

Mitigating Human Elephant Conflict through an Engineering Approach

Author: Chinthaka M. Dissanayake
 Email: c.dissanayake@pgrad.unimelb.edu.au
 Supervisors : Malka Halgamuge, Bill Moran, Rao Kotagiri
 Department: Department of Infrastructure Engineering



THE UNIVERSITY OF
MELBOURNE

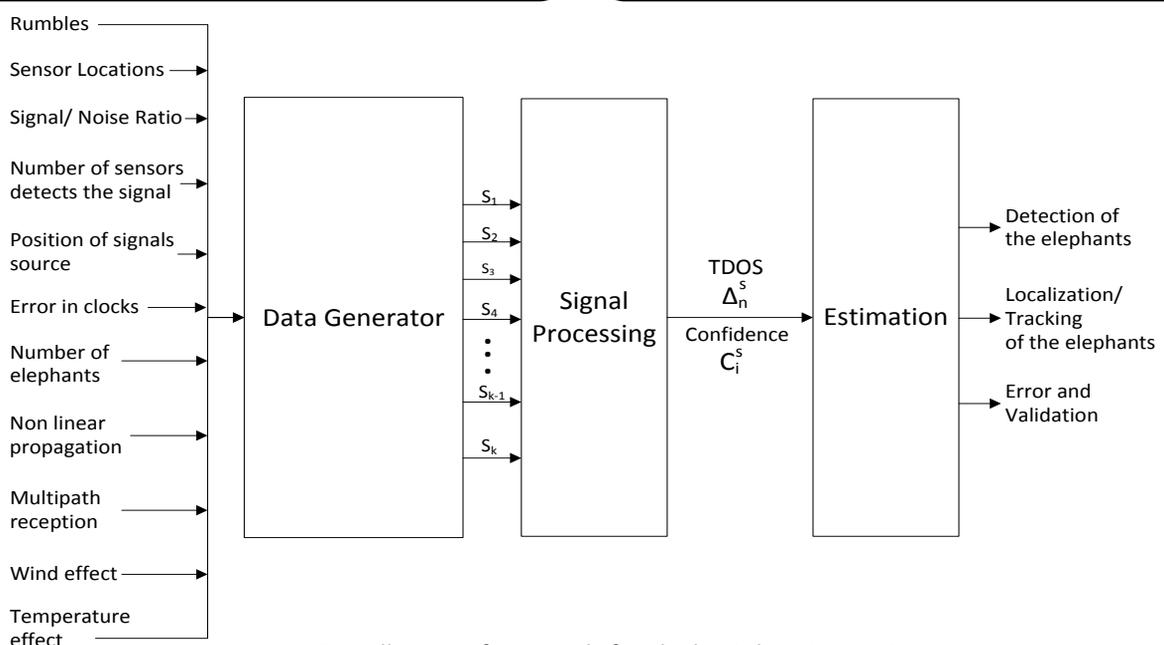


Abstract: Elephants and human were built with a long tradition of interdependence until contemporary times. However, today human-elephant conflict has become one of the most significant environmental and socio-economical crises in some parts of the world. The conflict primarily is a consequence of frequent attacks from crop riding elephants to the rural agricultural communities.

The main objective of our research is to reduce the occurrences of human–elephant conflict by developing a solution which allows rural agricultural communities to identify elephant migration towards the villages in advance. The proposed solution is basically to incorporate sensor network to detect, localize and track elephants before they move into the village area.

Introduction: Currently, it is estimated that there are approximately 4,200–5,000 wild elephants in Sri Lanka and almost 70% of them live outside the national parks, sharing the land with rural people. Elephants frequently enter agricultural areas searching for foods and occasionally damage human residences and lives leading to human elephant conflict. So far, about 60 people have been killed by elephants and 225 elephants have been killed by people annually as a result of the conflict. The existing solutions such as electric fencing systems and tracking elephants with GPS collars have significant drawbacks and therefore, alternative solution is required to address the problem.

Methodology : We propose that a sensor network which is capable of detect, localize and track the elephants can incorporate to reduce the occurrences of human-elephant conflict by identifying elephants before they migrate to the villages. Elephants can be detected by positively identifying low frequency elephant calls called *rumbles*. These calls are totally or partially in infrasonic frequency range and therefore can travel a long distance. Then through the acoustic ranging techniques, sensor network can be used to localize and track the elephants. However, accuracy of detection is challenged by the environmental factors and the methodologies need to be developed to minimize location estimation errors.



Overall system framework for elephant detection system