BioDCASE 2026 Task 6 - Zhong_NJU_task6_1

Validation-Gated Sampling-Based ARIA Counting System

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Abstract

This report describes Zhong_NJU_task6_1, a validation-gated, sampling-based submission for BioDCASE 2026 Task 6 under limited computational time. The system estimates bird abundance at the aviary level using stratified sampling of recordings, ARIA acoustic detections, and species-specific confidence-weighted detection-rate calibration. It produces the six listed required main-leaderboard predictions for the three primary target species: Red-billed quelea, Greater flamingo, and Hadada ibis.

Method Summary

Audio is grouped by aviary, day, and hour. Up to 32 recordings are sampled from each stratum. ARIA detections are converted into confidence-weighted detection-rate features. Species-specific linear baseline estimators are fitted on development aviaries processed under the same sampling policy, then applied to evaluation features. Predictions are rounded to non-negative integer counts. No embedding model or additional deep-model training is used.

Completed sampled ARIA outputs were available for evaluation aviaries 1, 2, 6, and 8. Preserved partial ARIA outputs covered 4,882 of 5,472 sampled recordings for evaluation aviary 4 and 5,059 of 5,195 sampled recordings for evaluation aviary 7. This submission is therefore a sampling-based fallback system under the available computational budget and is not the full official-default evaluation inference pipeline.

Development Result and Validation Gate

The official population estimator with the supplied official development features reproduces the reported leave-one-aviary-out mean absolute error (LOO MAE) of 11.50. Recomputed full development features produce LOO MAE 11.75; the observed difference is associated with recomputed flock_corrected_cwr acoustic features. A directly comparable official full-baseline LOO MAE is not claimed for this sampled fallback.

Attempted saturation correction, concurrent-source estimation, event deduplication, visibility correction, and repeated-observation features did not improve species-wise LOO validation. The final validation gate therefore selects the species-specific baseline estimator for Greater flamingo, Hadada ibis, and Red-billed quelea. This submission is not claimed to outperform the official baseline.

Submission Description

The system output contains the six listed required rows and three columns: aviary_id, species, and predicted_count. Counts are non-negative integers with no missing values or duplicate aviary-species rows. The package includes system metadata, reproducibility code, and a self-contained post-processing script that reconstructs and validates the submitted CSV. The script captures the final post-processing output but does not bundle raw audio, ARIA model weights, or large intermediate detection files.

References

[1] E. Argin, A. Harma, and A. Arslan-Dogan. BioDCASE 2026 Bird Counting Baseline: Avian Population Estimation from Passive Acoustic Recordings. GitHub, 2026.

[2] E. Argin, A. Harma, and A. Arslan-Dogan. BioDCASE 2026 Bird Counting: Avian Population Estimation from Passive Acoustic Recordings. Hugging Face Dataset, 2026.

[3] E. Argin, B. Amado Pereira da Costa, A. Harma, and A. Arslan-Dogan. ARIA: Acoustic Recognition for Inventory in Aviaries. IJCNN/WCCI, 2026.