SURVEY PAPER ON ELEPHANT TRACKING USING ACOUSTIC SENSOR

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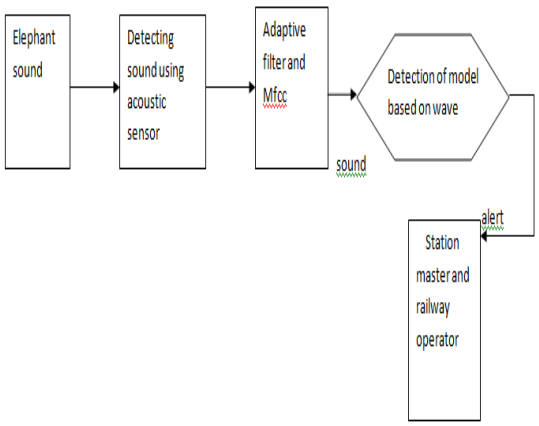
***Abstract*: Rail Elephant Conflict (REC) has been rise in the various regions in India and across the world. Large numbers of elephant where died in train accident .Tracking of elephant is difficult due to their size and nature of movement. By using acoustic sensor it helps to track the elephant vocalization. Acoustic sensor deal with existing methodologies through their effectiveness and accuracy in monitoring elephant sound without cause any harm to them .while, at the same time, helping the elephant from death. These papers address the survey of elephant tracking.**

I. INTRODUCTION

Due to the rapid growth of population the forest areas are converted into lands. And conversions of lands are mainly used for transportation of human settlement. Transportation is the one of the problem for animals because a number of elephants died in an accident. The serious issue is a number of elephants were perishing in train accidents. Train Elephant Conflicts are occurred various area/region. To reduce the death rate of elephant tracking is difficult. Minimizing Train Elephant Conflict (TEC) is only through elephant vocalization. The objective of the research is to understand the problem circumstance and possible factors for elephant death through train accidents and to minimize TEC. For this two methods are proposed for detecting the elephants in the railway track areas (a) acoustic sensor and (b) adaptive filter and Mel-frequency Cepstral Coefficient (Figure 1). Acoustic wave sensors are a class of microelectromechanical systems. It modulates surface acoustic waves to sense a physical movement. The acoustic sensor used to detect/record the sound of elephant vocalization. However, the large variety of noise sources present in the wild impedes automated analysis methods. As a result no system exists so far that is ready to operate in the field. So far research on the acoustic investigation of elephant calls has a deal with highly selective tasks such as the identification of elephants by their calls and the analysis of particular call types e.g. rumble types. There are two major problems in the detection of elephants in wildlife recordings. The first problem is the large variety of uncontrollable noise sources. Some noises are cars, airplanes etc. which particularly pollute the low-frequency channel. These noises disturb the automated detection. The second problem is the insufficiency and abnormality of elephant identifies which makes it tricky to understand the frequency of a call. Mel Frequency Cepstral Coefficient (MFCC) and Adaptive filter are used to reduce noise. MFCCs are used as it is the most widely used features for speech reorganization due to their ability to represent the speech spectrum in a compact form. An adaptive filter is a system with a linear filter that has a transfer function controlled by the variable parameter and a means to adjust that parameter according to an optimization algorithm. This system helps to moderate such conflicts in two ways: 1) By providing a warning to train operator and station master 2) By providing advance information to the authorities to the forest. And this method helps to minimize the railway elephant conflict in railway area using vocalization is proposed in this paper.



. Figure 1: flow diagram

II. RELATED WORK

The automated analysis of animal vocalizations has recently received increasing research focus as a method to study and monitor wild animals without curious with their lives or an environment. The integration of noise model is important when dealing with animal vocalizations since the recording environment is usually poor with many interfere noise source present. Acoustic sensor helps to detect the elephant from their roar in wildlife replica by extracting the characteristics basic incidence of rumbles using a sub-band pitch estimator. Elephants require relatively large areas and diversity of environments to forage (Santialillai et al. 2010; von Aarde et al. 2008). As a result ranges are complex and not limited to formally assign confined areas. Existing approaches for acoustic elephant recognition strongly rely on highly specific sound qualities that are difficult to estimate in noisy wildlife recordings (Matthias Zeppelzauer; Angela S.Stoger; Christian Breiteneder). This requirement limits the applicability of these approaches in a genuine world development. Hence even though investigate is in on process no method exists that fulfills the requirements for the constantly programmed discovery of elephant vocalizations beneath normal field environment. lephants make widespread use of controlling low frequency vocalizations commonly termed “rumbles” (Poole et al. 1988; Langbauer 2000; Soltis 2010), which travel distances of up to several kilometers (Garstang et al. 2004). This meets the criteria the elephant as a perfect representation species for acoustic observation from the time when it is possible to detect elephants by their rumbles even if they are out of scene (Seneviratne et al. 2004; Payne et al. 2003). In A. B.Venkataraman, R.Saandeep, N. Baskaran proposed converse the possible use of satellite technology for argument improvement.(Table 1 shows number of methods used for tracking elephant) The elephants mark with radio collars reply violently and damage it and even the elephants pass away. In Venter and Hanekom proposed the option of using the elephant to elephant communication (elephant rumbles) to identify the incidence of a group of elephants in close nearness. In this work the authors have recorded the low-frequency infrasound pattern but they do not compare with that of other animals to confirm an elephant occurrence. In elephant vocalization, detection noise is difficult. This noise can seriously reduce classification accuracy especially if the individuality of the noise varies across the dataset. By using various algorithms, we can remove the noise. Butterworth filter and windowing technique are used for reducing noise. Mel-frequency Cepstral coefficient (MFCC) is used for audio features that have been acceptably used for audio classification involves. The adaptive filter can be measured as a method in which the restriction used for the processing of signals change according to various norms (Widrow Bernard, Samuel Stearns D.2004). Usually, the standard is the expected mean square error or the correlation. The adaptive filter is unbalanced in a time since their factors are constantly in order to meet a performance condition

Year	Title	Input	Output	Formula
2014	An automated system for remote elephant tracking to reduce HEC	Wireless sensor network, sensor node, gateway, central processing unit	Sms alert	
2010	Automatic detection of African elephant infrasonic vocalizations from recording	Voice recording caller	Signal noise ratio	Windowing technique
	Acoustic detection of elephant presence in noisy environment	Voice detector	Reduce noise ratio	Partial derivation for time and frequency, Gaussian filter
2013	An early warning system for elephant intrusion along the forest border area	Sesmic sensor	Sms alert	Markov chain
2014	Towards an automated acoustic detection system for free ranging elephants	Acoustic sensor	Noise detection	Gaussian filter
2012	A reverse localization scheme for underwater acoustic sensor network	Acoustic sensor	Message exchange for localization, decreasing average localization response time	Distance equation
2010	Acoustic communication in the asian elephant, elaphas maximus maximus	Acoustic signal	Elephant sound	

2012	Visualizing sound emission of elephant vocalization :evidence for two rumble production types	Acoustic camera	Capturing image and sound	
2014	Surveillance and tracking of elephant using vocal spectral information	Sensor	Sms alert	Std deviation, butter worth filter
2013	Sensing solution for collecting spatio-temporal data for wildlife monitoring application	Wireless sensor network	Monitoring the animal	
2000	Sesmic properties of asian elephant (elephas maximus)vocalization and locomotion	Acoustic and seismic sensor	Track the elephant in long distance	
2012	Propagation Constraints in Elephant Localization Using an Acoustic Sensor Network	Acoustic sensor	Vocalization detection	Non linear model

Table 1

Other methods

M. D. Graham (2008) has made a testing approach for a thorough evaluation of elephant movements in illegal areas. Using radio telemetry, they have assessed the movement of elephants. Elephants spend more time at night than during the day, in view of the possibility of mortality caused by human resident. To avoid further environment destruction and the testing and application of conflict reduction actions where destruction has already taken place. Hence this method addressed that using radio telemetry elephant behavior can be observed clearly.table 2

Year	Title	Approaches
2009	Human elephant conflict mitigation of training course for community based approaches in Africa	Elephant behaviors
2010	Human elephant conflict in forest division, India	Mitigation measured
2010	Karnataka elephant census 2010	Survey of landscape
2010	The use of GPS radio collars to track elephants in the tarangire national park	Radio collars

Table 2

Conclusion

The survey of elephant tracking system in the view of wireless sensor networks, namely acoustic sensors. This investigation covers various paths of elephant tracking research. Train-Elephant Conflict is assumed as a real time problem. The need for a different solution arises due to the sound boundaries of the existing elephant tracking system. The identified objective and problems concerning the methodologies used for elephant tracking system may help in future research in this area. The initial purpose of such a survey may be steadily used by the researchers and the corresponding important observation may be analyzed.

It calls for further widespread research oriented studies, by all concerned, for the discovery of newer issues and challenges in this topic

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