Perspectives of Potentially Aversive Geofencing Application for Monitoring Wild Elephant Movement

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Description

In recent years the intersection of technology and wildlife conservation has shown great promise in addressing critical issues related to the protection and management of endangered species. Among these, the use of geofencing applications has gained attention for its potential to monitor and mitigate human-wildlife conflicts, particularly in the context of wild elephant conservation. This essay explores the multifaceted perspectives surrounding the deployment of potentially aversive geofencing applications for monitoring wild elephant movement. Wild elephants, the largest terrestrial mammals on Earth face numerous threats to their survival, including habitat loss, poaching, and human-wildlife conflicts. These conflicts often occur when elephants encroach on agricultural lands, causing significant economic losses and sometimes even endangering human lives. As a result, finding innovative and ethical solutions to manage these conflicts is paramount. Geofencing technology, typically used for location-based services in various industries, is now being adapted to create virtual boundaries and alerts in wildlife conservation efforts [1].

Aversive geofencing, as the term suggests, involves using geofencing technology to create a zone where negative stimuli or deterrents are applied to dissuade wildlife from entering specific areas. In the case of wild elephants, this may include emitting loud sounds, flashing lights, or even using non-lethal methods like chili smoke or rubber bullets. While aversive geofencing holds the potential to reduce conflicts and protect both elephants and human communities, it raises ethical, ecological, and practical questions. To better understand these perspectives, we delve into the potential benefits and drawbacks of this technology in the context of wild elephant conservation.

The primary motivation behind aversive geofencing applications is the mitigation of human-wildlife conflicts, a crucial aspect of wildlife conservation. By creating virtual barriers around areas vulnerable to elephant incursions, these systems can trigger deterrents when elephants approach, preventing damage to crops and reducing the risk of confrontations between elephants and humans. This can potentially save lives on both sides while fostering peaceful coexistence. Aversive geofencing offers a cost-effective and sustainable solution to human-wildlife conflicts. Traditional methods of conflict mitigation, such as building physical barriers or employing human guards, can be expensive to implement and maintain. Aversive geofencing once installed can operate continuously with minimal human intervention, making it a cost-effective long-term solution.

Compared to lethal methods of wildlife control, aversive geofencing applications prioritize non-lethal deterrents. This minimizes harm to the targeted animals and aligns with ethical wildlife conservation principles that emphasize the importance of preserving all species, even those causing conflicts with human populations. Aversive geofencing may also encourage elephants to adapt their behavior by avoiding conflict-prone areas altogether. Over time, this could lead to a reduction in the frequency of conflicts, potentially benefiting both the

elephants and local communities [2]. The use of aversive geofencing raises ethical concerns, particularly regarding the impact of deterrents on elephant behavior and well-being. While proponents argue that non-lethal deterrents are more humane than traditional lethal control methods, critics question the ethics of intentionally subjecting elephants to aversive stimuli.

Aversive geofencing effectiveness relies on elephants associating negative stimuli with specific areas. However, there is a risk that elephants may become habituated to these deterrents over time, rendering the technology less effective. Furthermore, if the deterrents cause stress or panic in elephants, they may behave unpredictably, posing risks to both elephants and humans. The potential ecological impacts of aversive geofencing applications are not yet fully understood. Disrupting the movement patterns of elephants could lead to unintended consequences in terms of their social structure, breeding patterns, and overall health. Additionally, deterring elephants from certain areas may lead to overgrazing in other regions, affecting local ecosystems [3].

The effectiveness of aversive geofencing depends on the reliability of technology, including the accuracy of location data and the functionality of deterrent devices. Technical failures or false alarms could undermine the credibility and success of these applications. The implementation of aversive geofencing must consider the cultural and social dynamics of the affected communities. Indigenous and local communities may have deep-rooted relationships with elephants and their habitats. The introduction of aversive technology could lead to conflicts with these communities and negatively impact their livelihoods. Questions about the long-term sustainability of aversive geofencing applications also arise. Maintenance, data management, and system upgrades require on-going resources, and their effectiveness may diminish over time without proper investment and adaptation [4]. As we consider the perspectives surrounding aversive geofencing applications for monitoring wild elephant movement, it becomes evident that there is no one-size-fits-all solution. The key lies in finding a balance between addressing human-wildlife conflicts and respecting the ethical and ecological complexities of elephant conservation.

A thorough understanding of elephant behavior and the long-term effects of aversive geofencing is essential. Continuous research and monitoring can help refine the technology and minimize unintended consequences. Engaging with local communities and stakeholders is crucial in the deployment of aversive geofencing. Their knowledge, experiences, and concerns should inform the implementation process, ensuring that the technology aligns with the needs and values of affected populations. The development and application of ethical guidelines for aversive geofencing can help address concerns related to animal welfare and ecological impacts. These guidelines should be dynamic, adapting as new knowledge emerges [5].

Conflict of Interest

There are no conflicts of interest by author.

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References

1. Padalia, Hitendra, Surajit Ghosh, C. Sudhakar Reddy and Subrata Nandy, et al. "Assessment of historical forest cover loss and fragmentation in Asian elephant ranges in India." *Environ Monit Assess* 191 (2019): 802.

2. Acharya, Krishna Prasad, Prakash Kumar Paudel, Prem Raj Neupane and Michael Köhl, et al. "Human-wildlife conflicts in Nepal: Patterns of human fatalities and injuries caused by large mammals." *PLoS ONE* 11 (2016): e0161717.

3. Allen, Benjamin L., Christopher Bobier, Stuart Dawson and Peter J.S. Fleming, et al. "Why humans kill animals and why we cannot avoid it." *Sci Total Environ* 896 (2023): 165283.

4. Lahdenperä, Mirkka, Khyne U. Mar, Alexandre Courtiol and Virpi Lummaa, et al. "Differences in age-specific mortality between wild-caught and captive-born asian elephants." *Nat Commun* 9 (2018): 3023.

5. Denninger Snyder, Kristen and Dennis Rentsch. "Rethinking assessment of success of mitigation strategies for elephant-induced crop damage." *Conserv Biol* 34 (2020): 829–842.

How to cite this article: Kopp, Cassandra. "Perspectives of Potentially Aversive Geofencing Application for Monitoring Wild Elephant Movement." *J Anim Health Behav Sci* 7(2023): 208.