



WHEN COMPUTERS LEARN FROG CALLS

Using a deep neural network to identify
frog species in the Yasuni Rainforest

by Ami Kano, Kate Meldrum, and Tyler Valentine

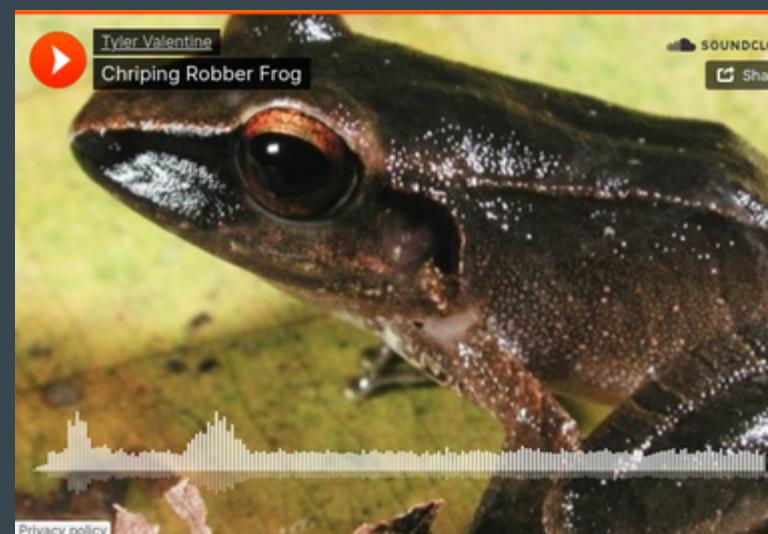
MEET THE FROGS

UPPER AMAZON
TREE FROG



VANZOLINI'S
AMAZON TREE
FROG

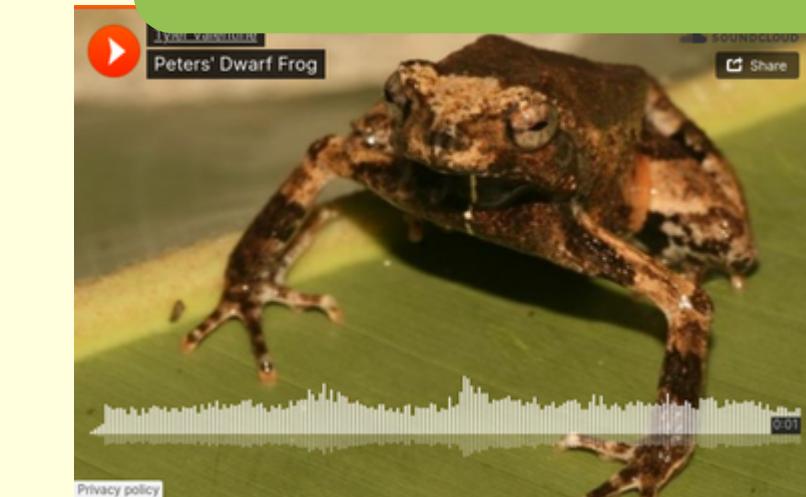
S. AMERICAN
COMMON TOAD



DEMERA
FALLS TREE
FROG



CHIRPING
ROBBER FROG



PETERS' DWARF
FROG



The Yasuni Rainforest
Ecuador

Data and Preprocessing

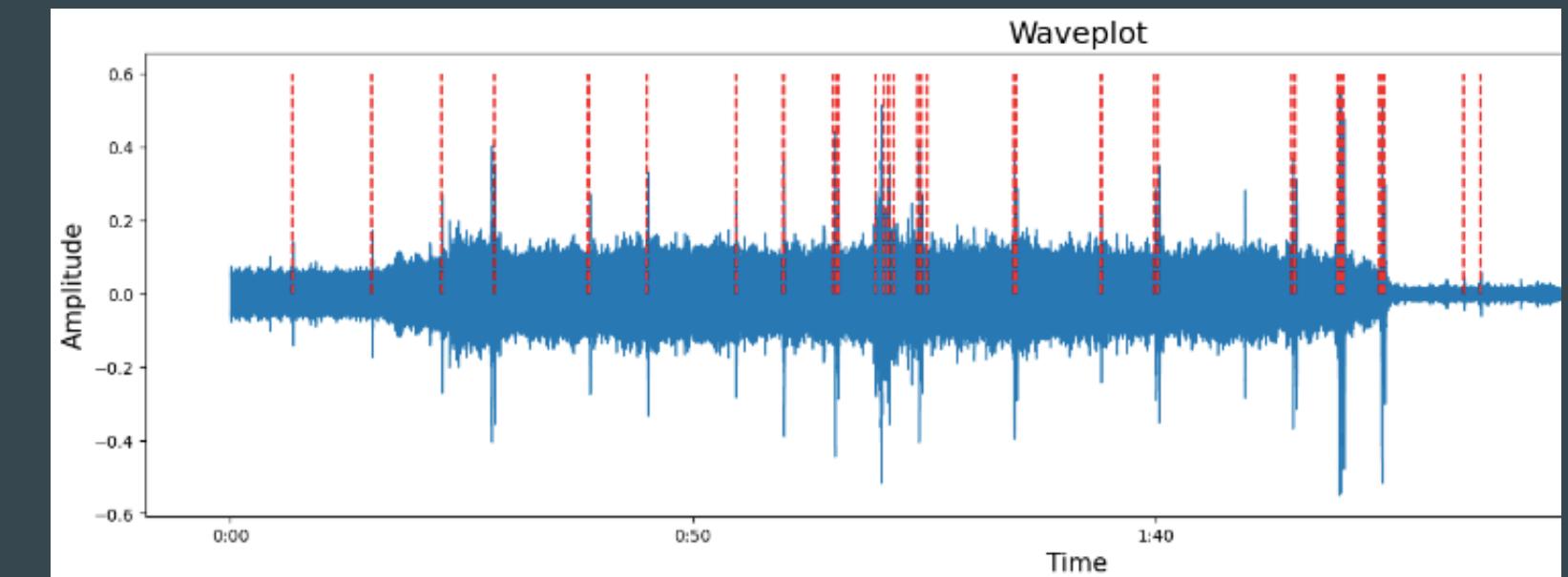
THE DATA:

Long audio files
recorded in the Yasuni
Rainforest and
annotated by the
Museo de Zoología
QCAZ



PREPROCESSING

Librosa's onset function
finds the chirps



Data and Preprocessing

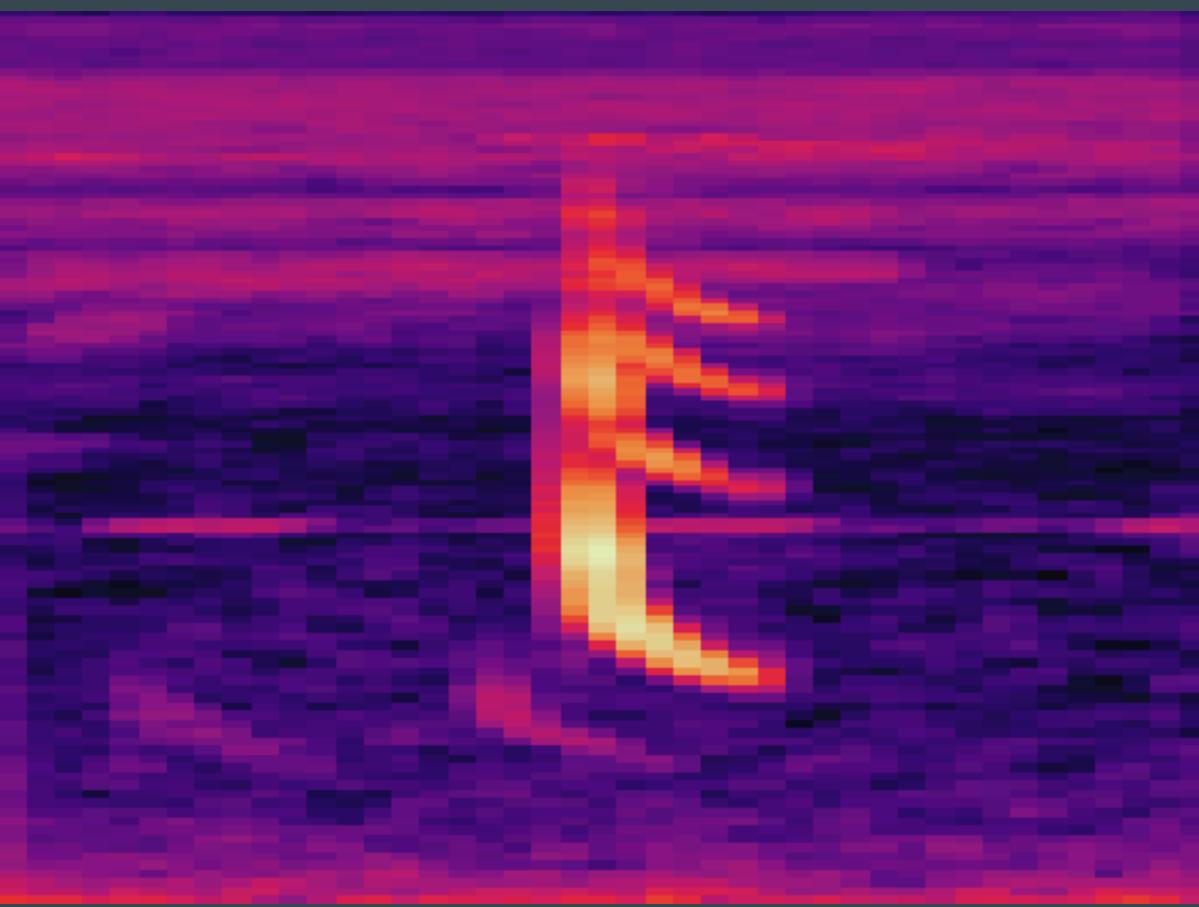


PREPROCESSING

Segment one-second
clips containing each
chirp

Convert the short audios
into Mel Spectrograms

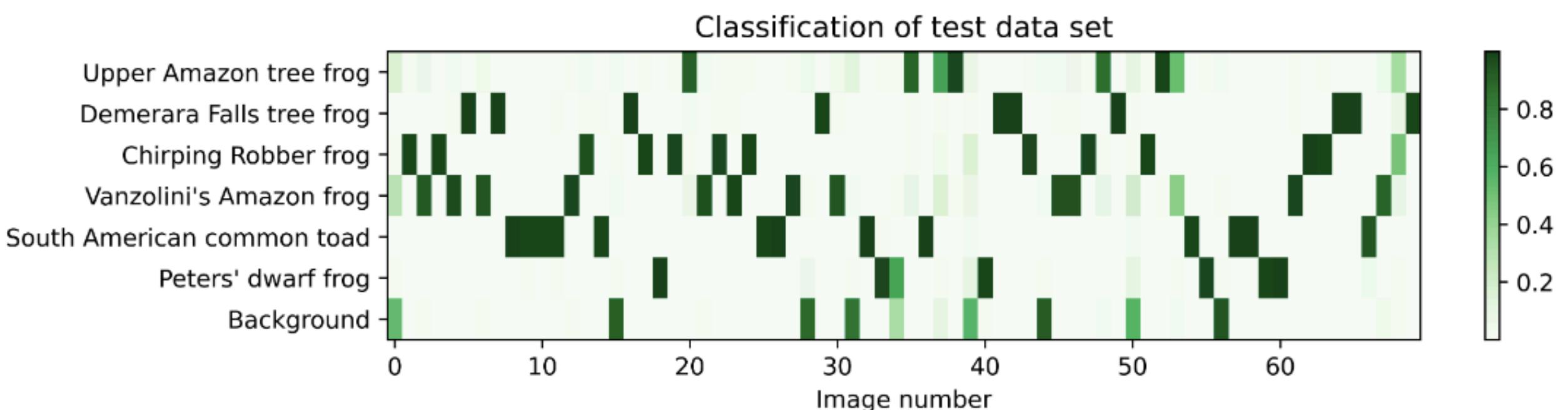
PREPROCESSING



Structure

- Five convolutional layers
- Four Linear Layers
- ReLU Activation Function
- 6 species classification labels
- Background Class label

Testing Accuracy:
98.6%



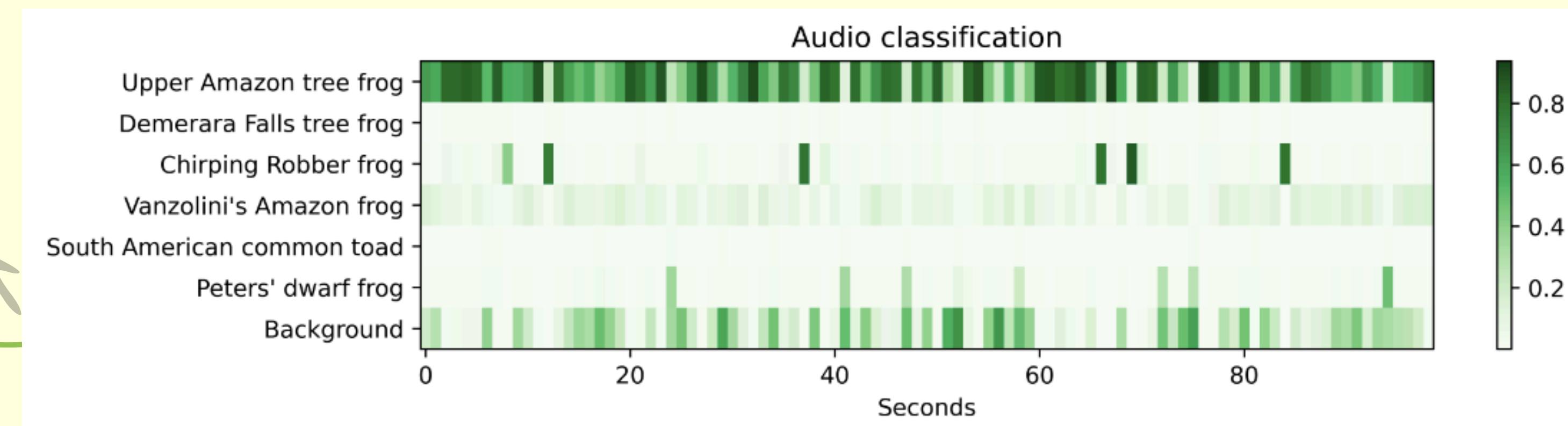
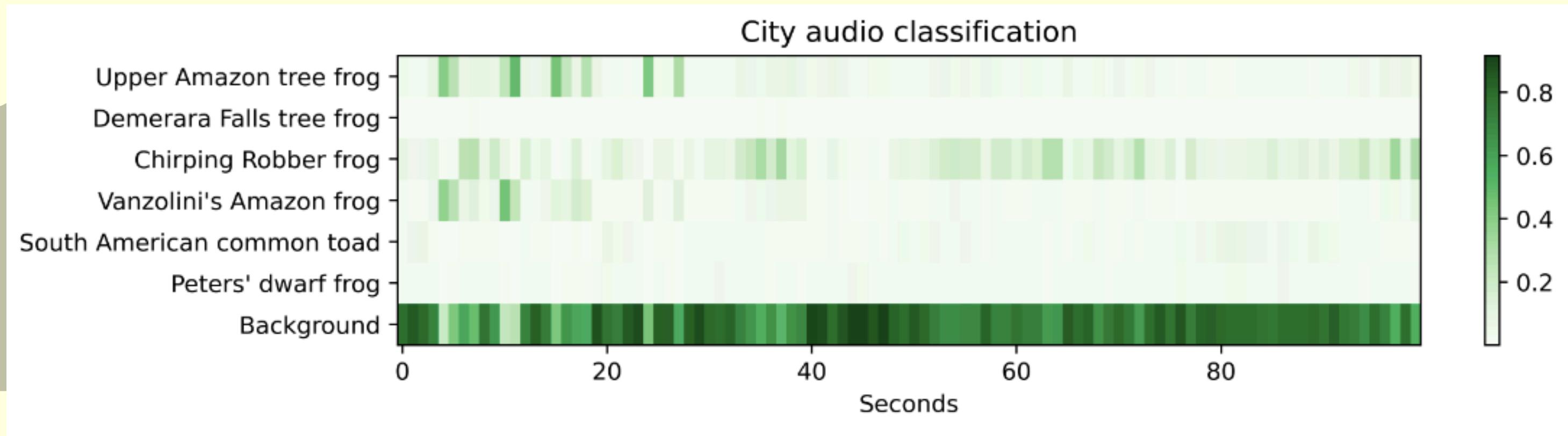
Convolutional Neural Net



Long Audio File Testing

City
Audio

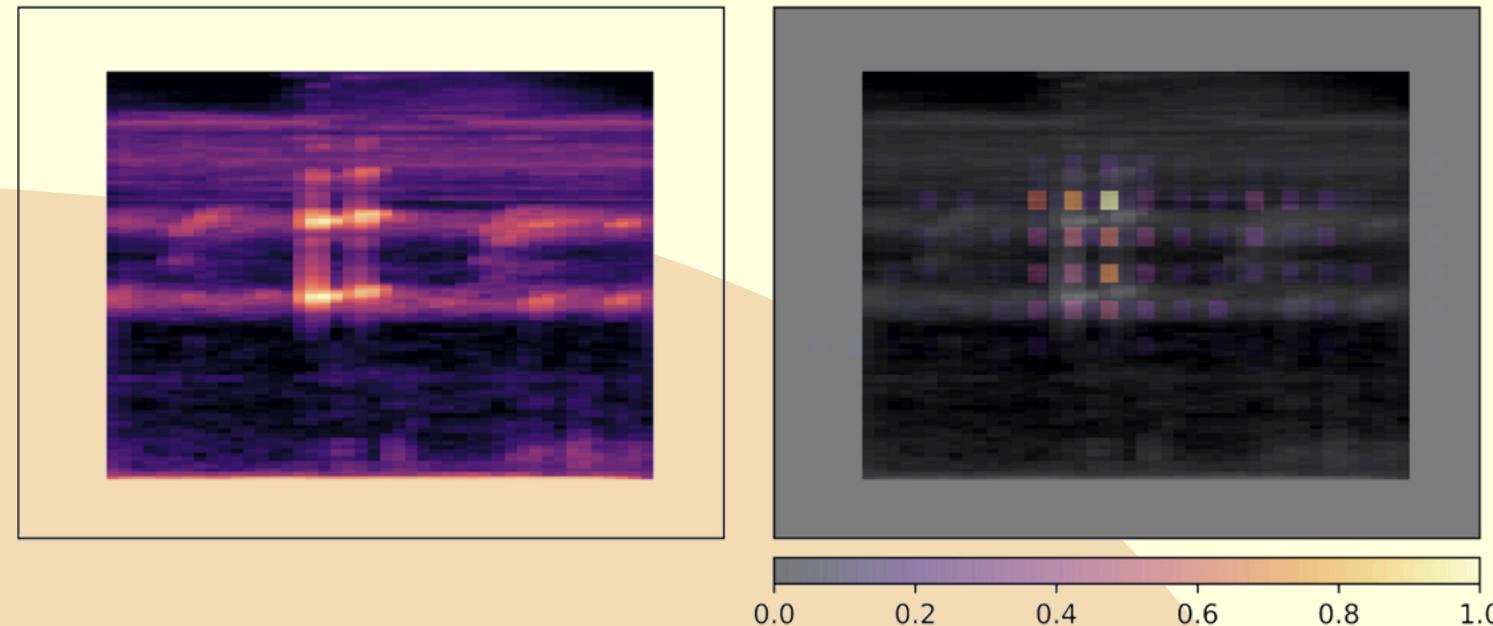
Unlabeled
Rainforest
Audio



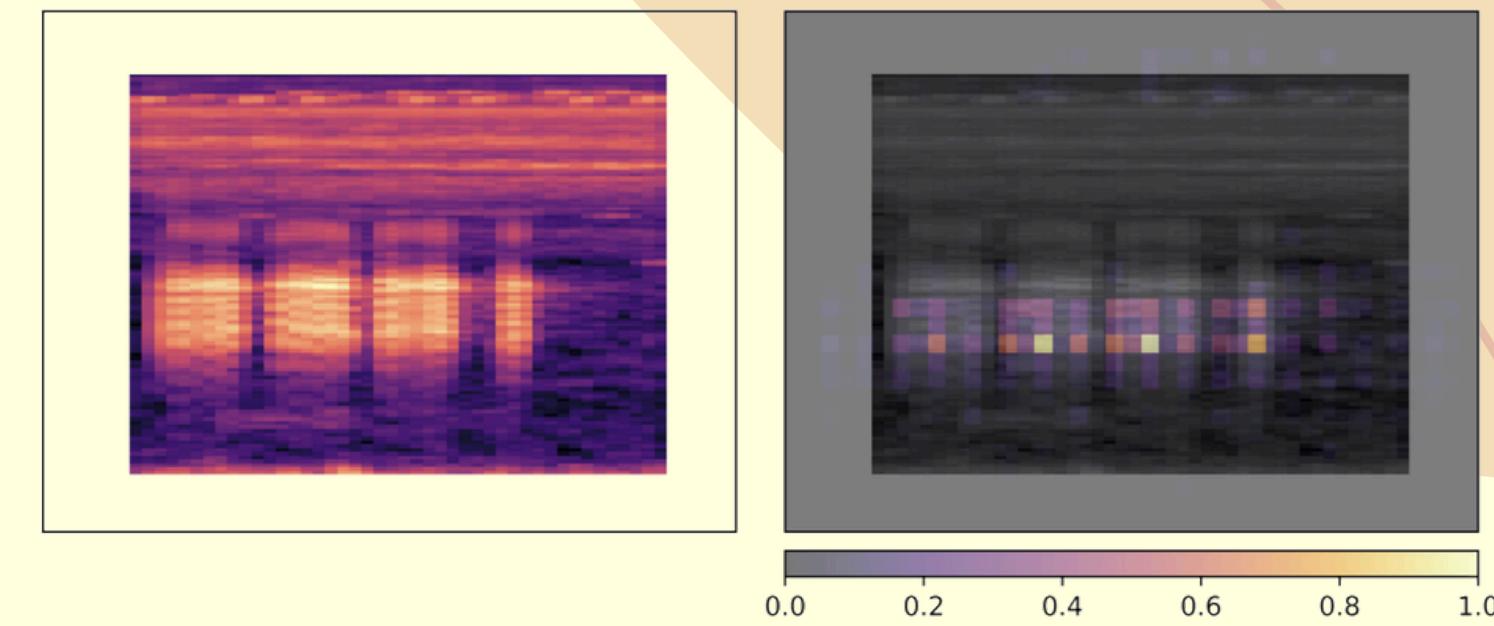
In the eyes of the model



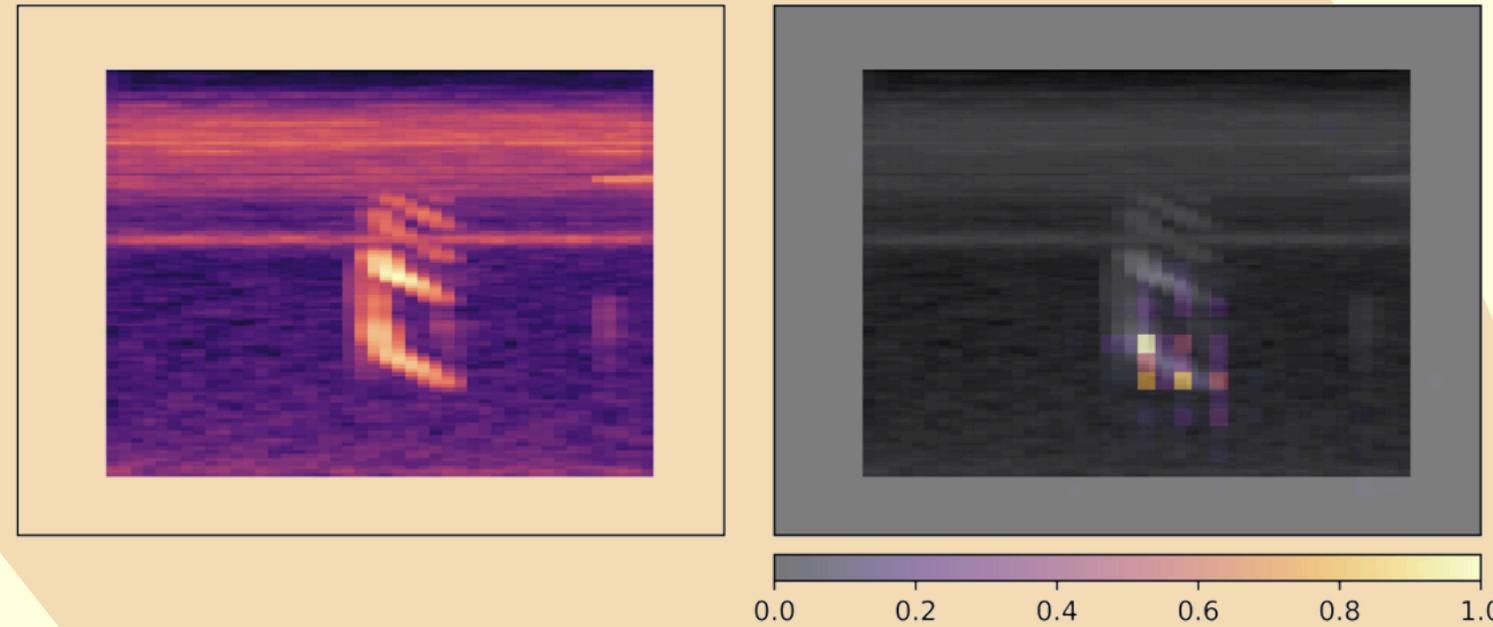
Demerara Falls Tree Frog



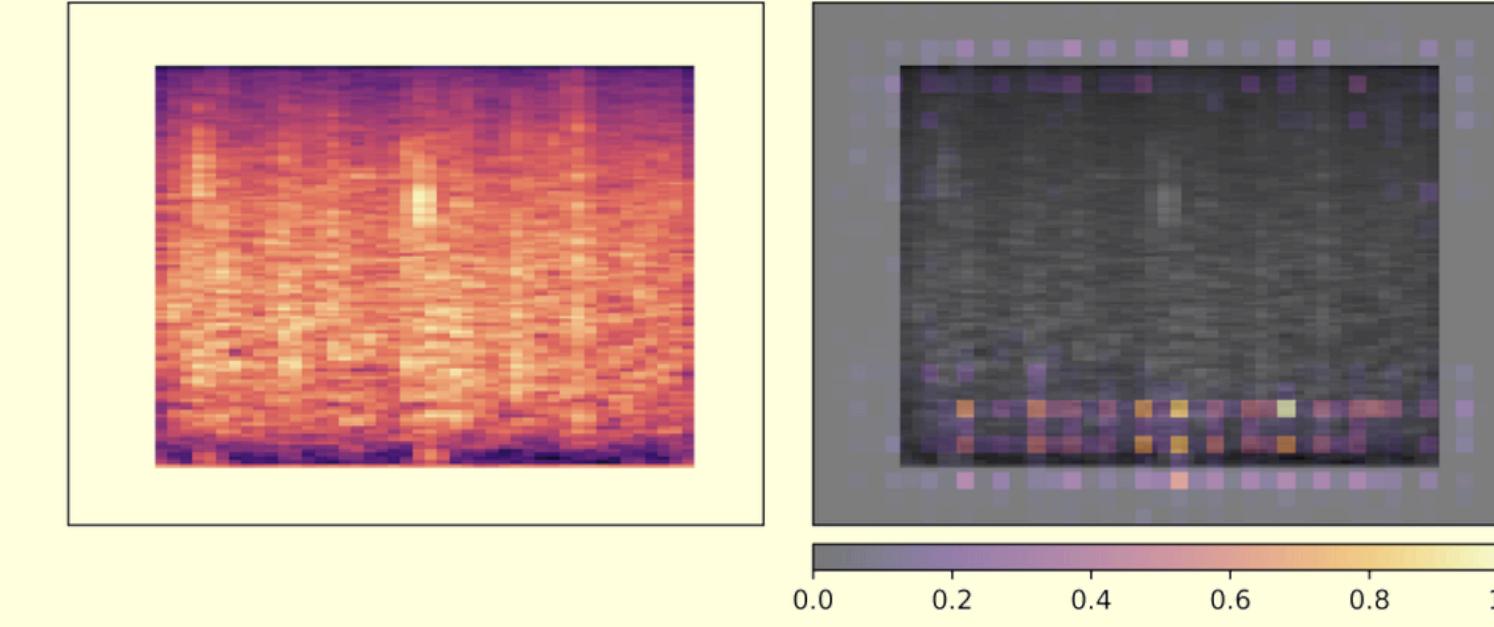
S. American Common Toad



Peters' Dwarf Frog

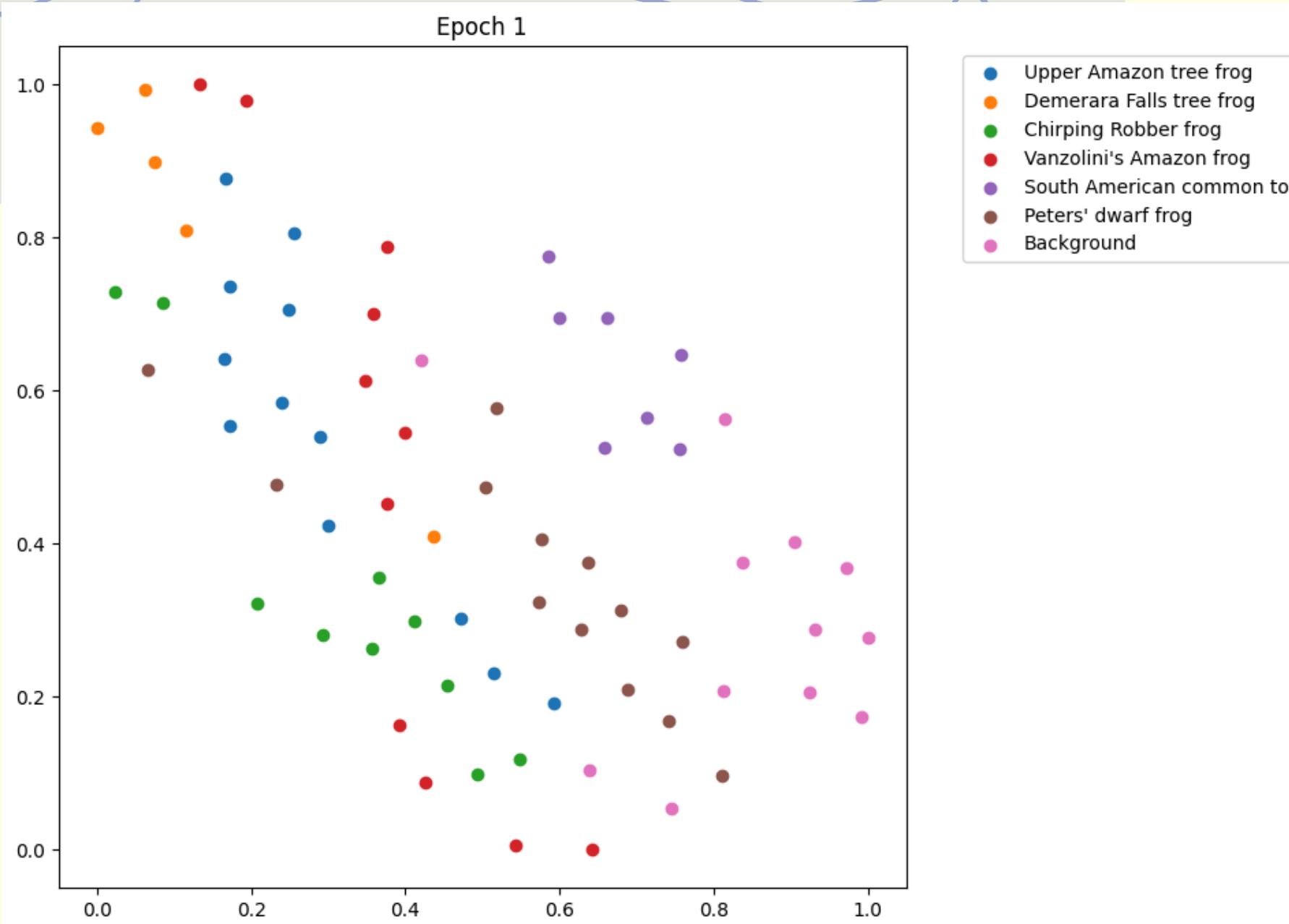


Background

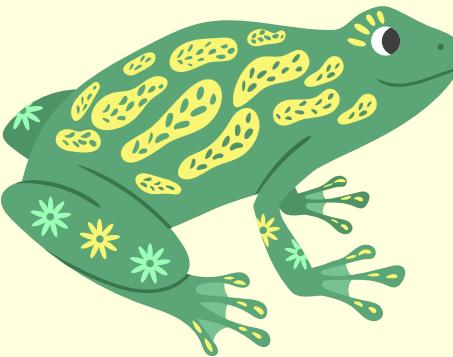
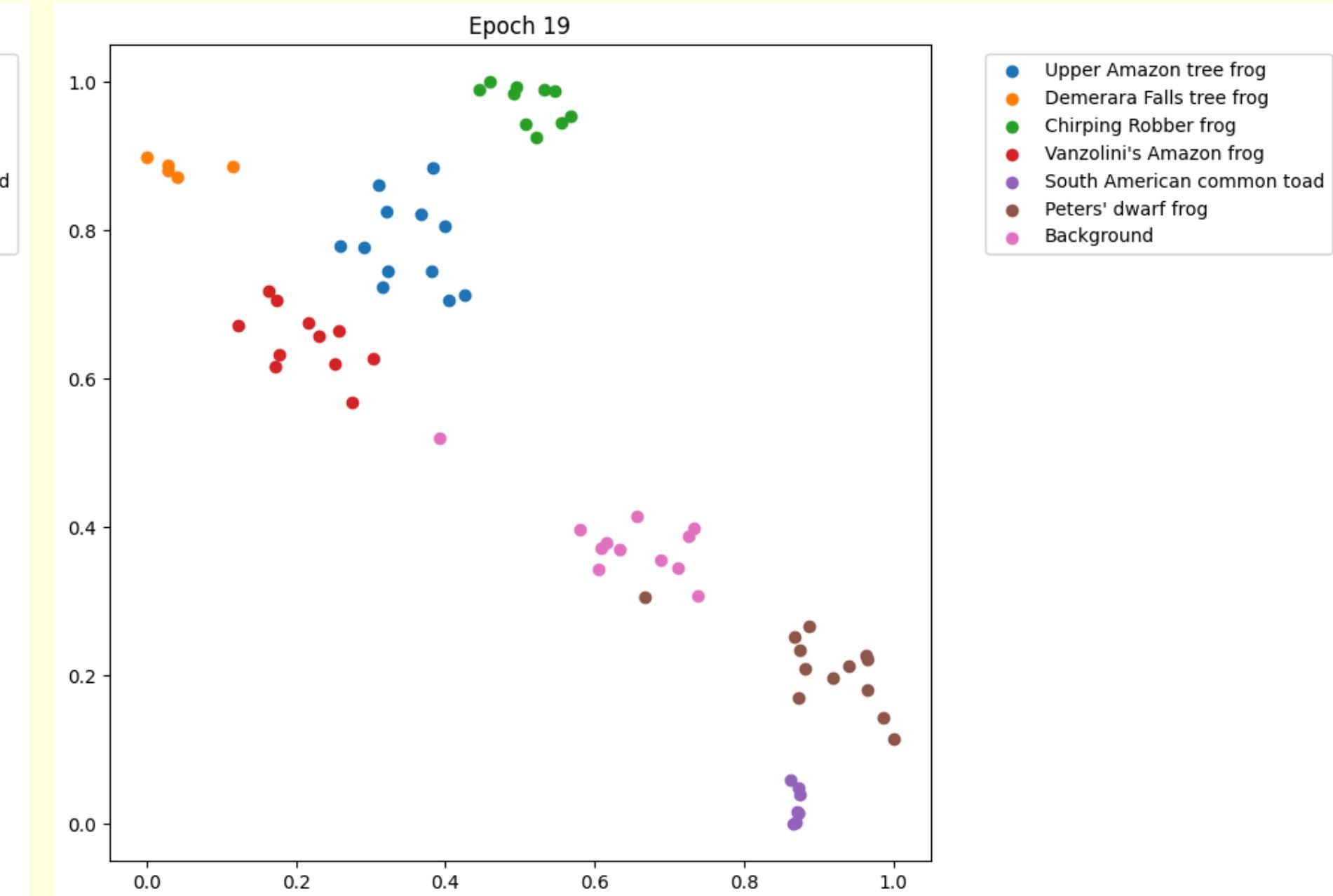


TSNE VISUALIZATION

Epoch 1



Epoch 19

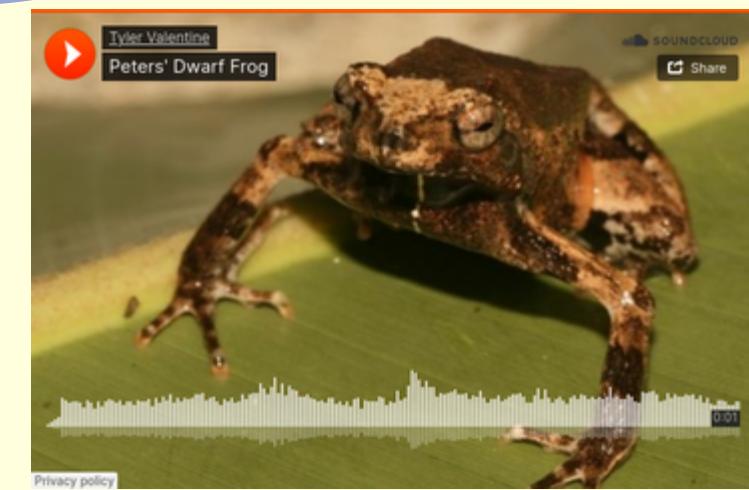
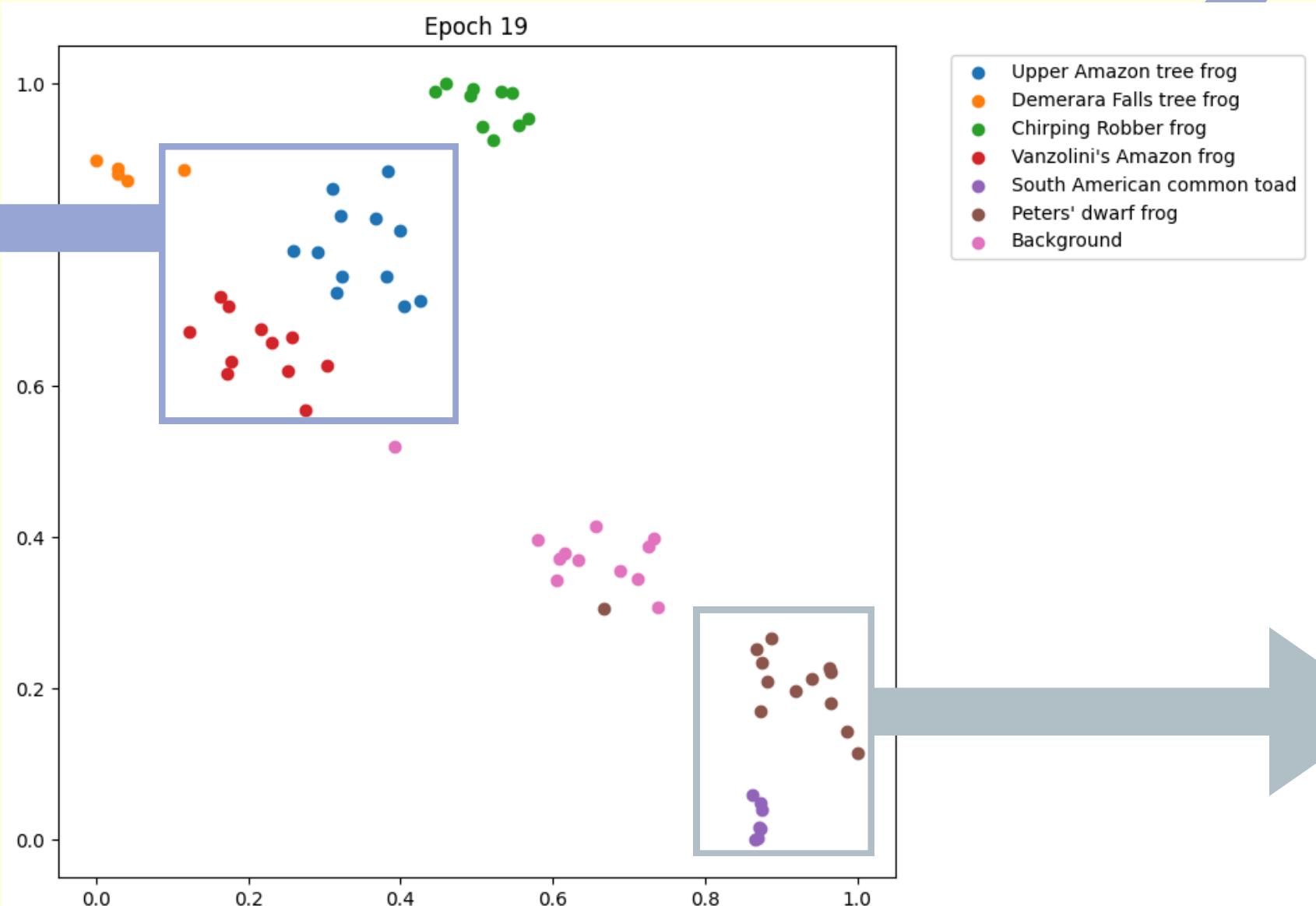
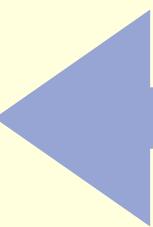


AVERAGE LOSS: 1.935
ACCURACY: 8.6%

**VALIDATION

AVERAGE LOSS: 0.092
ACCURACY: 97.1%

TSNE VISUALIZATION





THANK YOU!