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Abnormal behavior analysis for surveillance in poultry farms



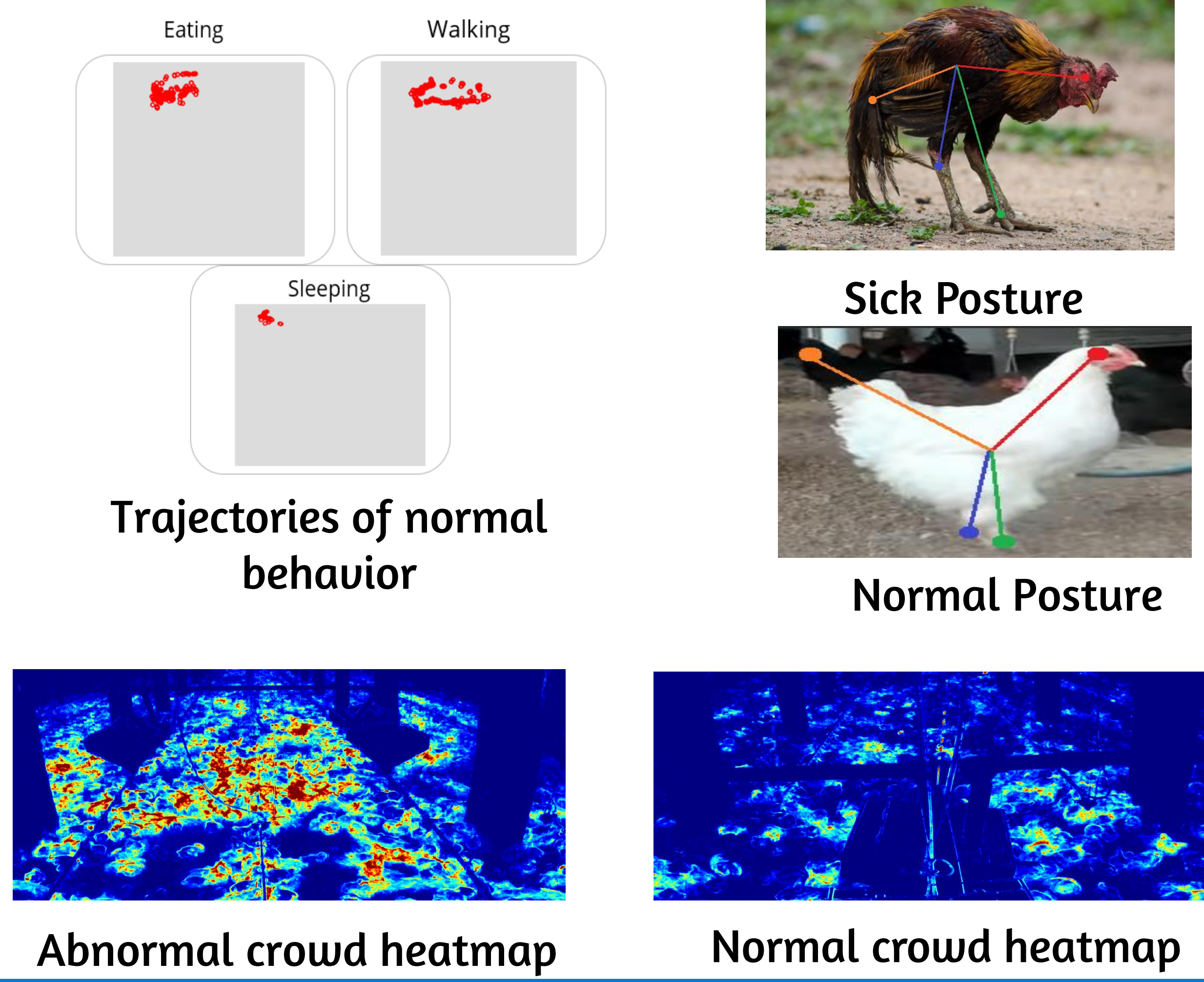
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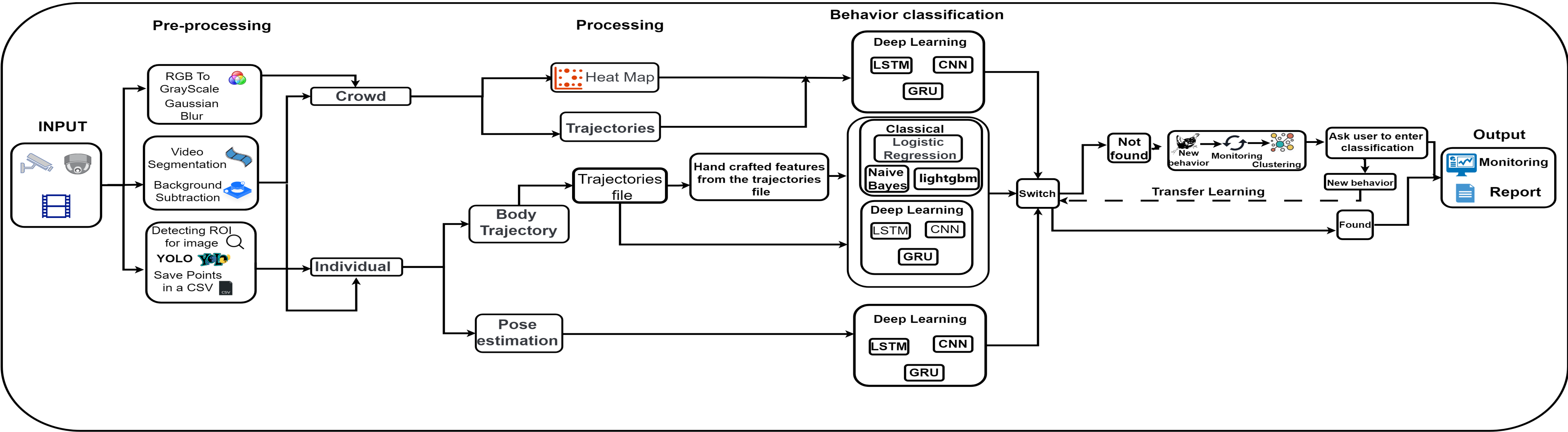


ABSTRACT

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



SYSTEM OVERVIEW

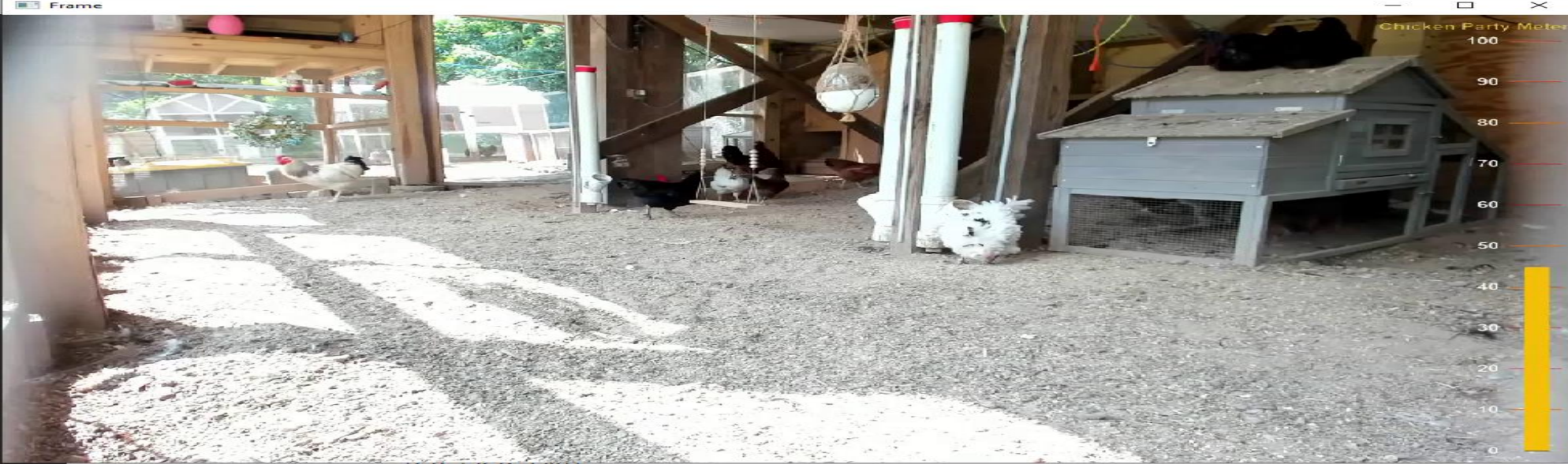


DATASET

The dataset was gathered from video footage sourced from both YouTube and Dakahlia



- 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

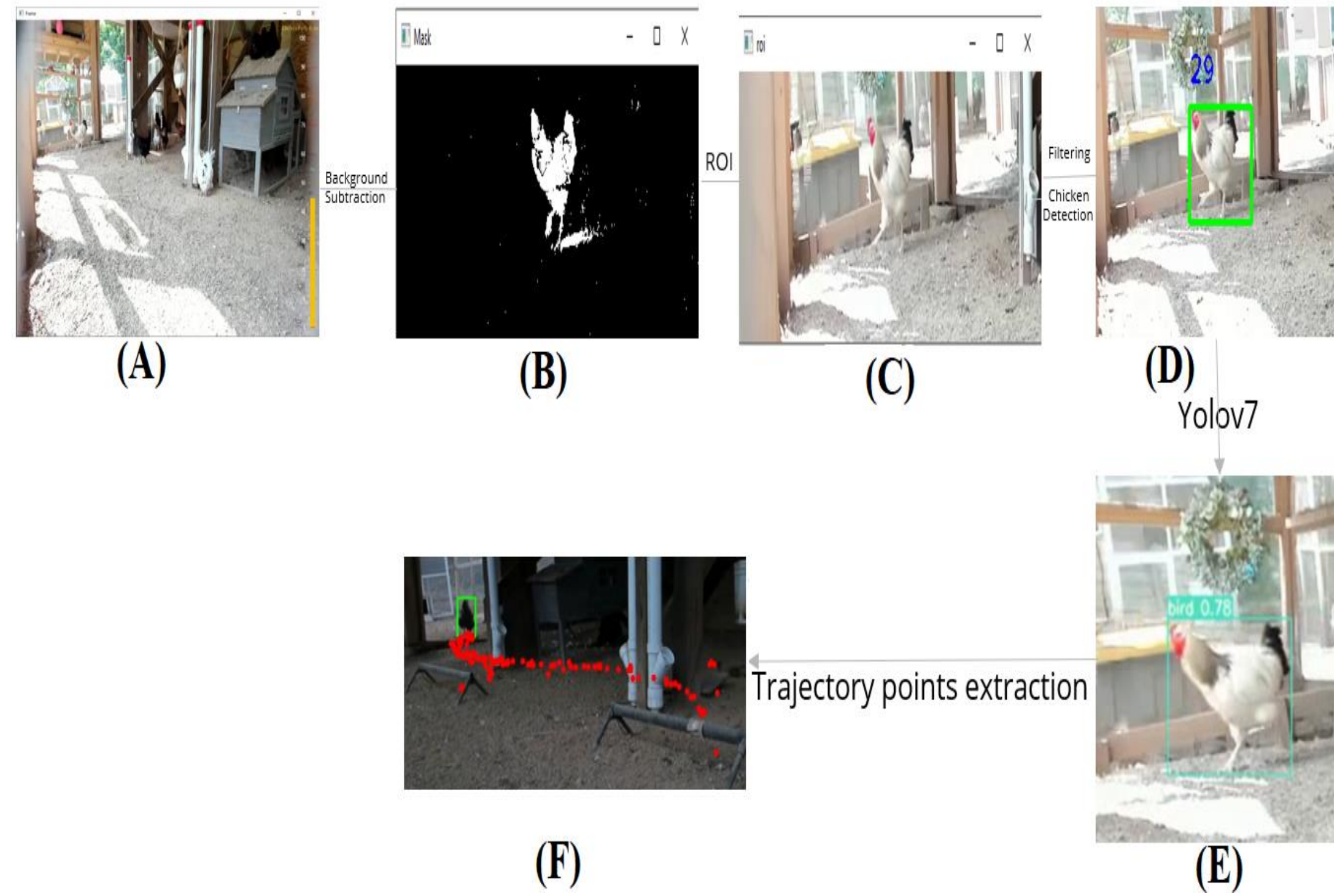
- Minimize mortality of chickens
- Detect any abnormal behaviors of chickens and detect the diseases.

USED TOOLS

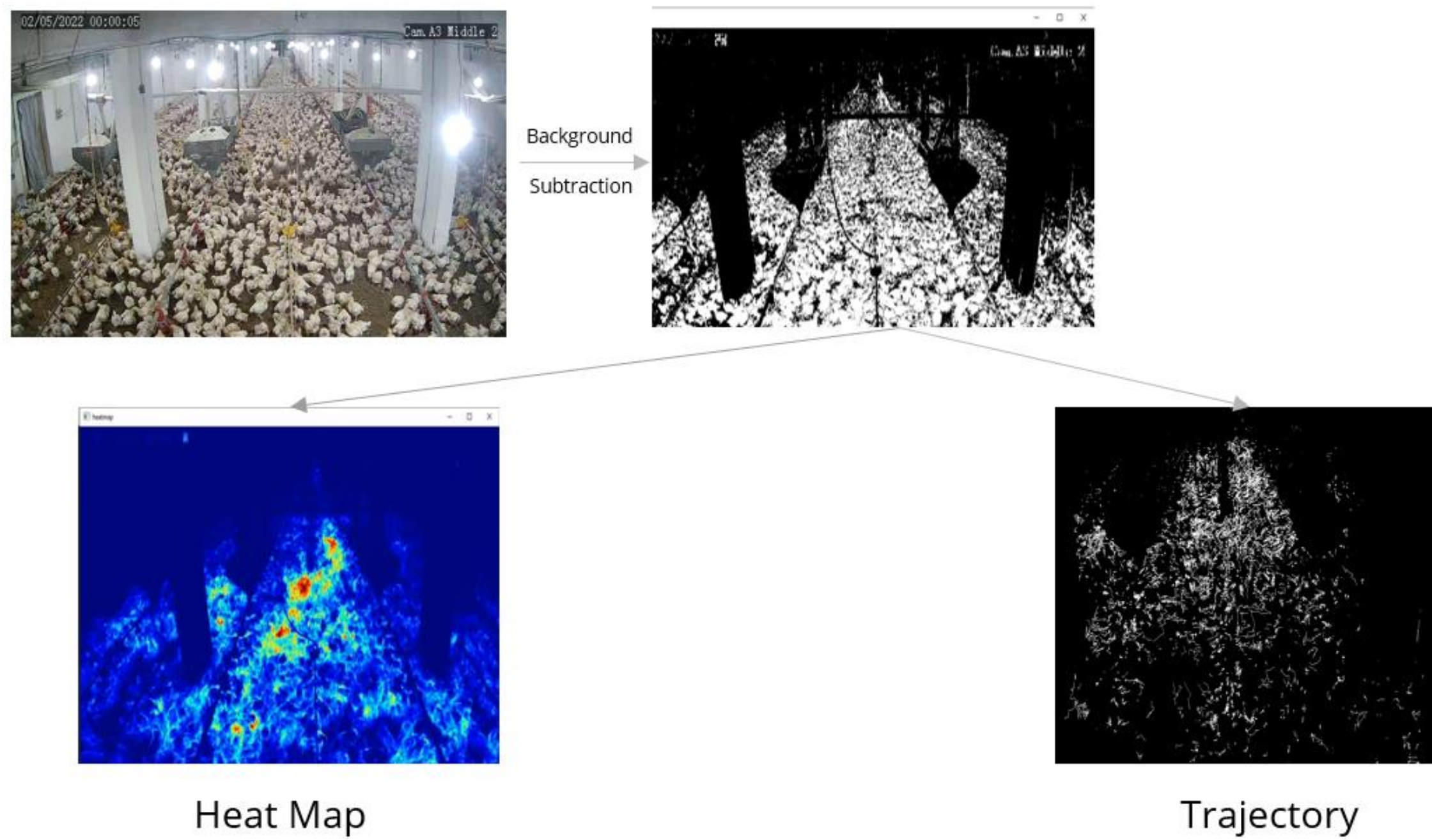


METHODOLOGY

The system proposed consists of six stages: pre-processing, background subtraction and ROI detection, chicken filtering, trajectory extraction, behavior classification, and output as shown in the following Figure.



- Pre-processing: video segmentation, background subtraction
- YOLO and Kalman filter for chicken filtering and ID assigning
- Trajectory extraction every 10 frames
- Handcrafted features were calculated such as mean, median, distance covered, etc.



RESULTS

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

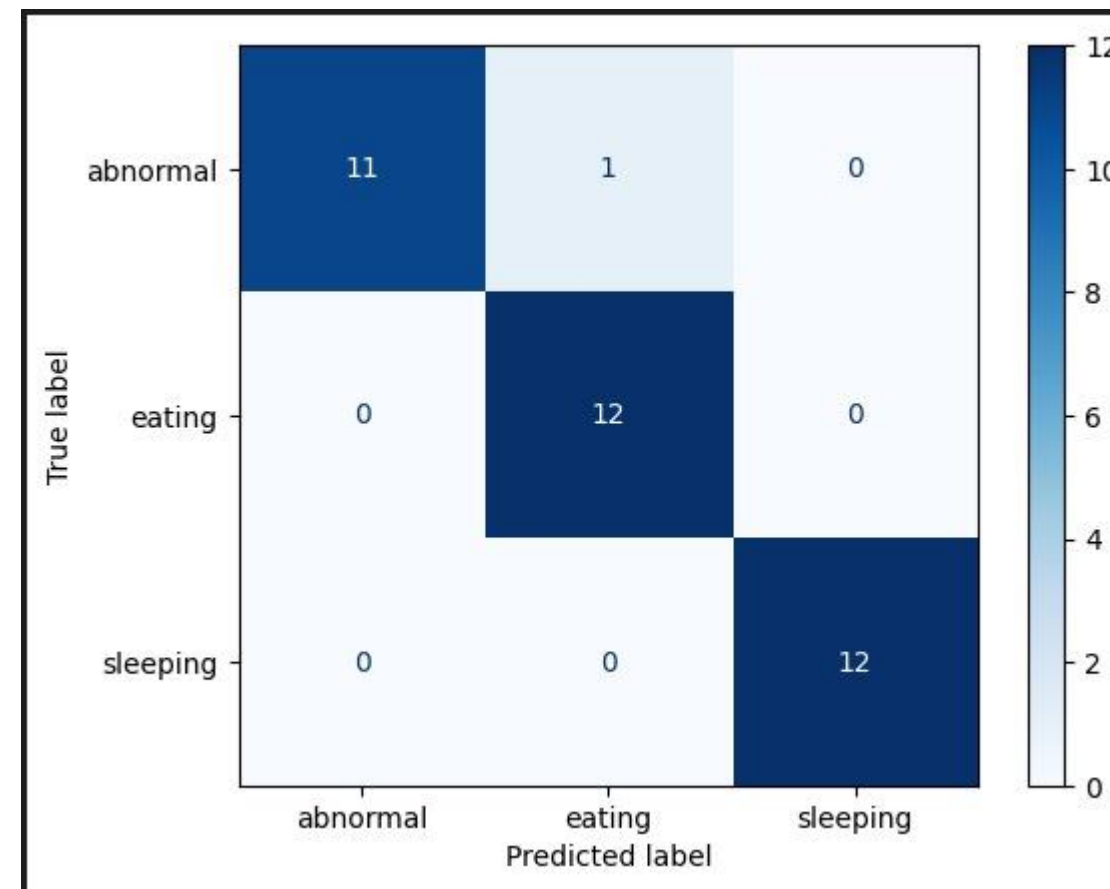
The model scored 94.44% in detecting chicken behaviors (walking, eating, and sleeping).
Data-set size: 90 records split evenly.
Data-set split: 80-20 split between training and testing respectively.



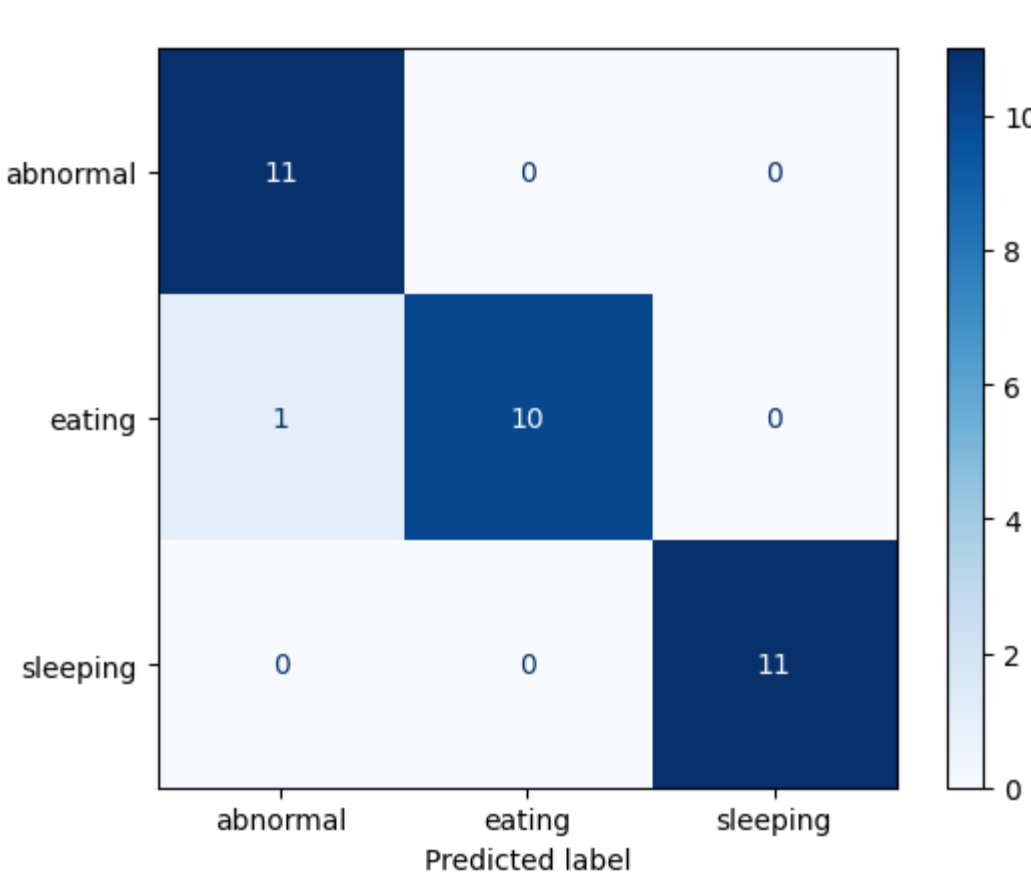
| Model | Accuracy | AUC | Recall | Prec. | F1 | Kappa | MCC |
|-----------------------|----------|--------|--------|-------|----|--------|--------|
| 0 Logistic Regression | 0.9848 | 0.9985 | 0 | 0 | 0 | 0.9798 | 0.9801 |

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

Heat Map



Trajectory Map



Demos, and presentation.



PUBLISHING

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



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Cooperation of
agreement



References

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- 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.