

Ray Rogers:

I'm Ray Rogers. You're listening to Fix This—a podcast exploring tech ideas and solutions to some of today's largest challenges. Creating a greener world means that future generations can enjoy clean air, healthy crashing oceans, soaring trees, and a planet brimming with biodiversity. Part of achieving a sustainable future requires a dramatic reduction in greenhouse gas emissions by reducing fossil fuel consumption. Electric vehicles and appliances often rely on lithium-ion batteries for power, and they are far more sustainable for the Earth than their traditional fuel-combusting counterparts. Here's the catch: Batteries don't last forever, and it is an energy intensive process to build them. So, extending the life of batteries and ensuring that we get the most out of each and every one will move us even closer to achieving a net zero global emissions future.

Ray Rogers:

To dive into the world of batteries, I chatted with Dr. Stephan Rohr. He's the founder and co-CEO of TWAICE, a software technology company that uses artificial intelligence driven predictive analytics to increase the lifetime, efficiency, and sustainability of lithium-ion batteries. TWAICE's software can determine the condition and predict the aging and performance of these batteries, which in turn gives companies the insights needed to make battery systems even more effective and reliable. And with well-known customers, TWAICE is set to cause change at scale building on AWS. Here's my conversation with Stephan.

Dr. Stephan Rohr:

I'm Stephan, co-founder and managing director, co-CEO of TWAICE. And as an entrepreneur started TWAICE three years back.

Ray Rogers:

So why did you start TWAICE?

Dr. Stephan Rohr:

We need to electrify mobility, but also make our power supply greener. So in general, batteries are an enabling technology, but also an Achilles' heel to achieve this. There are currently still major challenges; complex systems of the battery, it's degrading, it's highly valuable. We saw this gap in the market, and during our PhDs decided to go off of that kind of problem and try to solve it. And we did our PhDs in this topic of a predictive analytics solution. We think it's a game changer to make the battery life cycle more efficient, more sustainable, and also in general, more profitable. That will also on the other hand help to accelerate the transition to electric mobility in green energy.

Ray Rogers:

How would you describe what TWAICE is and who is using the solution that you provide?

Dr. Stephan Rohr:

Here we have customers like for example, Daimler or Hero, and they use our software to find the right battery size, to find the right trade-off between driving range and charging speed, and the expected lifetime. They do this in a fast and very cost-efficient way. Then we have customers like Audi on the mobility side or Verbund, which is the biggest Austrian utility company, on the energy side. They use our

Amazon Web Services (AWS)

Fix This Podcast Transcript

#43 – TWAICE builds a greener world with lithium-ion batteries and predictive analytics

Published July 26, 2021

Page 1 of

4

software for the continuous data integration and physical machine learning based analytics services. They use solutions to optimize the warranty, or calculate or optimize the operation of the battery storage, for example. It's really about, on our side, helping our partners, our customers, to speed up the development, reduce the cost, reduce OPEX, and help them to increase the sales numbers by making the storage or the batteries in cars a little bit more cost efficient and profitable.

Ray Rogers:

Why batteries? Why were you studying them when you were getting your PhD? What about batteries most interested you and the co-founder?

Dr. Stephan Rohr:

Batteries are the technology which will enable electrified mobility. On the other hand, batteries will also help on the power supply side to store energy and enable more renewables, more solar, more wind power gets into the grid. But on the other hand, they degrade over time. So everyone knows that from your smartphone, right? After two years, the battery is dead and you have to replace it, but with such invaluable components it's very necessary to really analyze and simulate the lifetime in different scenarios, different use cases to make a proper development and also enable really a long, long usage and extended lifetime.

Ray Rogers:

What are some of the challenges currently facing companies who produce and rely on lithium ion batteries?

Dr. Stephan Rohr:

The challenge is that batteries are a very valuable component with very high complexity. It is due to the high value of the component, it adds additional cost per car, bus, energy storage. And a lot of challenges for companies is to really bring the costs down and be competitive with all the fossil fuel-driven applications. In general, battery technology is moving very fast. So what you can also see is that we have very fast innovation cycles. Additionally, I would say as it is very young and dynamic market, so all the players have to set up a very new supply chain in general, like from the battery production, the mining, which on the other hand also of course creates opportunities for also younger companies, but the whole market is not yet created.

Ray Rogers:

What types of metrics does TWAICE's software allow companies to monitor so that they're able to help address some of these challenges?

Dr. Stephan Rohr:

The core is not the monitoring by itself, but they're really making this data usable, which all batteries are generating, then run different analytics and simulation on top of it. So really bringing intelligence to the kind of battery data. And so it means you can get, for your batteries, you can control the health of the system in a very accurate and detailed way, the remaining lifetime outliers, but it also goes even further. You can track your warranties, warranty outliers, and you can manage your warranties. The whole simulation part also kicks in by simulating different battery sizes or different charging scenarios, which

also enables you to find the right battery size and the right application to really deliver products to the market with a long range, fast charge, and low costs. That is actually what we are combining with our software.

Ray Rogers:

Were companies able to track all of that previously or were they kind of operating just with assumptions?

Dr. Stephan Rohr:

It's a very unique solution to really cover the problems along the whole life cycle to bring the synergies of understanding the development of batteries and the end life of batteries. And so in general, it's very new to the market. Having said that—because most companies were focused the last couple of years on building the battery—we ourselves are really delivering an optimization and analytics software tool, to those companies to do that in a better and faster way.

Ray Rogers:

How are insights from TWAICE's predictive analytics helping other companies drive greener solutions?

Dr. Stephan Rohr:

We have various impact and direct impact, for example reducing the resources required over the whole battery life cycle. But on the other hand, it's also has very strong, indirect impact because it's really helping to make this whole battery life cycle more and more efficient so that you're not replacing a battery system when you run out of warranty, but it can be extended instead. For example, extend warranties by knowing what's the health and what is the remaining lifetime helps you to keep the batteries much longer. It helps indirectly to succeed as a whole industry.

Ray Rogers:

And would all of this be possible without AWS?

Dr. Stephan Rohr:

We use AWS services and features to, for example, run our machine learning models on Amazon SageMaker, which helps us to predict lifetime and also helps our customers for every battery system out there to leverage the insights and make a proper lifetime prediction. We are very flexible and of course having different cloud development kits provided from AWS to make, for example, the onboarding and the development time from our side much faster so we can really concentrate on our core, providing the analytics software in general.

Ray Rogers:

Looking forward, where do you think the battery market will go in the next 5-10 years? Will lithium-ion batteries still be the primary focus?

Dr. Stephan Rohr:

For my personal opinion, a hundred percent, that the most batteries are still powered with lithium-ion battery technology, but we will, of course, see a certain share of new cell chemistries, which pop up and are currently in development. But lithium-ion batteries are still very dominant. In general, I'm very convinced that especially for cars, but also for buses and so on, batteries are the way to go for the next five to 10 years to really make the mobility electrified.

Ray Rogers:

And as it relates to sustainability and predictive analytics, what excites you most?

Dr. Stephan Rohr:

It really excites us that we can build a game-changing battery software solution and help the whole industry to be faster and succeed the next five to 10 years to get to a CO2 emission-free future. And on the other hand, additionally, I would say we have a focus really on battery analytics solutions along the life cycle, but also for the two major industries, mobility and energy. And what we will see in what we already see is that both industries are really merging together. By delivering solutions for both industries, you generate more value for example, two grid applications, or second-life applications. And so helping these two major areas on the mobility and energy side to succeed the next 10 years, that's the task we took with TWAICE and why we founded the company.

Ray Rogers:

Since being founded three years ago, where is TWAICE today?

Dr. Stephan Rohr:

Since we have founded TWAICE, we emerged really as like the leading company in the battery analytics space. Now operating mainly in Germany in Europe, but currently also on the way to build a global company. So we have already, I would say emerged as a successful player, which helps those companies to succeed in the next couple of years in electrifying the mobility and also deploying energy storage to the grid.

Ray Rogers:

To discover more customer stories, be sure to check out our archives wherever you get your podcasts or visit us online at aws.amazon.com/fix-this-podcast. Thank you to our guest, Stephan. And thank you for tuning in. If you liked today's show, please remember to subscribe, rate, review, and share. We'll be here on the next one.