

Crowdsourced Verification for Operating Calving Surveillance Systems at an Early Stage

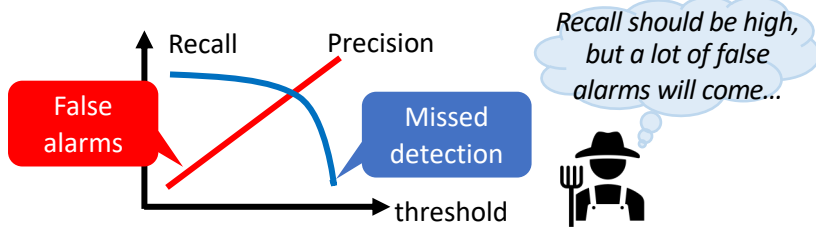
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Problem

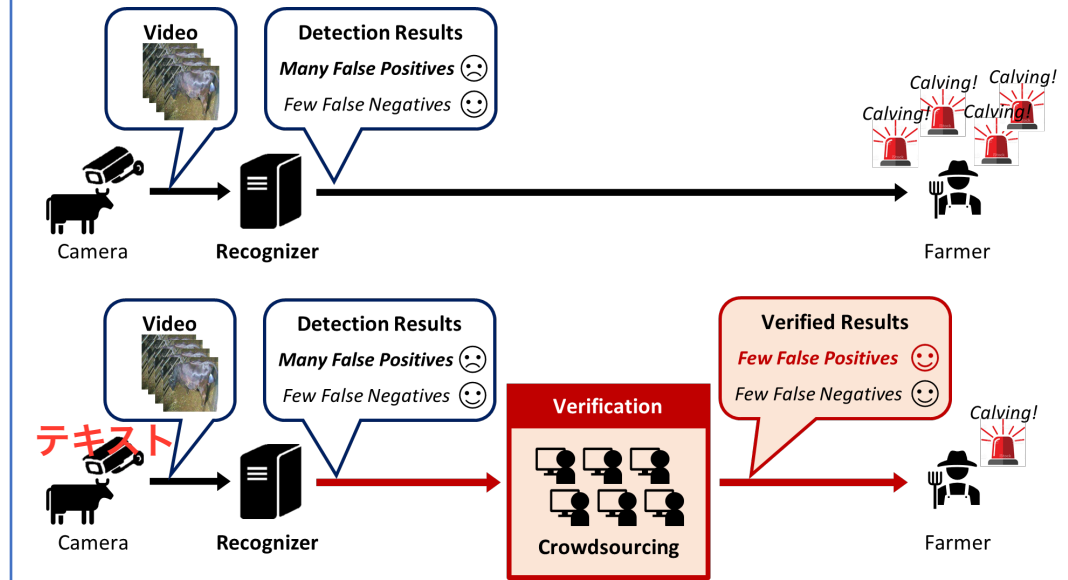
Objective: Reliable operation of pattern-recognition-based video surveillance systems at an early stage

Problems

- No pre-trained models and large-scale data available in many real applications (e.g., calving detection from video)
- Many errors with low resource training



Approach: Crowdsourced verification



Experiment

Objective: To investigate whether crowdsourced verification can reduce false alarms without increasing missed detection.

Task: Detecting allantochorion and fetal membrane of cow

Data: Cattle region images extracted with YOLOv2 and YOLOv3

	Positive (images)	Negative (images)
Training	9,877	9,877
Testing	324	4,138



Positive image

Result: Crowdsourced verification helped a lot in reducing false alarms.

Th	CSV	precision	recall
0.5		0.52	0.86
0.9		0.83	0.71
0.5	✓	0.89	0.83

Simply raising threshold

Precision recall

Crowdsourced verification

Precision recall

- Images are verified by a majority vote of four crowdworkers.
- If even one image is verified as positive in 5 minutes (180 images), alarm is sent.