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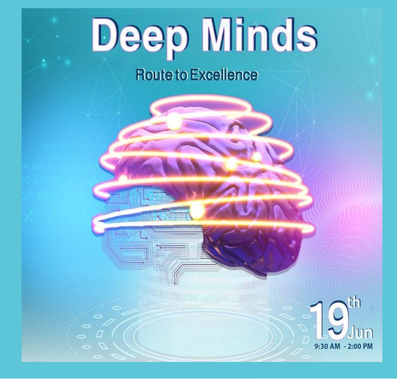
Under Supervision of:
[Professor. Ayman Ezzat]

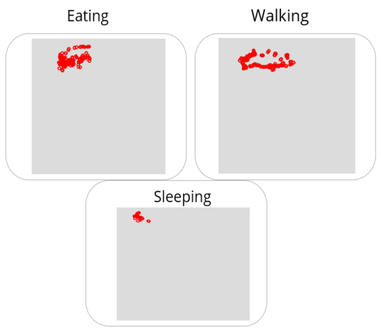
[Abnormal Behavior Analysis for Surveillance in Poultry Farms]

Project ID: GP6

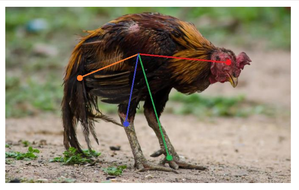


ABSTRACT

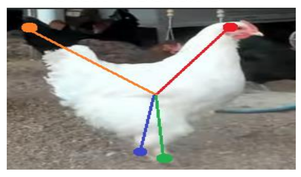
Poultry farming is an important industry that provides food for a growing population. However, the welfare of the birds is a major concern, as poor living conditions leads to abnormal behavior that affects the health and productivity of the flock. In order to monitor and improve the welfare of the birds, it is important to have a surveillance system in place that monitors the behavior of the chickens and alert farmers to potential issues. We present a computer-vision-based system that detects and monitors the behaviors of the chickens in poultry farms



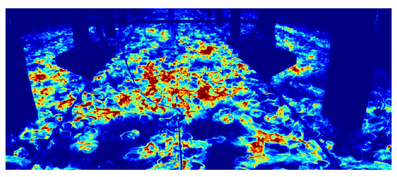
Trajectories of normal behavior



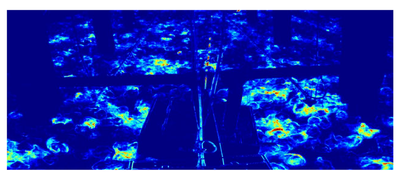
Sick Posture



Normal Posture

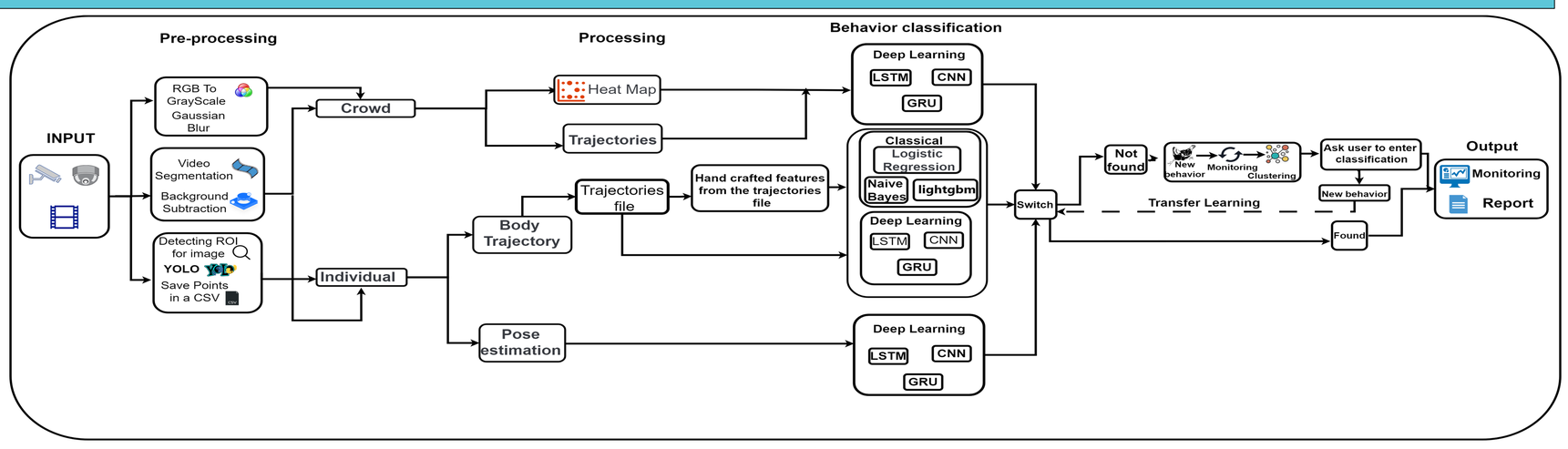


Abnormal crowd heatmap



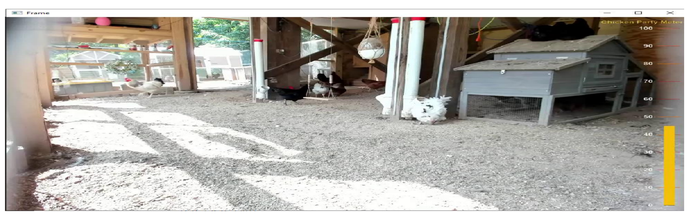
Normal crowd heatmap

SYSTEM OVERVIEW



DATASET

- Dakahlia Farms dataset consists of 3 hours of videos.
- 3 classes (eating, sleeping, abnormal) accurately labelled by professionals.



- Youtube videos sum to 6 hours of videos
- 3 classes namely walking, eating, and sleeping.

Aim of the work

- Minimize mortality of chickens
- Detect any abnormal behaviors of chickens and detect the diseases.

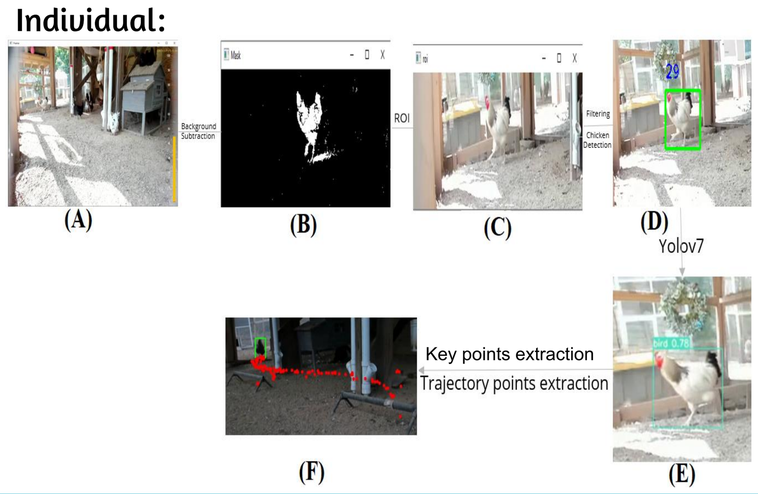
USED TOOLS

python™ Keras PyCaret YOLO OpenCV

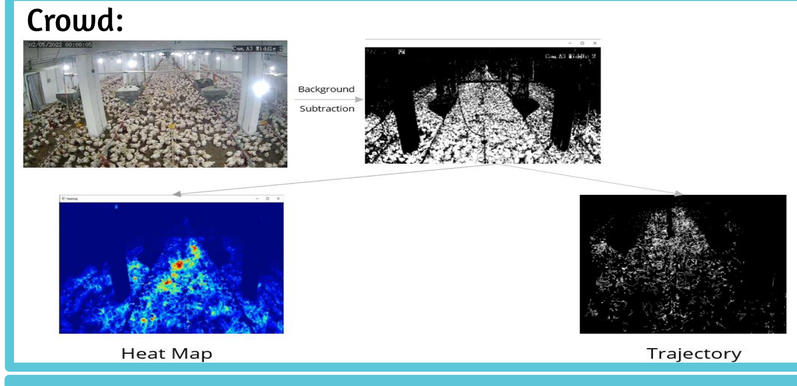
Demos, and presentation.

METHODOLOGY

Individual:



Crowd:



Contact

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Cooperation of agreement

References

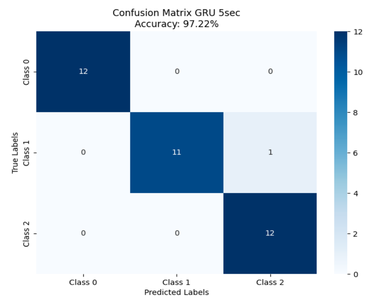
- P. He, Z. Chen, H. Yu, K. Hayat, Y. fan He, J. Pan, and H. Lin, “Research progress in the early warning of chicken diseases by monitoring clinical symptoms,” Applied Sciences, 2022.
- A. Siriani, V. Kodaira, S. Mehdizadeh, I. N˙a˙as, D. Moura, and D. Florentino Pereira, “Detection and tracking of chickens in low-light images using yolo network and kalman filter,” Neural Computing and Applications, vol. 34, 08 2022.

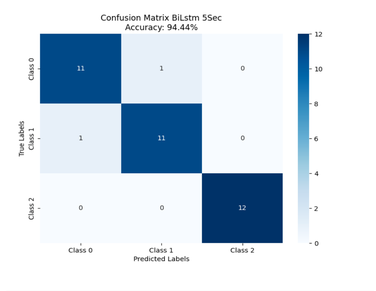
RESULTS

Trajectory Approach:
- Classifying walking, eating and sleeping.
- Data-set size: 90 records split evenly, 80-20 split.

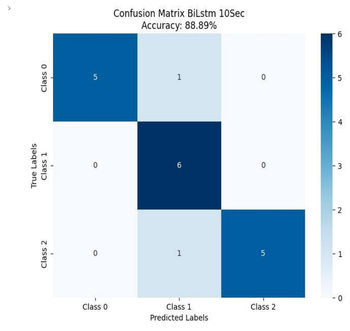
Deep Learning:

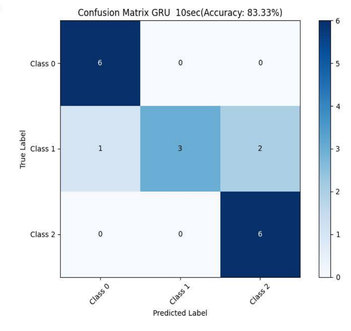
5-seconds experiment:
1. GRU: 97.22%
2. BI-LSTM: 94.44%
3. LSTM: 66.67%





10-seconds experiment:
1. BI-LSTM: 88.89%
2. GRU: 83.33%
3. LSTM: 55.56%





Classical Machine Learning:

	Model	Accuracy	AUC	Recall	Prec.	F1	Kappa	MCC
Light Gradient Boosting Machine		0.9444	0.9676	0	0	0	0.9167	0.9209

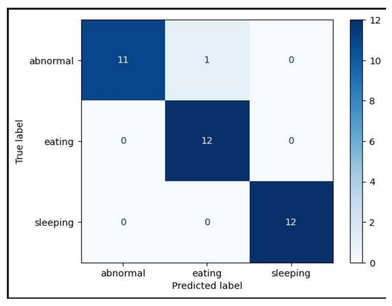
	Model	Accuracy	AUC	Recall	Prec.	F1	Kappa	MCC
0	Logistic Regression	0.9848	0.9985	0	0	0	0.9798	0.9801

- 98.8% accuracy on a bench-marked HAR data-set.
- 4 classes: standing still, walking, jumping, running.
- Data-set size: 270 record split evenly, 80-20 split.

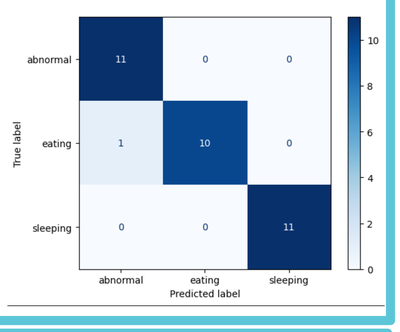
Crowd:

- 96.7% accuracy for heat and trajectories map.

Heat Map

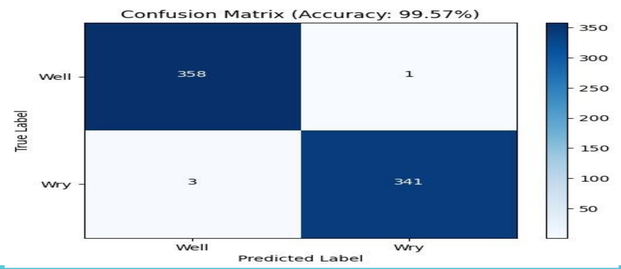


Trajectory Map



Pose (frame by frame classification):

- 99.57% accuracy classifying a chicken with wry neck disease (lack of vitamins), and a healthy chicken.



PUBLISHING

The paper has been published in the International Journal of Advanced Computer Science and Applications (IJACSA) March 2023 Edition (Volume 14 No 3).

(Trajectory Based Approach)

THE SCIENCE AND INFORMATION ORGANIZATION

Crowd Behavior : Approach

A scientific paper discussing this project has been accepted at the IMSA Conference, which is part of the IEEE, and is currently awaiting indexing and publication.

IEEE