**Identification of Deer in Thermal Images to Avoid Deer-Vehicle Crashes**

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**Abstract:**

Car accidents due to deer vehicle-crashes (DVCs) are constantly a major safety issue for the driving on rural roads in Europe and North America. Many attempts have been made to avoid these accidents, but few have been succeeded. One of the options is to use thermal images to identify the presence of deer, then to warn the drivers to slow down. In this research, we proposed using thermal images to determine whether deer are present or not. The histogram of orientated gradient (HOG) method and the support vector machine method (SVM) have been used to identify deer. In this algorithm, based on the calculation of the HOG on the thermal images of thousands of samples (deer thermal images), SVM method is firstly used to get the pattern of deer to generate deer description, called descriptor. Then the descriptor is used to compare with the HOG of the current image. The comparing result will tell the existence of deer in the current image. In order to improve accuracy, the second training, where the false positive images are used as training samples, has been performed. The lab and field test results have shown up to 85% accuracy. By achieving this goal, deer can be identified and warning signal to drivers can be issued. Thus the possibility of deer – vehicle crashes can be reduced.

**Biography of presenting author** (should not exceed 100 words)

Dr. Debao Zhou Bai is a Professor in Department of Mechanical and Industrial Engineering at the University of Minnesota Duluth, where he started as an Assistant Professor in in Jan. 2009. He received his Ph.D. degree in in Nanyang Technological University, Singapore in 2004 and the M. Sci. and B. Eng. degree in Tsinghua University, P. R. China, in 1996 and 1993 respectively both in Mechanical Engineering.

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