



**IN
PARTNERSHIP
WITH
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Project Proposal 2020/21

Project Elefante (Automatic Alert System)

Group Number: 24

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Introduction

The human-elephant conflict in Sri Lanka has a history of challenging the conservation of Asian elephants (*Elephas Maximus*). Asian elephants are an endangered species which of most can be seen in Sri Lanka throughout the world. Since our country stands the third highest in population is to elephants' ratio, it has succeeded to contribute at a higher level in the Human- elephant conflict (HEC).

The responsibility in mitigating HEC in Sri Lanka goes to the department of wildlife conservation (DWC) agency. Even though there have been many strategies taken by the wildlife conservation department such as electric fencing and GPS/VHF collars, nearly 50 humans and 150 elephants are being killed every year.

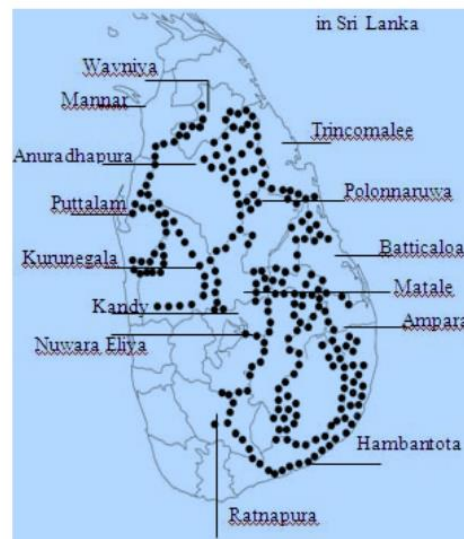


Figure 1. HEC affected areas in Sri Lanka

Blocked by human habitation and boundaries, elephants have been forced to the deep forest making them leave access to their critical resources. In the day, people who live in rural areas attack the giants and threat them to retreat. Yet they won't give up easily. Being nocturnal and under the radar, they seek for necessities sneaking in the night where the real conflict occurs and results in deaths from both sides of species. This affects directly to their freedom and lifestyle (Wijesundara, 2014).

The solutions given by our project will be an automatic alert system designed to alert an upcoming (HEC) conflict situation prior to the incident. With the current technological solutions brought up with the department of wildlife conservation agency, it will be an ease for success in reducing the human-elephant conflict through this project.

Project Objective

Designing an **Automatic Alert System** (AAS) to prevent from the human-elephant conflicts (HEC).

Background and Motivation

During years 2010-2019 The total number of HEC incidents were recorded as 14,516 in the country. There were 807 human deaths and 2631 elephant deaths recorded approximately. It has been shown that HEC was a very widespread throughout the country. The death rate through HEC is mostly because of the irresponsible behaviour in humans when approaching wild elephants (T. G. Supun Lahiru Prakash, 2020).

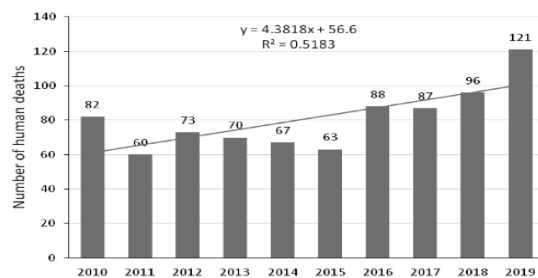


Figure 2. Annual human deaths.

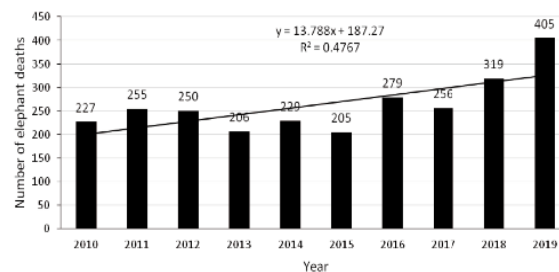


Figure 3. Annual elephant deaths.

Safety precautions such as translocating elephants in a safe environment, collaring elephants with extensive techniques such as VHF/GPS trackers and also setting electric fences.

Collaring elephants has reduced a certain amount of HEC cases in the turn off the 19th century. However fixing collars has a procedure of immobilizing with proper appropriate anaesthetics with the correct dosage for the elephants and the process costs almost a fortune. The electric fences are being located in HEC primed areas by the Department of wildlife conservation. Yet the elephants have figured out to be immune for the fences and have outlawed it (Wijesundara, 2014).

Relying on a strategy such as translocation of elephants to protect areas is a bit debatable is debatable such as translocation of elephants to protective areas are debatable. Since experts also believed that moving elephants is futile because such act can cause the death of an elephant due to hunger and stress and facing social difficulties upon such new establishment.

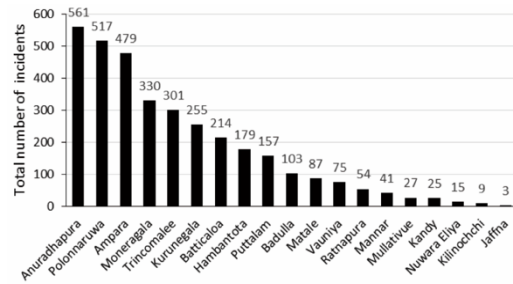


Figure 4.Total number of HEC incidents by district.

GPS collars or Global Positioning System used today is an approach only to identify the migration patterns and tracking elephants. Due to its excessive cost of the solution is not feasible and only can be used to identify migration patterns of the elephants. The VHF or the Very High Frequency device is used to transmit a signal with a continuous “beep” sound through the collar to a receiver. It similarly works as a metal finder and this method is called “homing in” where the signal strength identifies the reach of the elephants current positioning. Due to high manpower requirement, short range and the short lifetime of the device cannot be used to prevent the existing human-elephant conflict (T. G. Supun Lahiru Prakash, 2020).

There has been recent initiative of distributing guns by the government for HEC mitigation in some districts which is likely to greatly escalated the conflict which will increase human deaths by having elephants driven to aggression and death of elephants from gunshot injuries. Since the former solutions brought up to control HEC can be seen as a total failure and a viable option will be brought up by the project that we are carrying out.

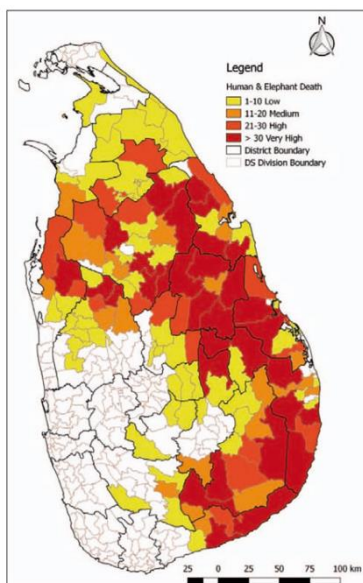


Figure 5.DS divisions with human and elephant deaths.

Approach and Methodology

With the failure of the existing solutions implemented by the department of wildlife conservation (DWC), we will be creating an Automatic Alert system to identify future human-Elephant conflict situations and prevent from happening a conflict.

We will be using cameras to capture the elephants and identify when they are entering to human establishments. Using Open CV, the cameras will be connected and divided into small frames.

Then by the pre trained cascade classify, we detect and double check the captured frames from the cameras. If the image (elephants) detects , then the camera id and time of the specifically located camera will be sent to a live fire base we create.

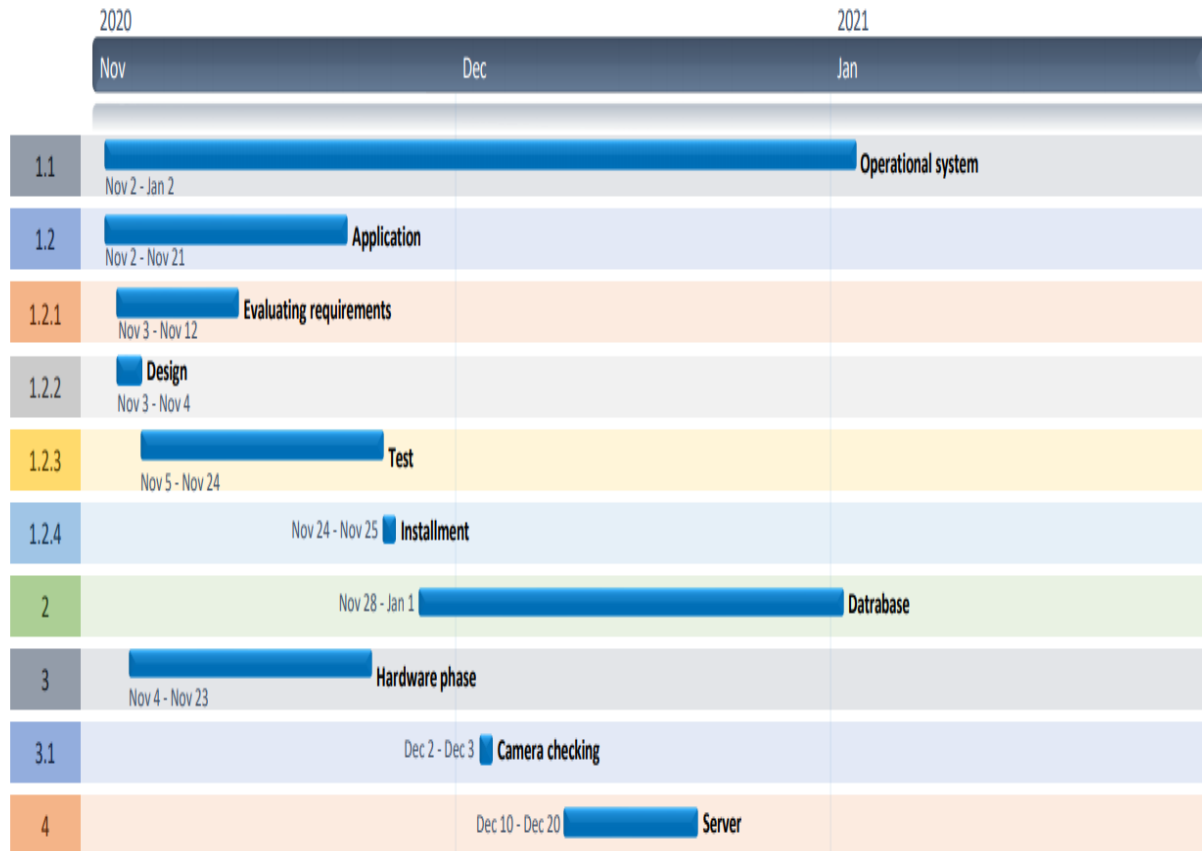
To reset the camera for a new capture, it will be hibernated for a time of five minutes.

Through the mobile application, it will search for new data from the fire base for any detections of elephants trespassing. If the data are positive, a quick alert will be notified to the user through the mobile app.

Resource Requirements

- Flutter
- Firebase Realtime Database
- Python Language
- OpenCV
- Deep Learning
- Detecting Cameras

Project Plan



References

- Wijesundara, A. G. a. M., 2014. A Solution for the Elephant-Human Conflict. January.
- T. G. Supun Lahiru Prakash, A. W. W. a. P. F., 2020. Human-Elephant Conflict in Sri Lanka: Patterns and Extent. May, pp. 16-25.
- Ecology Center (2019) *Elephant Population - Causes of Death and Mortality Rates*. Retrieved from <http://www.ecologycenter.us>.