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Enhancing Crop Yield with Animal Detection in Agricultural Land using Convolutional Neural Network and Sound Based Scare Tactics

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Abstract: *Agricultural sector faces a major loss that is caused by animal assaults and is one of the greatest threats in diminishing crop production. Pests, natural disasters, and animal damage pose severe risks to Indian farmers, lowering productivity. Crop raiding is one of the most acrimonious human-animal conflicts as a result of the extension of farmed land into former animal habitat. Traditional methods followed by farmers are not that effective and it is not feasible to hire huge manpower to keep an eye on crops and prevent animals from destroying them. Since safety of both human and animals is equally vital, it is important to protect the crop from damage caused by animal as well as divert the animal without any harm. The goal is to develop a model that can accurately detect animals in agricultural lands. The system will use deep learning to detect animals entering into the farm by using convolutional neural network concept. This system will monitor the entire farm at regular intervals through a camera which will be recording the surrounding throughout the day. With the help of a deep learning model, the system detect the entry of animals and also use sound based scare tactics to deter animals from the agricultural land.*

Keywords: Ungulates, Convolutional neural network, Object Detection, Scare-based system

REFERENCES

[1]. X. Yu, J. Wang, R. Kays, P. A. Jansen,T. Wang, T. Huang, ‘‘Automated identification of animal species in camera trap images,’’ EURASIP J. Image Video Process., vol. 2013, no. 1, p. 52, Dec. 2013.

[2]. B. G. Weinstein, ‘‘A computer vision for animal ecology,’’ J. Animal Ecol.,vol. 87, no. 3, pp. 533–545, May 2018.

[3]. Bushnell. “CelluCOR 20 Low Glow Cellular Trail Camera”Accessed:Feb. 22, 2022. [Online]Available:https://www.bushnell.com/trail-cameras/wireless-2/cellucore-20-low-glowcellular-trail-camera/P1688588.html.

[4]. H. Nguyen, S. J. Maclagan, T. D. Nguyen, T. Nguyen, P. Flemons, K. Andrews, E. G. Ritchie, and D. Phung, ‘‘Animal recognition and identification with deep convolutional neural networks for automated wildlife monitoring,’’ in Proc. IEEE Int. Conf. Data Sci. Adv. Anal. (DSAA),Oct. 2017, pp. 40–49.

[5]. A. G. Villa, A. Salazar, and F. Vargas, ‘‘Towards automatic wild animal monitoring: Identification of animal species in camera-trap images using very deep convolutional neural networks,’’ Ecol. Informat., vol. 41,pp. 24–32, Sep. 2017.

[6]. M. S. Norouzzadeh, A. Nguyen, M. Kosmala, A. Swanson, M. S.Palmer, C. Packer, and J. Clune, ‘‘Automatically identifying, counting,and describing wild animals in camera-trap images with deep learning,’’ Proc. Nat. Acad. Sci. USA, vol. 115, no. 25, pp. E5716–E5725,June. 2018.

[7]. R. Thangarasu, V. K. Kaliappan, R. Surendran, K. Sellamuthu, andJ. Palanisamy, ‘‘Recognition of animal species on camera trap images using machine learning and deep learning models,’’ Int. J. Sci. Technol.Res., vol. 8, no. 10, pp. 2613-22, 2019.

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[8]. M. Takagi and R. Hirano, ‘‘Proposal and evaluation of a method for automatically classifying images of agricultural work and animals acquired with motion sensor cameras,’’ in Proc. IEEE 2nd Int. Conf. Inf. Comput. Technol. (ICICT), Mar. 2019, pp. 102–108.

[9]. H. Yousif, J. Yuan, R. Kays, and Z. He, ‘‘Animal scanner: Software for classifying humans, animals, and empty frames in camera trap images,’’Ecol. Evol., vol. 9, no. 4, pp. 1–12, 2019.

[10]. S. Jamil, Fawad, M. S. Abbas, F. Habib, M. Umair, and M. J. Khan,‘‘Deep learning and computer vision-based a novel framework for Himalayan bear, marco polo sheep and snow leopard detection,’’ in Proc. Int. Conf. Inf. Sci. Commun. Technol. (ICISCT), Feb. 2016.

[11]. R. Kamesaka and Y. Hoshino, ‘‘Development of a prevention system for best damage of agricultural products using deep learning,’’ in Proc. Joint 10th Int. Conf. Soft Comput. Intell. Syst. (SCIS), 19th Int. Symp. Adv. Intell.Syst. (ISIS), Dec. 2018, pp. 747–752.

[12]. A. Kamilaris and F. X. Boldú, ‘‘Deep learning in agriculture: A survey,’’Comput. Electron. Agriculture., vol. 147, pp. 70–90, Apr. 2018

[13]. Y. Yu, K. Zhang, D. Zhang, L. Yang, and T. Cui, ‘‘Optimised faster R-CNN for fruit detection of strawberry harvesting robots,’’ in Proc. ASABE Annual. Int. Meeting, 2019, p. 1.

[14]. R. Shi, T. Li, and Y. Yamaguchi, ‘‘An attribution-based pruning method for real-time mango detection with YOLO network,’’ Comput. Electron.Agriculture., vol. 169, Feb. 2020, Art. no. 105214.

[15]. Y. Tian, G. Yang, Z. Wang, H.Wang, E. Li, and Z. Liang, ‘‘Apple detection during different growth stages in orchards using the improved YOLO-V3 model,’’ Comput. Electron. Agriculture., vol. 157, pp. 417–426, Feb. 2019.

[16]. N. P. Ramaiah, E. P. Ijjina, and C. K. Mohan, ‘‘Illumination invariant face recognition using convolutional neural networks,’’ in Proc. IEEE Int. Conf. Signal Process., Informat., Commun. Energy Syst. (SPICES), Feb. 2015.

[17]. R. Singh and H. Om, ‘‘Newborn face recognition using deep convolutional neural network,’’ Multimedia Tools Appl., vol. 76,no. 18, pp. 19005–19015, 2017.

[18]. T. Dobhal, V. Shitole, G. Thomas, and G. Navada, ‘‘Human activity recognition using binary motion image and deep learning,’’ Proc. Comput. Sci.,vol. 58, pp. 178–185, Jan. 2015.

[19]. H. A. Alwzwazy, H. M. Albehadili, Y. S. Alwan, and N. E. Islam,‘‘Handwritten digit recognition using convolutional neural networks,’’ Int.J. Innov. Res. Comput. Communication. Eng., vol. 4, no. 2, pp. 1101–1106,Feb. 2016.

[20]. Hendry and R.-C. Chen, ‘‘Automatic license plate recognition via sliding window darknet-YOLO deep learning,’’ Image Vis. Comput., vol. 87,pp. 47–56, Jul. 2019.

[21]. Nikhil, R., B. S. Anisha, and Ramakanth Kumar. "Real-time monitoring of agricultural land with crop prediction and animal intrusion prevention using internet of things and machine learning at edge." In 2020 IEEE International Conference on Electronics, Computing and Comm.Tech.(CONNECT), pp. 1-6. IEEE, 2020.

[22]. Chang, Kuei-Chung, and Zi-Wen Guo. "The monkeys are coming─ Design of agricultural damage warning system by IoT-based objects detection and tracking." In 2018 IEEE International Conference on Consumer Electronics-Taiwan (ICCE-TW), pp. 1-2. IEEE, 2018