

Why Shaping the Future of Mobility is a Triathlon

01/06/2019 Obtaining a Doctor of Philosophy (PhD) is like running a marathon: It is an endurance event that requires a lot of hard work, motivation and self-discipline.

At least, that is true for most doctoral students. For me, however, my PhD is more akin to a triathlon. It's not that one is easier than the other; it's more that they present different challenges. Doing my doctorate at University of Stuttgart in cooperation with Porsche AG, I compete in three disciplines: fundamental research, pre-development and innovation.

I have now been a PhD student at theInstitute for Systems Theory and Automatic Control for a little over two years. I split my time between the University of Stuttgart, where I carry out research on optimization algorithms and optimization-based control concepts, and thePorsche Development Centre Weissach, where I work on connected car technologies, automotive applications and in-car content.

My road to Porsche

To be honest, I am not one of those who have been dreaming about working at Porsche since they were a child. And I am not that much into cars. So, my road to Porsche was pretty winding: I obtained my bachelor's and master's degree in Engineering Cybernetics, specializing on systems and control theory, from the University of Stuttgart. Between my bachelor's and master's, I got a research scholarship and spent three months at the National University of Singapore, where I focused on cutting edge medical robotics. Then, I travelled the world as a backpacker for seven months. For my master's thesis, I spent a semester as a visiting student at the University of California San Diego.

Coming back to Germany, I was asking myself: What comes next? I was convinced to do my doctorate, but the traditional five years of theory, teaching and research at a university did not sound very appealing to me.That's when a former doctoral student and faculty colleague told me about the the possibility to obtain my PhD in cooperation with Porsche and encouraged me to apply for it. What intrigued me was not so much the fancy brand or the great sports cars—even though they're fun to drive. It was the possibility to work on the future of mobility, to use digital technologies and new concepts to bring innovations to the road, while doing fundamental research on the other hand.

And now, here I am, splitting my time into three:

1. Better research, better algorithms

I spend one to two days a week at university. My research sets out to assess a novel class of derivative-free optimization algorithms. These are inspired by natural phenomena like biological processes and evolution and play an increasingly central role in solving real-time decision-making problems that arise in engineering and control problems. As computational power continues to grow, so too will the usefulness of optimization algorithms and machine learning techniques. What I value about my time spent at university is that it allows me (i) to deepen my theoretical knowledge in cybernetics and mathematical optimization, (ii) to indulge in solitary intellectual work, (iii) to work closely with other academics, and (iv) to teach and supervise students.

2. Pre-development: Privacy by Design

Pre-development is an integral part in creating and optimizing vehicles, it's a mix of research and development. In Weissach, several teams are working on various new concepts and elements that will be ready for serial production in one to five years. In my work, I am focussing on how we can use the potential of machine learning while guaranteeing highest standards in data security. We are currently developing a new method for machine learning that inverts the traditionally used algorithms, so that the data used never leave the car and its owner, although the learning outcome is shared with the

fleet—Privacy by Design.

For those who are interested in this topic: My colleague Tobias Grosse-Puppendahl and I have already written a bit more in depth about innovation at Porsche—you can read the article here.

3. Innovation: AI for maximum customer experience

To find innovative solutions for the future of mobility, Porsche counts on cooperation—with partners, suppliers and startups. I am very glad that I am able to spend a third of my time with a true innovation project: Together with two startups, we are working on a new navigation solution that maximizes the Porsche driving experience. The Porsche spirit is not so much about simply getting from A to B, but rather lies in the drive itself. We'll leverage AI to empower our customers to have an even better experience on the road. I know this sounds tempting, but it's still top secret. So, stay tuned!

There is no "regular" working day for me—just like the three projects, every day is different and my tasks are very diversified. I love that about my job. I love that I am able to really dig into theory and research and, at the same time, get to know the business side and learn how to put innovation on the road. I love how this connection between University of Stuttgart and Porsche bridges the gap between theory and practice, between academia and industry. In my opinion, that is the basis for the sustainable future of mobility. I took part in many triathlons, so I know what it takes to reach this goal: a lot of staying power, motivation and discipline.

What is your heart beating for? Have you finished your studies and would like to join us as a doctoral student? We're always looking for new colleagueswho'd like to shape the future with us.

About Jan Feiling

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