

A Roadside Animal Detection System in South Africa



Abstract

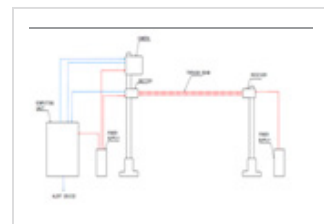
Many animal-vehicle accidents on South African roads remain rampant. The collisions have damaged properties, harmed human race and wildlife species. Factors such as changes in human and animal behaviors, road features, connectivity and climate have contributed to roadkill. Destabilization of animal species in their habitats is highly attributed to anthropogenic activities. Humans engage in activities such as wildfires and emission of green gasses that are harsh to these vertebrates. These acts have led to a rise in species distribution in seek for new habitat that is conducive. The movements if not monitored will drastically increase mortality rates. In February 2012, atleast 470 wildlife animals were killed in South Africa. Birds were the leading victims, followed by reptiles, mammals and amphibians. These killings also happen globally and in other parts of Africa. Because of these deaths, intelligent monitoring systems are deployed to monitor wildlife. Globally, traditional systems such as overpasses and underpasses, and automated systems such as break the beam, Tripwire, etc are adopted to mitigate roadkill. Lately in developed economies, Intelligent systems such as break-the-beam sensors and mobile mapping have been explored. These systems use automatic systems and intelligent algorithms to detect animal species and prevent Roadkill. Such solutions do not exist in Africa especially South Africa, which has a high demand due to the alarming car cases and unique animal species. In this work, we want to investigate connectivity in wild reserves and develop a roadside animal detection system integrated with fencing. This system will detect an animal species using intelligent algorithms and alert the driver about the existence of an animal species on the road. This system will be composed of hardware and software components. The hardware components are computing unit, camera, sensors (photoelectric through the beam), alert system and power supply, plus software components such as TensorFlow and protocol buffers. Raspberry pi will be configured to work with the intelligent algorithms, camera and sensor to detect images in real time. This research will be the first of its kind in Africa and specifically South Africa, it will contribute to conservation on road and finally help mitigate animal-vehicle collisions in South Africa.

Irene Nandutu

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Biography

Irene is a first year PhD Student in Applied Math at Rhodes University. She is understanding the integration of sensor technology and machine learning to mitigate conservation problems with a keen focus on animal-vehicle collisions. As humans engage in activities that are harsh to wildlife, we witness species distribution in search for new habitats which are conducive to these vertebrates, Irene is particularly interested in regions near the game reserves or hotspots and existing systems developed that prevent roadkill. What are some of the reasons why animals move towards particular roads, during a particular season of the year? How can an automatic animal detection system be developed to reduce animal mortality rates due to animal-vehicle collisions? What is the degree of connectivity in wild reserves? Irene aims to answer these questions by exploring datasets and building models while understanding the fields of wildlife, biodiversity, and environmental science, plus Artificial Intelligence. She hopes to continue her journey of building skills for contributing towards a transition to sustainable practices in Research and Artificial Intelligence in the developing world.



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