



Artificial neural networks-based OCR

In the traffic sector, almost any company that develops software may at some stage require ALPR technology. This encompasses companies offering software for tolling, truck weighing, network video recorder (NVR) applications, police authorities, city councils, and more. Perhaps as a consequence of the wide scope of ITS tasks that ALPR is used for, the marketplace is awash with vendors offering various solutions. The variety of options to consider when first investing in ALPR solutions can be bewildering, so it helps to get some expert advice.

At the heart of any ALPR system is the OCR software engine. You can have state-of-the-art image capture – the latest cameras, illuminators, etc – but unless the software engine that's processing those images is effective and reliable, your system is as good as useless.

A number of companies are marketing ALPR software engines, either as part of a full

Need to know?

The use of proprietary neuronal technology to create advanced ALPR engines

- > Expert assistance on ALPR systems from computer vision specialists
- > How neuronal technology contributes to effectively read license plates
- > Helping software companies with vertical solutions get into the ALPR sector without any stress
- > How these ALPR engines are being deployed in the real world

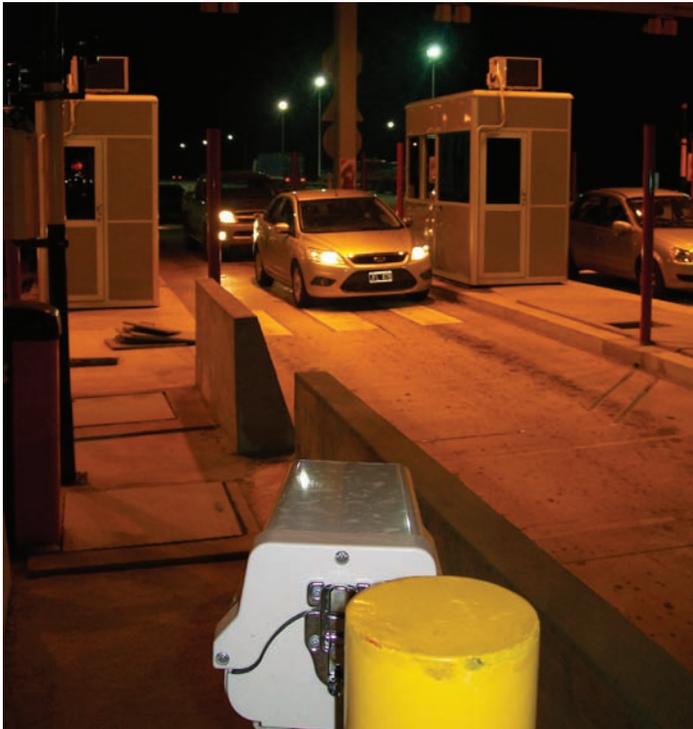
ALPR system or as an individual component of a pick-and-mix approach – but very few of these companies offer as much experience and expertise as the Barcelona-based Neural Labs.



The company was founded in 2005 by computer vision experts Elías Valcárcel Torres and Jesús de la Calle Ordeza. The founders share 15 years of experience in recognition

software (not only for license plate recognition but also for applications such as container ID recognition) including being involved with Spain's first ever ALPR systems. They had worked in full ALPR systems before seeing a gap in the market for a sustained focus on the computer vision and neuronal network segment of an ALPR system – the engine. They identified a need to offer tools to enable companies that are new to the ALPR sphere to enter this world quickly and hassle-free. Testing specialist TÜV Rheinland Iberica, for example, needed to include ALPR in its vehicle-inspection software to meet Spanish law requirements, so Neural Labs provided its ALPR engine and TÜV used Axis cameras to incorporate the engine into its vehicle-inspection software.

Using proprietary neuronal technology, Neural Labs' ALPR engines perform extraction of the license plate information



from an image using a number of techniques – including image processing, image analysis, and artificial intelligence – to create what is known as ‘artificial neuronal networks’.

The company’s main USP is that its engines are not hardware-dependent and work with all of the main types of cameras found within the ITS market, such as those from IDS, JAI, Sony, Axis, and Mobotix to name but a few. This is a real selling point for those customers looking to gain license plate recognition functionality, as all

they have to do is combine the Neural Labs engine with their existing, off-the-shelf camera hardware. Naturally, the company also offers unbiased advice about what camera hardware works best for any given task. As clients typically have a vertical solution requiring ALPR capability in their software, Neural Labs works alongside them to guide them as to which cameras are a good fit for ALPR, where to buy them, how to set them up, and even how to design specific solutions.

Neural Labs prides itself on responding to customer demands with an appropriate technical solution. One client, for instance, needed to read more than two license plates in one image, so a software engine was developed that can now read up to eight plates in one image. Similarly, another client needed to conduct ALPR in-vehicle, day and night, without any illumination at all. The software copes admirably with this challenging condition, which well reflects Neural Labs’ unofficial tagline ‘If you can see the license plate, our engine will read it’. And as Neural Labs owns all of its technology, it’s also easier for it to tailor software to meet specific situations, the knock-on effect of which is that continual development and modification results in even better engines.

Satisfied customers

For 99% of the software licenses sold by Neural Labs, the company has no idea where the technology is ultimately deployed, either due to badge engineering, confidentiality agreements or the fact the software is discreetly integrated into an end system without users even being aware of the engine supplier. Despite this, Neural Labs has a number of interesting case studies that showcase exactly how these engines are being deployed.

A toll road in Ecuador, for example, needed to implement an ALPR system to prevent

fraudulent activity occurring within a clearing system between three toll bridges. The clearing system grants free access at the second bridge for a certain amount of time to those vehicles that paid at the first toll bridge. With the ALPR system implemented by Telectrónica and the NeuralLabs ALPR engine, the operator can verify at the second toll bridge that the fee was paid at the first by correlating the license plate reads in both cases. Sixteen toll lanes are now outfitted with this ALPR solution.

Telectrónica and Neural Labs also put their technologies to work on a toll road in Argentina. Under the country’s law, motorway concessionaires are obliged to register the license plates of all the vehicles traveling across their toll bridges. Telectrónica’s automated system complies with this with a performance rate of 99% by using the NeuralLabs ALPR engine. This specific concessionaire company now has 20 lanes with the ALPR system installed and working.

Aside from toll roads, Neural Labs has also sold software licenses to 30 countries across the world, where the engines are used for access control, security applications, law enforcement, traffic signal control, and more.

Despite such success, Neural Labs’ founders are eager to bring ever more advanced offerings to the market and will keep improving the existing range as well as launch new solutions, including an embedded engine that represents a cost-effective solution to process one camera and send results to an application running on a server. Another development will also bring together its object-tracking and ALPR technologies into one single traffic engine. ○



(Main, opposite and above) Toll plazas rely on ALPR (Left) Neural Labs technology is behind a variety of ALPR systems for different applications

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