ABSTRACT

SOFTWARE FOR COUNTING THE NUMBER OF ANIMALS CAPTURED BY CAMERA TRAPS: diploma work Tshikudi Credo Bakajika. Gomel GSTU named after P.O. Sukhoi, 2026 Diploma work: pages, figures, tables, 18 sources, 3 appendices.

Keywords: camera trap, wildlife detection, yolov8, u-net, django, deep learning, image segmentation, instance counting, postgresql, ecological monitoring.

Object of development: a software platform for automated detection, segmentation, and counting of animals in camera-trap images.

Purpose of the work: to design and implement a self-hosted, offline-ready web application that integrates YOLOv8 object detection and U-Net semantic segmentation into a single multi-user platform accessible to ecological researchers without machine-learning engineering expertise.

Method of research: systematic review of existing wildlife detection and classification tools; design of a layered monolithic Django 5.2 application following the Model-View-Template pattern; implementation of three inference pipelines (YOLO-only, U-Net-only, and a combined YOLO→U-Net camera-trap pipeline with connected-component instance counting); structured functional testing across 18 test cases covering all specified requirements.

Results obtained: a working web platform that reduces camera-trap image annotation labour from 30 person-hours per campaign to near-zero for the detection stage; all 18 functional test cases pass; quantitative segmentation metrics (IoU, Dice) on an expert-validated hold-out set were not established in the main scope; an optional offline pilot U-Net run reported mean IoU 0.16 and mean Dice 0.24 on three validation images with YOLO-derived pseudo-labels; payback period of 4.3 years at a single institution with four monitoring campaigns per year.

Scope of application: ecological research institutions, wildlife monitoring programmes, field stations operating with limited or no internet connectivity.

The author confirms that the diploma work was completed independently. The explanatory note was checked in the anti-plagiarism system. The originality percentage is _%. All borrowed theoretical and methodological provisions are accompanied by references to sources listed in the List of References.