Cow Animal Avoidance System for Vehicles to avoid accidents

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Abstract- One difficult issue that all the created countries are confronting today is demise and wounds because of street mischances. The impact of an animal with the vehicle on the roadway is one such enormous issue, which prompts such street mischances. In this paper, a straightforward and an ease approach for programmed animal detection on expressways for averting animal-vehicle crash utilizing PC vision methods are proposed. A technique for finding the separation of the animal in certifiable units from the camera mounted vehicle is additionally proposed. We propose a framework to arrange dairy animal utilizing image preparing philosophy. We will utilize grouping and arrangement calculation for identifying animal.

Keywords- Cow Detection, Object Detection, Classification

I. INTRODUCTION

The present car configuration principally relies upon wellbeing measures, security devices and solace instrument. The approach has encouraged the advancement of a few shrewd vehicles that depend on current apparatuses and innovation for their execution. The security of a vehicle is the most astounding need as per an ongoing report [1]. The report appointed by World Health Organization in its Global Status Study on Road Safety 2013, uncovered that the main source of death for youngsters (15-29 age) all around is because of street car accidents. Despite the fact that different nations have started and found a way to lessen street car accidents and mishaps, the aggregate number of accidents and car crashes stay as high as 1.24 million every year [2]. Street auto collisions and wounds are relied upon to ascend by right around 65% before the finish of 2020 [3]. Because of street mischances, consistently 1 out of 20,000 people lose their life and 12 out of 70,000 people confront genuine wounds in India [4]. India is additionally known for the greatest number of street mischances on the planet [5]. As per the information given by National Crime Records Bureau (NCRB), India, there was very nearly 118,239 individuals who lost their life because of street mischances in the year 2008 [6]. A noteworthy level of these street accidents and mishaps included auto and different vehicles. Street mischances are expanding because of the expansion in various vehicles step by step and furthermore the because of the nonattendance of any smart interstate security and ready framework. As indicated by information given in an examination [7], the quantity of individuals who lost their lives in India because of street mischances was right around 0.11 million passings in 2006, which was roughly 10% of the aggregate street mishap passings on the planet. As per the mischance inquire about examination led by JP Research India Pvt. Ltd. for the Ahmedabad-Gandhinagar locale (urban communities of India), for the term February 2014 to January 2015, add up to 206 street car crashes were recorded and these were affected by three principle factors i.e. human, vehicle, framework or a mix of them [8]. The number in figure 1 is a level of the aggregate number of mischances reviewed. As indicated by the record, human factor impact on street car crashes was 92%, vehicle 9% and foundation 45%. Out of aggregate 45% (91 mishaps) foundation impacted auto collisions, 6% (12 mischances) were because of creatures out and about though out of aggregate 92% (171) human factor affected car crashes, 14% (24) were because of driver carelessness and nonattendance of any opportune ready framework for keeping the impact . Comparable sorts of overviews were directed for the Mumbai-Pune road, and Coimbatore by JP Research India Pvt. Ltd. what's more, the determinations indicated at a huge level of street mishaps coming about because of a question (creature) out and about, driver obliviousness, and nonappearance of a clever interstate wellbeing ready framework.

II. LITERATURE SURVEY

The authors proposed system is trained on more than 2200 images consisting of positive and negatives images and tested on various video clips of animals on highways with varying vehicle speed. As per the two-second rule, thier proposed method can alert the driver when the vehicle speed is up to 35 km/h. Beyond this speed, though the animal gets detected correctly, the driver does not get enough time to prevent a collision.[1]

Wireless Sensor Networks (WSNs) are used in various scenarios, including rural and forest environments. Wildlife protection and conservation is a challenge, especially in natural reserves, dangerous locations or hot spots near human environment (i.e., roads, railways, and other civil infrastructures). This system proposes WSN based system for wildlife management in the surrounding area of human

passages to establish safe ways for animals to cross transportation infrastructures.[2]

In this project, authors have tested different platforms, approaches and techniques to develop a prototype network for a wildlife-roadway collision warning and mitigation system. The system utilizes wireless sensor networking (WSN) technologies and emphasizes on energy efficiency, low cost and easy deployment and maintenance. It is through this research that we conclude wireless sensor networking technology has great a potential for future applications in wildlife-vehicle collision avoidance and environment monitoring, where network nodes co-operate to achieve network functionalities. Highly qualified personnel (HQP) training goal has been successfully achieved through the project work. The most challenging task, however, lies in the effective sensing techniques for large scale environment and resource constrained networks, which need further future investigation.[3]

This paper provides a survey of the existing systems that mitigate the AVC. Moreover, this paper presents the high-level design of a deployable and intelligent Camel-Vehicle Accident Avoidance System (CVAAS) using global positioning system (GPS) technology. The use of the GPS technology in this kind of application is a novel idea. To evaluate the CVAAS system a simulator has been implemented.[4]

To assess the overall effectiveness of measures to reduce wildlife-vehicle collisions, authors employed a standardized, multi-agency wildlife-vehicle collision tracking form. This tracking, ongoing since 2000, allows us to assess changes in collision rates pre- and post-highway upgrade, as well as against control areas. To assess the effectiveness of underpasses as well as elk-proof fencing, escape jumps and one-way gates on the completed highway section, both video camera monitoring and prepared track bed counts are being used. Cameras and track beds have been placed inside the two underpasses, at the mouth of the underpasses, and approximately 60m away to determine relative rates of passage by approaching wildlife.[5]

IV. DETECTION METHODOLOGY

Though various practical solutions for automatic lane detection and pedestrian detection on highways are available still research related to automatic animal detection on highways is going on.

• Animal detection in wildlife (forest) videos or underwater videos (controlled areas) have been tried in past but the challenges are much more when detecting animals on highways (uncontrolled areas) as both animal as well as a camera mounted vehicle is moving apart from other obstacles on the road which are also moving or stationary. There is no issue of speed (vehicle speed as well as animal speed) and detecting distance of animal from the vehicle in wildlife videos which is crucial and critical in animal detection on highways.

• The biggest challenge in detecting animals compared to pedestrians or other objects is that animals come in various size, shape, pose, color and their behavior is also not entirely predictable. Though the basic shape and size of a human being are pretty average and standard, the same is not true for animals.

• Although various methods and approaches have been used and are still in progress to detect, solve and reduce the number of animal-vehicle collisions, the absence of any practical systems related to an animal-vehicle collision on highways has delayed any substantial development in the scenario.

Specific Reasons For Animal (Cow) Detection

According to the surveys and report given by the Society for Prevention of Cruelty to Animals (SPCA) and , the number of accidents on Indian roads has increased due to increase in a number of vehicles day by day and also due to the presence of animals on the road (mainly two animal's dog and cow). The collision of an animal with the vehicle on the highway is one such big issue apart from other problems such as over speed, abrupt lane change, and drunk-drive and others which lead to such road accidents and injuries. The associated number of fatalities and injuries are substantial too. Specific reasons behind developing automatic cow detection system in place of any other animal are:

• India is mainly an agriculture based country where 70% of people depend on agriculture, and 98% of them depend on cow based agriculture.

• The cow is a sacred animal in India and nobody wants to hit a cow.

• Cow milk is the most useful and compatible with human mother's milk than any other animal or so.

• According to some surveys, cow's milk and cow dung have many medicinal benefits.

• Cows, as well as dogs, are found quite often than other animals on the Indian roads.

• As cow is a large (heavy) sized animal, the collision between a cow and vehicle will be very much severe. The collision between a small (less weight) sized animal like dog and car won't be that much severe. The speed with which the vehicle is coming and hitting the animal also plays a critical role in deciding the impact of the collision.

V. PROPOSED WORKFLOW

The image is inputted for object detection in system. Then we are doing pre-processing steps to enhance the image. For feature extraction and learning of the system, we are using a combination of clustering and classification for animal detection. All the image processing techniques are implemented in Matlab software. Once the animal gets detected in the image, the next step is to find the distance of

the animal from the testing vehicle and then alert the driver so that he can apply the brakes or perform any other necessary action which is displayed on command prompt as a message.

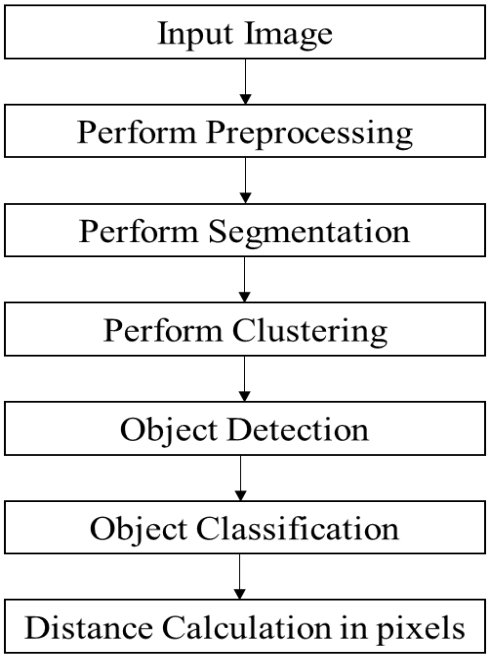

Fig.1: Basic Flow of Proposed System

Depending on the distance of the animal from the camera mounted vehicle, three kinds of messages (indication) are given to the driver i.e. animal very near, if animal is very near to the vehicle, animal little far, if the animal is little far from the vehicle and very far, if the animal is very far and at a safe distance from the vehicle.

System Architecture

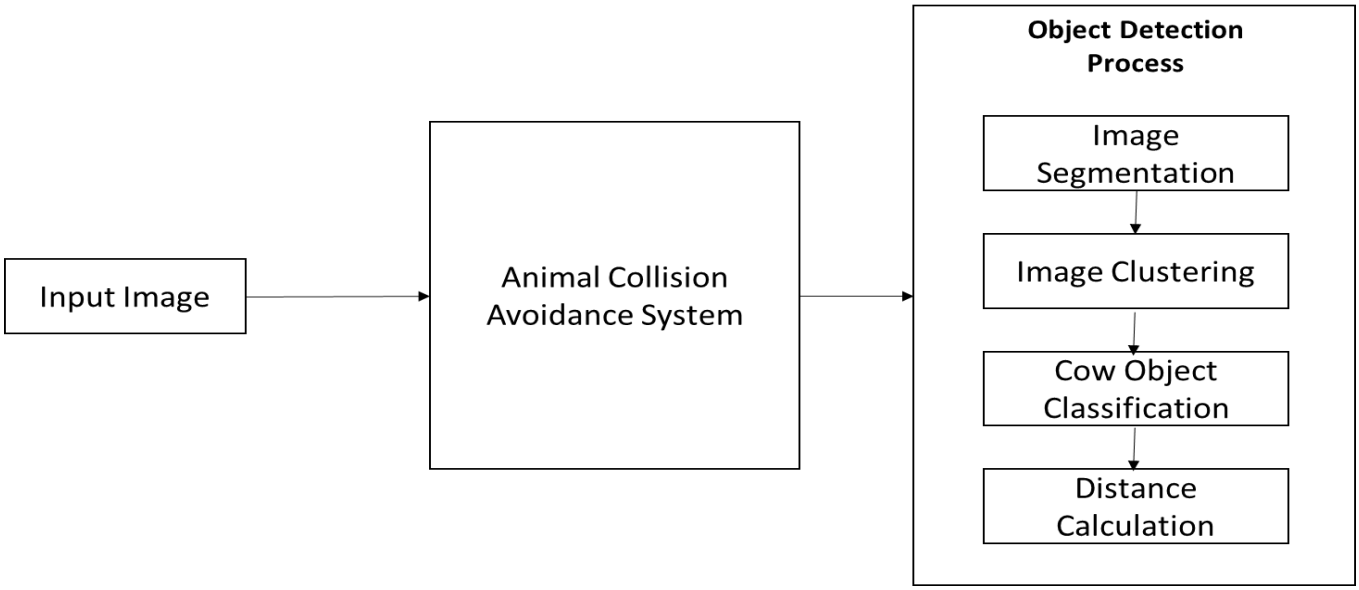

Fig.2: Proposed System Architecture

Following is the procedure for calculating the distance of the detected animal from the camera-mounted vehicle:
• Image resolution is 640 × 480
• X range is 0 to 640
• Y range is 0 to 480 Let the right bottom coordinate of the detected cow be (x, y).
Then the distance of cow from the lower edge (car/camera) is 480 – y.

VI. CONCLUSION

The scope of the paper lies in conserving wildlife and also avoiding accidents causing harm to human and animals. The disadvantages of existing systems lead to a design of low cost, large scale effective system to avoid the accidents caused by animals and also preserve wild life. The paper mainly concentrates to avoid the animal vehicle crashes along the roads crossing the wildlife sanctuaries or forest. Cow is selected as core animal as they are mostly siting on roads in India and are determined as God. To avoid accidents we have proposed cow detection and classification system with distance calculation as well.

VII. REFERENCES

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