
TCU Computer Science

Bat Lab Glossary

Version 1.1

Bat Lab	Version: <1.1>
Glossary	Date: 03/Oct/2025
Software Engineering	

Revision History

Date	Version	Description	Author
03/Oct/2025	1.0	Add basic definitions for terms used in project documentations	Riley Phan
03/Oct/2025	1.1	Adding definitions for Bat Call Parameters	Rachel Rajamoney
03/Dec/2025	1.2	Adding definitions from Vision and Scope	Rachel Rajamoney
05/Dec/2025	1.3	Adding additional definitions	Stryder Schossberger

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Glossary

1. Introduction

This document is used to define terminology specific to the problem domain of Bat Lab, explaining terms that may be unfamiliar to the reader of the use-case descriptions or other project documents.

1.1 Purpose

Often, this document can be used as an informal data dictionary, capturing data definitions so that use-case descriptions and other project documents can focus on what the system must do with the information.

1.2 Scope

This glossary is associated with the Bat Lab project, a project to aid in the classification of bat species and identification of bat behaviors in different research locations.

2. Definitions

2.1 Administrator

Responsible for managing calls database, including but not limited to: upload, update, delete information regarding bat species and detector location.

2.2 Bat Researcher

Professors and students who engage in the field of bat research and who use this product to simplify the process of identifying bat species and their behaviors to aid with researching.

2.3 Call

A single echolocation pulse emitted by a bat.

2.4 Calls Database

A database of classified acoustics sound files. Each sound file is allocated to a specific location and one or more bat species, as well as their behaviors (if any) that can be inferred from the sound.

2.5 Classification Rules

A set of rules unique to each sound detector, which are specified by the bat researcher prior to classification.

2.5.1 Location

The location is characterized by coordinations and geographic attributes.

2.5.2 Frequency Range

The range of frequencies (ex: 30 - 40Hz) limit the number of identifiable species and is set for each sound detector prior to sound recording.

2.6 Sound Detector

A sound recording device placed in or near bat habitats to record bat echolocation for research purposes. Each detector comes with an Id that indicates location and range of recorded frequencies.

2.7 Bat Call Parameters

The measurable acoustic features of echolocation calls that describe their structure, frequency characteristics, duration, and energy distribution. These parameters allow scientists to identify bat species, study their behavior, and understand how they navigate and hunt.

2.7.1 Call Structure

The overall pattern or shape of the echolocation call.

2.7.2 Minimum Frequency

The lowest frequency reached within a single call.

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- 2.7.3 **Maximum Frequency**
The highest frequency reached within a single call.
- 2.7.4 **Characteristic Frequency**
The frequency at which the bat most often emits energy during a call; often species-specific.
- 2.7.5 **Frequency at the Knee**
The frequency at which the slope of the call (in a spectrogram) changes noticeably, usually marking the transition between frequency-modulated and constant-frequency components.
- 2.7.6 **Frequency with Maximum Energy**
The frequency within the call where the sound energy is strongest.
- 2.7.7 **Bandwidth**
The range of frequencies covered by a call, calculated as maximum frequency minus minimum frequency.
- 2.7.8 **Duration**
The length of time of a single call, usually measured in milliseconds.
- 2.7.9 **Shape**
The visual contour of the call on a spectrogram (e.g., straight, curved, U-shaped, shallow sweep).
- 2.7.10 **Presence of Harmonics**
Whether multiples of the fundamental frequency are present (e.g., 2×, 3× the fundamental frequency), which can affect how the call is perceived and analyzed.
- 2.8 Audio File (.WAV)**
A 3-4 second bat echolocation recording produced from a bat detector and used as input for species and behaviour classification. It may contain multiple calls, silence, and/or noise.
- 2.8.1 *Also referred to as: Sequence, Recording*
- 2.9 Echolocation Call**
A sound pulse produced by bats for navigation and foraging, characterized by frequency, duration, shape, and other acoustic parameters.
- 2.10 Sonogram (Spectrogram)**
A visual representation of an audio clip that displays frequency over time and supports both automated and manual interpretation of call structure.
- 2.11 Audit Request**
A request by a bat researcher to manually review and correct classification outputs labeled as “Unknown”.
- 2.12 Spectrogram**
An image representation of frequency content over time derived from a recording.
- 2.13 Prediction Confidence**
A probability assigned to the predicted species label.