

Technology Based Wildlife Preservation In South Africa

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The Problem

Wildlife poaching, has been a longstanding threat to the biodiverse nature of wildlife in Africa and Asia. Africa's amazing biodiversity, particularly in the southern and eastern regions of the continent, is among its most notable traits. The very species that are most at risk to poaching are core parts of local culture, keystone species of the savannah and forest environments, as well as major attractors of ecotourism in supporting local economies. Rhinos especially have suffered severely with black rhino populations decreasing 98% between 1960 and 1995 and poaching continuing to press issues for their survival. With 11,000 being killed by hunters between 2008 and 2011, leaving them in critically endangered status, and only around 6,000 left alive on the whole continent, they are a top priority for preservation.

Smart Savannahs

Smart Savannahs is a Sweden-based nonprofit specializing in conservation efforts driven by technology. They partner with several national parks and wildlife preserves in parts of Kenya and South Africa to deploy embedded devices ranging from shot detectors and intelligent tags to field stations servicing areas with low cellular coverage. Recently, they have been looking to expand their array of deployment types to use newer and more effective improvements in the realm of software and hardware technology.



Community

The community served was two part. In attempting to support wildlife preservation initiatives, efforts must first strive to serve the community of front-line national park rangers who are the group most responsible for catching and preventing poaching efforts. According to Smart Savannahs, “more than a third of the African continent consists of grassland. The areas are too large, the illegal game trade generates too much money and the guards’ salaries are too low.” By working to improve the lives of anti-poaching guards and rangers and equipping them with better technology than the poachers themselves, the fight against poaching can grow stronger everyday. Additionally, many efforts of wildlife rescue and reintroduction can be empowered through the use of technology. Ultimately, however, the community of this project was the endangered species being affected by poaching. However, it is only by keeping both parts of the community in mind that effective work can be done to protect Africa’s wildlife.



Scholar Impact

My project focused on providing reliable and scalable trail cameras for use by the rangers all across the sanctuaries in which they operate. These trail cameras provide real-time information on the movements of animal populations and potentially poachers in the region using a combination of tinyML and traditional machine learning techniques. Rangers and staff are now able to see within seconds and accurately track the movements of zebra, giraffe, wildebeest, antelope, buffalo, rhino, leopard, and other important wildlife populations whilst responding to any attempts at harm. Outside of technical aspects, much of the project’s efforts included assisting veterinarians with animal care, aiding big cat rehabilitation efforts, and farm maintenance for smooth running of the many important roles of the reserves.

30
Cameras
Deployed

12,000
sq. m.
covered

1000+
Photos
Per Day

Timeline

- March, April, May: Develop prototype and test software
- Week 1: Writing up extensive project specification and testing tinyML capabilities
- Week 2: Deploying and testing several devices in the field
- Week 3-6: Constructing more devices and deploying across park areas along park rangers + assisting veterinary staff in big cat rehabilitation efforts. Continuous improvements as needed.
- Week 7-8: Working with park rangers to ensure familiarity with deployed devices and performing maintenance as needed