**Orthoptera Sound Analysis Setup Guide**

**Prerequisites (Fresh Windows Machine)**

**Step 1: Install Anaconda**

1. Download Anaconda from: https://www.anaconda.com/products/distribution
2. Run the installer and follow the default installation options
3. **Important**: Check "Add Anaconda to PATH" during installation

**Step 2: Create Environment and Install Dependencies**

Open **Anaconda PowerShell Prompt** (search for it in Start menu) and run these commands one by one:

# Create a new environment with Python 3.10

conda create -n orthoptera python=3.10 -y

# Activate the environment

conda activate orthoptera

# Install core scientific packages from conda-forge (more reliable)

conda install -c conda-forge numpy=2.0 pandas matplotlib scikit-learn -y

# Install audio processing libraries

conda install -c conda-forge librosa numba -y

# IMPORTANT: Install PyTorch with GPU support via pip (more reliable than conda)

pip install torch torchvision torchaudio --index-url https://download.pytorch.org/whl/cu121

# Install opensoundscape and other packages via pip

pip install opensoundscape==0.12.0 fastapi uvicorn python-multipart kaleido

# Fix potential missing dependencies

pip install wrapt pandera crowsetta

# OPTIONAL: Install Bioacoustics Model Zoo for pretrained models

pip install git+https://github.com/kitzeslab/bioacoustics-model-zoo

# Fix potential OpenMP conflicts

conda env config vars set KMP\_DUPLICATE\_LIB\_OK=TRUE -n orthoptera

**Step 3: Test Installation**

# Reactivate environment to apply OpenMP fix

conda deactivate

conda activate orthoptera

# Test basic installation

python -c "from opensoundscape import CNN; print('✓ OpenSoundscape installed successfully!')"

# Test GPU detection (CRITICAL for performance!)

python -c "import torch; print('✓ CUDA available:', torch.cuda.is\_available()); print('✓ GPU detected:', torch.cuda.get\_device\_name(0) if torch.cuda.is\_available() else 'No GPU - will be VERY slow!')"

# Optional: Test bioacoustics model zoo

python -c "import bioacoustics\_model\_zoo as bmz; print('✓ Model zoo available:', len(bmz.list\_models()), 'models')"

**GPU Troubleshooting**

If CUDA shows False:

# Remove CPU-only PyTorch and reinstall GPU version

pip uninstall torch torchvision torchaudio -y

pip install torch torchvision torchaudio --index-url https://download.pytorch.org/whl/cu121

Verify your GPU is working with: nvidia-smi

**Directory Structure**

Create this folder structure on your C: drive:

C:\OrthopteraProject\

├── data\

│ ├── AnnoFiles\

│ └── WavFiles\

├── models\

├── results\

└── scripts\

**Quick Start**

1. Place your annotation files (.txt) in C:\OrthopteraProject\data\AnnoFiles\
2. Place your audio files (.WAV) in C:\OrthopteraProject\data\WavFiles\
3. Run the main script (see next artifact)

**Troubleshooting**

* If you get OpenMP errors: Make sure KMP\_DUPLICATE\_LIB\_OK=TRUE is set
* If imports fail: Try conda update --all -n orthoptera
* If out of memory: Reduce batch\_size in the training parameters