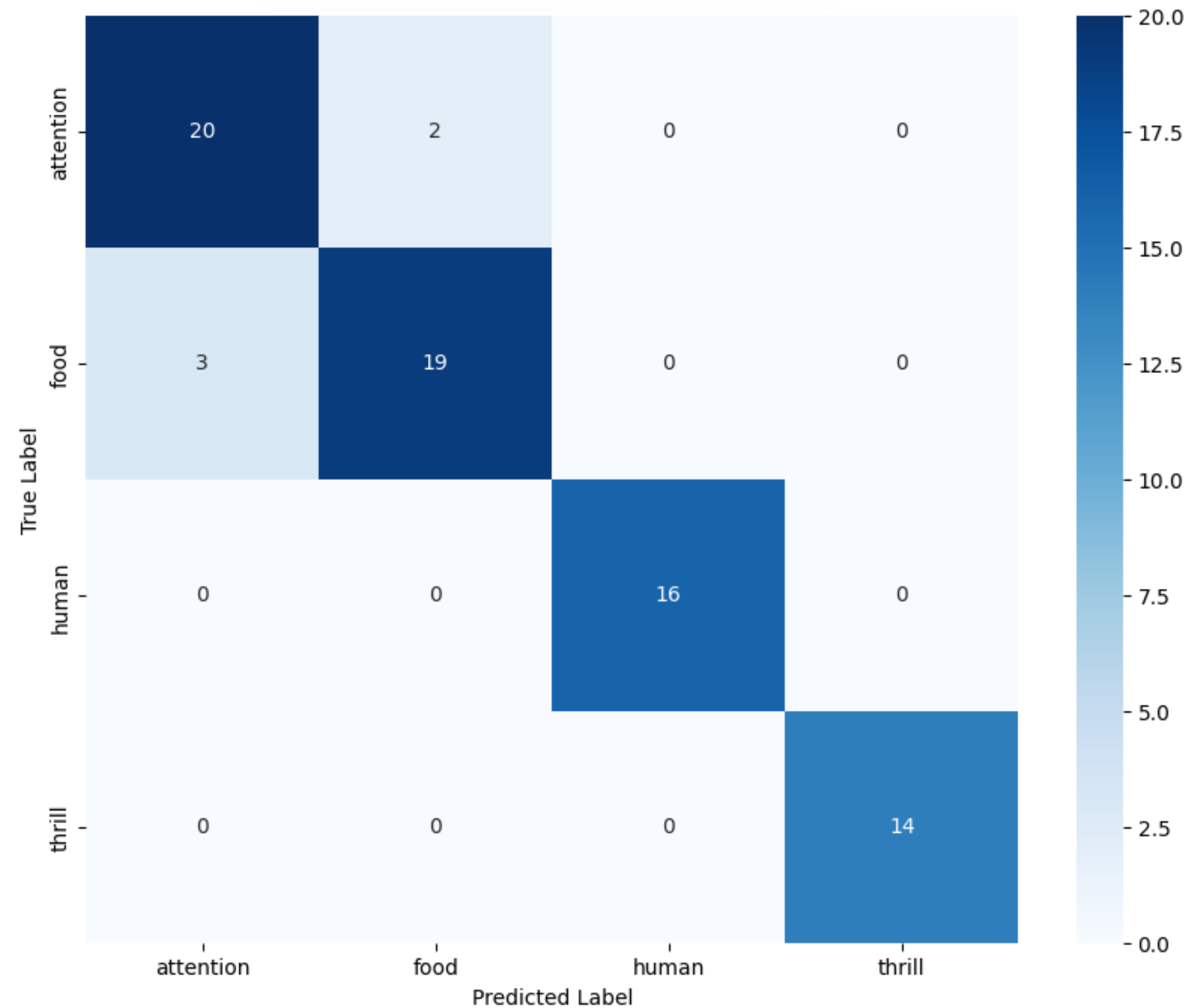
# Neural Network Sequential



**Accuracy on Class Prediction: 93.2 %**

# Confusion Matrix

Certain level of misclassification between FOOD and ATTENTION





# PREDICTIONS

## Mio: Food

Probabilities for each class:

attention: **3.65%**

food: **96.35%**

human: **0.00%**

thrill: **0.00%**

Predicted Class: **['food']**

## Kate

Probabilities for each class:

attention: **0.00%**

food: **0.00%**

human: **100.00%**

thrill: **0.00%**

Predicted Class: **['human']**

## Andrei

Probabilities for each class:

attention: **0.02%**

food: **0.00%**

human: **99.98%**

thrill: **0.00%**

Predicted Class: **['human']**



# **FUTURE STEPS**

- **Mobile App Development:**

Help new pet owners understand their pets from the start

- **Database Expansion:**

Enlarge the database, enhancing the accuracy and reliability of the predictions

# THANK YOU!



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