Benefits of high-performance video processing technology

For various traffic applications, images of cars are taken with the purpose of identifying them using the information on the license plate. In access control situations, gates automatically open where entrance, payment and exit can be matched. Speeding tickets are issued based on the pictures. And for road user charging, the video is used as enforcement or to charge the road users.

With this in mind, the importance and expectations of the automatic handling quality have dramatically increased. Identifying their origins leads us to the various image processing technologies that can fulfill these needs.

Handling the pictures automatically reduces the operational cost for identification. This is mainly beneficial to enforcement and tolling systems, where millions of images may need to be processed daily. Security, travel time and parking applications also benefit from an instant identification process, where both the traffic flow and user experience are affected.

Quality control

Amongst others, quality of identification can be expressed in terms of the percentage of images being processed automatically, the part of these processed images being identified correctly, and the time needed to fulfill the processing task. This quality is a product of the quality of the acquisition – for instance, the resolution, sharpness and contrast – as well as the processes and software used to handle the acquired footage.

Given a video stream of particular quality, the characteristics of the outcome are still a trade-off between the amount of video handled correctly and the errors made. For tolling and enforcement applications, such errors imply additional costs and a possible threat to public opinion and acceptance. On the other hand, for tolling back offices, the operational costs grow almost linear with the images that are handled automatically. Finally, any unread in access control applications will frustrate automatic matching and, therefore also the traffic flow, as gates will not open immediately.

As such, moving from a ‘nice to have’ additional feature, automatic license plate recognition (ALPR) has become a key part of our everyday business. As a result, the requirements expected of the automatic handling have also increased. Improvements on the acquisition side go hand in hand with the software making use of these improvements.

Software solutions

Software may support the identification process in various ways. The most prominent technology is optical character recognition (OCR), which automatically reads registration numbers of passing vehicles – what we refer to as ALPR.

Alternatively, the software can match passing cars with a previous observation using their environment-independent visual characteristics, also referred to as the vehicle fingerprint. This enables the automatic identification of vehicles that for whatever reason could not be read through ALPR – such as fixed objects (e.g. tow bars) partially occluding the license plate.

Well-designed working processes can further enhance the identification quality, where they smartly weave the above-mentioned software modules with the possibility of manual review into an effective workflow.

With the various Intrada variants, such as Intrada VSR and Intrada Synergy, Q-Free offers software solutions that address the specific needs of the different traffic domains. For the environmental zone in the Netherlands, for instance, 95% of the images are handled automatically, with less than 0.02% errors. In the Stockholm Congestion Charging system, Intrada ALPR and a fully tuned workflow on the images from front and rear cameras enable the automatic handling of 96% of all vehicles with an error rate of less than 0.01%.

With a growing dependency on identification with video, the demands on the corresponding processes and software have increased. With Intrada technology, Q-Free can supply a solution that fits the high needs of the specific domain within various markets.

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