Interview with the Entrepreneur - Florian Seitner

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This column presents an interview with Dr. Florian Seitner (pictured in Figure 1), CEO of emotion3D, which is headquartered in Vienna, Austria.

What does emotion3D do?

Emotion3D specializes in software and algorithms for camera-based in-car "vehicle intelligence" safety and user experience applications. Our vision is to become THE one-stop shop for people who build intelligent cars and need to know what's going on inside them.

How is in-car "vehicle intelligence" different from ADAS?

Many of your readers will already be familiar with automatic driver assistance systems (ADAS) that use cameras and other sensors outside the vehicle, as cars become increasingly smart and autonomous; however, there is also a fast growing market for sensing the environment *within* the car, such as detecting automatically if a driver is drowsy or recognizing the positions of people and objects, so that airbags can be deployed in the safest way possible. For example, considering the occupants' head positions and by differentiating between babies, children, or adults. A future vision is to manage the hand-over between manual and semiautonomous driving modes, so that the car knows the state of the driver (e.g., sleeping, talking, reading) and how quickly she might be able to take over the controls if needed.

When can we expect to start seeing this in new cars?

The safety aspect is currently strongly driven by various safety regulations that stipulate in-car monitoring, in a way that can only be satisfied by camera-based systems. However, once the camera systems are installed within the vehicle, other applications can be built on top of the same computing infrastructure and three-dimensional (3-D) vision algorithms. These include "user experience" (UX) features, such as automatically adjusting the seat position, mirrors, and air conditioning vents to fit the individual based on her exact dimensions and position within the car. UX applications such as these

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Figure 1. emotion3D's CEO Dr. Florian Seitner (left) alongside his CTO Dr. Michael Hödlmoser (right). Photo courtesy of emotion3D GmbH.

can serve as differentiators between models or be sold as add-ons... one day there might even be an App Store for cars!

Tell me about the Technology

We have invested several man-decades developing a highly-specialized software stack that lies at the intersection of embedded systems, deep learning, and automotive domain expertise.

Our technology is a multilayer architecture that goes from images to end-user applications. On the bottom layer are deep learning algorithms for pixel-level image analysis that are optimized to run on low-resource processing platforms common to the automotive industry. Computational models deliver low-level features to the next layer, which identifies key structural features, such as the location of body joints, the head pose, and the driver's hand and eye orientations. These can be exploited for multiple top-level applications, such as drowsiness detection, either using our off-the-shelf, or custom-built modules.

What's your Product?

The product is a software development kit (SDK) comprising analytical modules for camera-based 3D understanding of the car interior. We deliver patent-protected IP in the form of software binaries that can be integrated by our clients.

The bottom layer of the 3-level architecture is implemented in such a way that all features needed by subsequent layers are computed only once—which means that after the system is integrated, each additional application can be provided at minimal computational cost, but sold to the end-client at a significant margin.

What is your business model?

We are a "Tier 2" supplier to the automotive industry and operate a classic SDK model, namely with nonrecurring engineering costs charged to the client for customization and integration, then a license fee based on the volume of cars the modules ultimately appear in. This first part is important for two reasons: first, it allows us to get close to our customer early and validate demand as well as understand their priorities, and second, the time to market in the automotive industry can be long, so we are able to generate revenue early on, without waiting for the license revenues, which in many cases takes years—and not many small companies have the financial means for this.

Do you have any advice for first-time tech founders?

Focus, focus, focus! I would advise founders to start by specializing on one industry and customer group: find a niche you can dominate and where you can differentiate your product from competitors. A common error for tech entrepreneurs is to believe *a priori* that they understand what the customer needs—they do not! In contrast to my younger self, my motto now is "Let customer demand drive everything."

Tom Wilson is currently the Chief Technology Officer with Concured Ltd, Montréal, Canada. He was a shareholder in emotion3D from 2010 to 2015. Contact him at tomwilson@ieee.org.