Effectiveness of Crop Assurance Methods of Various Smart Crop Protection Systems

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Abstract: ***Crop damage due to the animal attack is one among the the principle dangers in diminishing the crop yield. The farm areas near the forest edges are unmistakably suffering from the wild animal attacks.. This surveys various methods used in many application for crop Security to redirect animal interruptions in the crop field. Most of these models in the crop field are outfitted with PIR sensors, sound creating gadgets, light flashers and some equipment module. For early discovery of the animal at the edge of the ranch interruption location framework should be introduced. Animal section at the homestead limit can be distinguished by certain hubs fixed at the limit and can be imparted to the focal base station. The progression of the center point commencement is zone based, time based and closeness based. On accepting this data the hubs inside the region of the animal actuates the hindering devices and diverts the animal far away from the area.***

Keywords: Animal intrusion, safe guarding, Alerting etc.

I. INTRODUCTION

As of not long ago, there has been little consideration given to vertebrate species that harm crops, especially crops of little scale ranchers in tropical and sub-tropical regions. However, great proof crop assaulting isn't a substitution phenomenon. The rising of global population results in higher food production demand (Müller, Alexander, et al., 2008). Agricultural lands are always under danger of attacks from various animals (Ojalammi et al., (2015)). Expansion of cultivated land into earlier wildlife area is the major factor of crop attacking which is getting one among the chief normal irregularity irritating human-wildlife connections (Teel, Tara L., et al., 2010). On the contrary hand, one among the most difficulties confronting wildlife protection inside the twenty first century is that the expanding communication among people and wildlife and in this manner the subsequent clashes that rise. Crop fields specifically in the proximity of forest area, the issue of wildlife animals entering and destroying crop field has taken a major crisis situation. The total outcome of crop yield is dependent on how the crop is protected from the animal attacks. Insects, birds, and other intruders may cause damage to the crop from outside. The extensive damage to agricultural crops is caused by crop-raiding animals, and this is always a major issue of controversy all over the world. Harvest striking animals may make significant harm farming crops (Slope, Catherine M, 2000), and this has consistently been a significant issue of conflict all through the world. Because of the extension of farmland into past wildlife living space, crop assaulting is getting one among the first basic clashes estranging human wildlife connections. On the contrary hand, one among the most difficulties confronting wildlife protection inside the twenty-first century is that the expanding association among individuals and natural life and along these lines the subsequent clashes that develop. A few pieces of world are thickly populated in light of the migrants in the investigation territory and further more in light of the fast increment in indigenous populace. Due to expanding interest for land and along these lines the declining profitability of the as of now farmland, human networks are looking to virgin grounds particularly backwoods, which they accept to be more ready than their own property, for growing horticulture proficiency. Specifically, development in timberland territories which simultaneously go about as wild living spaces in numerous areas is progressively prompting struggle. The survey work is organized as follows. Section II provides the detailed analyzes of various methods to protect farms from wild animals. Section III summarize the comparative analyzes of various hardware implementations Section IV concludes the details.

Table 2.1: Summary of crop protection methodology

Title	Author name	Method used	Merits	Limitations
Comparative Analysis of crops protected from various diseases, 2013.	Cai, Qiang, et al	Important disease-control methods	Analyzed the performance of novel viable procedures to battle sicknesses brought about by microbial pathogens and vermin.	Not covered the obstacles faced by genetically modified crops and Lacks with integrity.

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Crop protection and conflict mitigation , 2012.	Hill et al.	Crop protection	Influence of Deterrents like barriers, alarms, repellents in Crop protection	It requires direct human intervention all strategies
integrated analyzes of crop management in safeguarding crop production, 2004.	Oerke et al.	Multi crop cultivation case study	Detailed analyses of potential animal attacks and the actual losses are presented	No crop protection practices
Use of sound generating devices, light flashers and RF module, 2017.	Bapat, Varsha, et al.	WSN networks	WSN nodes will be placed at the corners which will detect the animal entry using a laser assisted perimeter guarding sensor.	Can't detect any outward animal intrusion
Low-power solar repeller devices equipped with a driver for amplifying the sound and a speaker, 2018.	Giordano, Stefano, et al.	IoT solutions	Heterogeneous sensors and actuators interfaced with the cloud to provide network enabled services	protect and monitor entire territory is of significant importance

II. SUMMARY OF CROP DAMAGE MANAGEMENT

Although it was observed that guarding through the use of machineries was most effective, financially viable and the safest means, it was a very intensive and time-consuming process. Crop guarding was especially useful against animals that could charge back and even kill when they find humans in their way. Other methods involving noise making through different means were hardly successful although intensive due to unpredictable frequency and intensity of wild animals (Thapa, Shova.2010). These kinds of methods such as noise making through group warning, use of claps for early warning can only work for a short time and eroded over time due to habituation (Pandey et al., (2015)). Bio-fencing and net wires were useful for small animals like chital. Fencing alone was not useful for nilgai as they can easily cross over 1.5 m in height, and was only temporarily effective for wild boar as after few visits it could pass through by digging holes beneath the fence (Zhao, P. Y., et al., 2010). One of the main problems of the different means used by households was that they were all temporary methods, which make wild animals move away to a certain distance within the park boundary so that they can return when it is quiet again. Due to the nature of preventive methods being momentarily used to drive wild animals away only to allow them to return after things calm down, crop damage worsened over the years (Dayan et al., (2009)).

Apart from these generalized methodologies some of unique findings are suggest for different crop damages for crop

Figure1.1: Sample Images of Camera trap Dataset

guarding in the various farmland such as rope barriers, electric fencing, selective hunting, cultivation of non-edible crops. Crop damage is a very important issue for communities' livelihoods and if park management programmes can support the communities in implementing different means, there are higher chances of communities' participation in conservation programmes. Understanding the usage and effectiveness of different means could also help to minimise crop damage problems which will have a direct impact on improving the relationship.

III. RESULTS:

The investigations were led on two benchmark datasets Camera Trap dataset [20]furthermore, Wild-Animal dataset [10]. The Wild-Anim al dataset contains 5000 pictures of five wild creatures: bear, elephant, panther, lion and wolf. The dataset is isolated into five subsets which contain absolutely 1000 pictures for preparing and testing every subset. Each picture in the dataset are 256 x 256 pixel pictures and further trimmed to 128 x 128. The Camera trap dataset contains 1000 pictures for every creature class. It contains twenty sorts of creatures.

However, we converged to eight classes because of fundamentally the same as highlights and names. For instance, red-deer and roe-deer converged as deer class. We handpicked 400 pictures and trimmed to 128 x 128 pixels and each class is additionally separated into two sets containing 300 and 100 for preparing and testing separately. Figure (1) shows sample images from two datasets

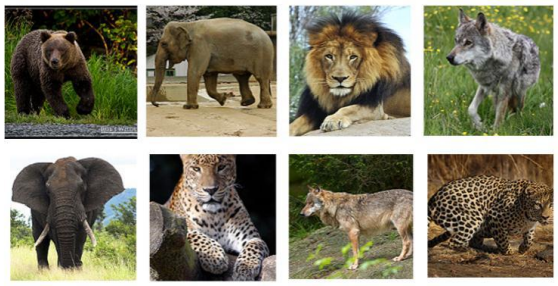

Figure1: Sample Images of Wild Animal Dataset

Conclusion

It was found that crop varieties, stage of crops, distance of the farm from the park boundary, crop season and therefore the surrounding ecology were the most factors in crop damage variation. Although different means were wont to prevent crop damage, most of the means were only temporarily effective as animals were only driven away for jiffy to be expected to return back after things were quiet. Different means were used for various sorts of animals also as different sorts of crops and crops growth stages, no single means would be considered effective. Similarly, different animals were creating problems in several villages which means no single means should be used to all or any the villages. This highlights the necessity for site-specific management techniques to attenuate the crop damage problem.

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