
Improving performance and energy consumption in automatic labeling by image transformations on CPU and GPU

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Image labeling is important in the work of autonomous cars because it provides a lot of information from the vehicle environment. Improving the efficiency of labeling is vital for further development of such vehicles. In this study, two main aspects of image labeling are analyzed and tested, namely, time which is required for labeling and power consumption. Decreasing the required time will allow increasing the number of processed images, what in consequence will improve the quality of vehicle control. Lower power consumption will permit extending the usage of a vehicle.

In this paper, a method is proposed which decreases the time of serial and parallel implementation of labeling. The first part of the proposed method is converting an original image to a monochromatic picture. Other transformations, such as sharpening and change of colors intensity, are based on picture histogram. The testing and validation of image transformations are performed on exemplary images with different vehicles, using both CPU and GPU processing. For both serial and parallel labeling, the same artificial neural network is used. Preliminary results show promising improvements of both the performance and energy consumption when performing labeling, without a noticeable loss of its quality.

Keywords: image processing, energy consumption, automatic labeling.