

Machine Learning Techniques Can be used to Identify Crocodiles from Drone derived imagery for the purpose of Conservation

Assessing the Feasibility of Identifying Wildlife from A Drone's Perspective

Rozina Myoya, Lesego K. Matojane

1 Intro

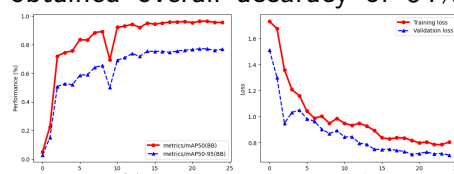
- Crocodile populations are under threat. Effective monitoring is essential for their conservation.
- Propose use of drone imagery & ML techniques to identify unique features of individual crocodiles for population monitoring.

2 Methods

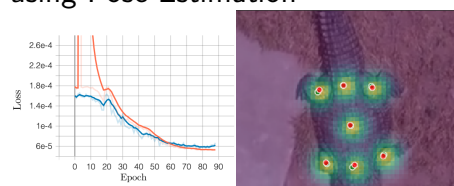
- The project employs CNN for identifying crocodiles within drone-derived imagery and applies "Instance level analysis" for individual recognition based on Pose Estimation methods.

3 Results

Phase-I: Crocodile Identification, obtained overall accuracy of 84%



Phase-II: Crocodile Re-Identification using Pose-Estimation

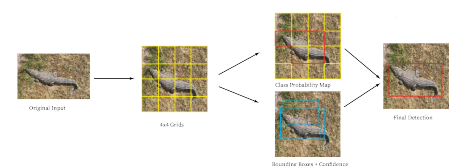


- The results from the tests are promising, however, further training is required to improve the model's performance.

Extra figures

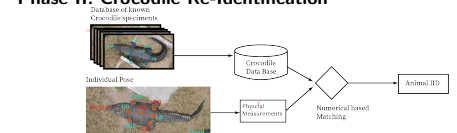
Phase 1: Crocodile Identification

Hyperparameter	YOLO-v8s
Optimiser:	Stochastic Gradient Descent
Learning Rate:	0.01
Mini Batch size:	16
Epoch:	25
Input Image size:	640 x 640
Loss function:	Binary Cross-Entropy with Logits Loss



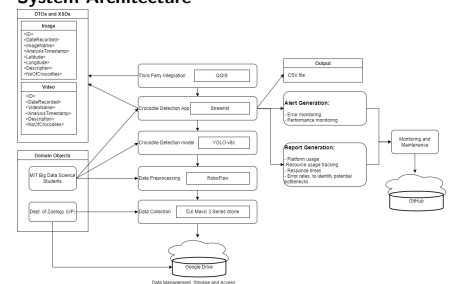
	Test set 1	Test set 2	Test set 3
TPR	89%	43%	33%
TNR	47%	60%	14%
FPR	53%	40%	86%

Phase II: Crocodile Re-Identification



- Re-identification framework, whereby new specimens are processed and compared to the specimen database.

System Architecture



Department of Computer Science

Faculty of Engineering,
Built Environment and
Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en
Inligtingtegnologie / Lefapha la Boetsenere,
Tikologo ya Kago le Theknolotši ya Tshedimošo

Capstone Project - MIT 808

Course Coordinators:
Dr. Vukosi Marivate (vukosi.marivate@cs.up.ac.za)
Abiodun Modupe (abiodun.modupe@cs.up.ac.za)

