Kuehne+Nagel's **Inside Semicon**

Episode #4

Is Semicon driving the AI revolution?

Tom (00:04.056)

Welcome to our podcast series Inside Semicon. And in today's episode on AI, we are talking about the link to the Semicon industry and how it will affect us all moving

Tom & John (00:22.424)

Welcome back to episode number four of Inside Semicon. Good to have you here, John. Good to see you again. Thank you very much, Tom. It's great to be back for the episode. We're getting into it now and getting more into the series, but more into, how would I say, the more interesting elements of it how it affects our lives. Exactly. My name is Tom Mulders. I'm your host for the podcast today. We're here with John Desmond, the Vice President of High-Tech and Semicon within Kuehne+Nagel. Thank you very much, Tom.

Today we're going to be talking about AI. AI is a hype at the moment, right? Yeah, it's on everybody's lips. Exactly. I just want to start with some basics. John, explain to me what AI is. Well, AI, the words AI, short for Artificial Intelligence. And before people start thinking, it's the robots taking over the world, it's more of a, at this stage of the development.

It's how it's taking away mundane tasks. So you would have had this before, but because of the computing power, AI is now able to make real -time decisions and feedback real -time what's going on within your question. A classic example of that would be you can go to some websites and you can try on a pair of glasses. And in real time, you have the glasses on and you're holding up the phone and you move your head. The actual phone screen will show your head moving with the glasses on. The computing power for that is phenomenal, but that's AI actually interpreting your face. And as you rotate, and if your face is different, it's actually superimposing the glasses on your face with all its imperfections. So that's where we are with AI. You'd never have thought that that was possible. It's like a mission impossible, know, scene from Mission Impossible. Now you can wear glasses and suddenly it'll show you what you look like from the side, from the back, from the front and in real time processing this. So it's quite a powerful progression in terms of computing power. Yeah. How does that tie in with semiconductors and microchips then? The thing is that this is within the last, if I go back over my career, say 40 years, there's always something to drive the semiconductor industry. know, cars have remained the same, four wheels, brakes, seat belts, and there's been improvements

John (02:43.544)

but nothing really to drive the industry to show a paradigm shift in how it works. So back in the day you had, say the proliferation of mobile phones. So that was the first thing that drove semiconductors because in there you went from phone you pick up, you make a phone call and then there was, you know, wireless LAN was on it. Then there was Bluetooth and there was infrared. And then suddenly you could access the internet on it. So all of these needed different chips. Yeah. So to speak to drive this forward. And then after that, obviously you had memory because that's what was needed to access the data that we were pushing out. So we went from paper to storage devices. The storage devices were old storage devices which had mechanical mechanisms in there. On tape, real devices, you see it from the 60s. And then that migrated towards also semiconductor. So then you had SRAM, Static RAM, and Dynamic RAM. So then suddenly that was driving the whole industry. And then from there, we moved on then to where we are today, which the proliferation of devices in everything that we use. So we have, you know, washing machines through to cars, and then you have devices for converting analog to digital, facial recognition to digital, the back out to facial recognition, so then that drove it. And now we kind of have control over all those. We're increasing the speed, but actually there's nothing new is driving it. Now artificial intelligence has suddenly exploded because we're able to now utilize that.

We now have the ability to think how can we make a brain and how can this process information? So we've gone from serial processing, know, ones and zeros coming in in a line to now we're doing that in terms of four. So we're actually processing four different things in the same time it took one thing to process. So therefore that's now driving artificial intelligence and that's driving the chips. Yeah. Yeah. Just to recap there, a semiconductor for a normal process or for memory or whatever, right? That's a technical process of an AI chip, right? So as you said, an AI chip uses... Well, it has way more computing power due to the way that it works. Yeah, I think the best way would be if you compare it to say your body, your eyes would be the analog to digital converters. You see something, it converts it to what your brain can understand you know, and your hands and your fingers are all different elements, but they all work together. But, you know, as the brain gets more intelligent and can do more tasks and it's trained better, that's what we're now looking at with artificial intelligence. So all the other pieces coming together to actually allow the brain to process faster, work faster, think faster. And that's how it all kind of ties in. In terms of the semiconductor itself, you can use a conventional chip to train AI, for example, or to run AI, right? Is that purely the computing power or is it something else? It's something else. It's not about how much power you can give it. at the end of the day, it's symbiotic in that it does need power, obviously. But you have to think in a different methodology with regard to the AI because you have to teach it what is, say, a cat.

And then once you teach it what a cat is, there are different variants of cats, but then it has to know that a cat has four legs and a tail, but sort of a dog. So then it needs to understand that level of detail, but that's got to do with processing power. But it does have to take in all the inputs. So if you imagine it has one input for legs, one input for tail, one input for the body size. So therefore it's quite a larger chip is needed. And then that obviously then ties in to the brain say the processing chip, but that needs to actually understand that, you know, to have a cat, need this, this and this, but it could be a dog, it could be a mouse, you know, it could be many things with four legs and a tail. And that's where it has to learn. And that's what the processing power is. So you might have four or five or even six of these artificial intelligence chips processing millions of, I want to say gigabytes, probably cubits of data to understand what is a cat. But it learns from that then. Then once it has nail down what a cat is, then that's it. It moves on to the next learning process. So quite quickly and exponentially, not in terms of doubling, but exponentially it will grow and it will learn exponentially. So suddenly it

knows what a cat is and could take, say, you know, use an example, a week to learn what a cat is. But then it could take a day to learn what a dog is and it could take a few hours to learn what a cow is. But they all have four legs and a tail and a body.

So then suddenly then it's learning grows exponentially. And that's where as well people are questioning on the cap. You where do we cap this learning? At what point do we say it's learning too fast? And that's where we are now with some discussions. So it seems that the technological advancements in semiconductor manufacturing has led to this increase in computing power of these chips. And that has basically the advancements in AI too, right? Yeah, I mean, it's correct. It's like, again, I go to my box here as an example.

John (08:12.301)

So what I'm holding up here is some of the people might remember these, an old tape player. So he's asking, what has this got to do with AI? So this was the time when you would put a cassette in and you would hit the play button and you would stop it. And then after that, if you didn't like that song, you had to press forward and then try to get to the start of the song. So that's got an archaic piece of kit. However, what does the AI got to do with that? I can pick up my phone, tell the phone, you know, I want to hear the latest song by singer X or Y and straight away it'll bring up that song. Like that was not there 30 years ago. You you had to use your cassette player or, you know, your record player, for instance. That was a very analog way of working. But because of AI starting to understand, you know, the request, you know, like when you say Google take me home on your navigation, it understands home, but where's home? But you had to tell it where home was, but then it suddenly goes, ah, your home is at this location. And then when you get in to your car to come home, I get a message going, it's only 51 minutes to home. Like I didn't ask you to take me home, didn't want to know that, but it's learning your movement. So you can see how we've moved from something like an analog, you know, to pressing blade to suddenly artificial intelligence now understanding where you are, where you're living, where you're working, and it gives you all this information that you can then use. So this is continually being developed and the AI is continually learning more about you. The more data points it has from you, the more it learns about you. And that's a long way from a cassette player, which was, you know, all about music, because now it learns what music you want. So I have a Spotify account and it says, John, there's a new, you know, release from this person.

Did you know they're coming to your town near you? So it's learning what I'm actually interested in, what kind of music, and then recommends other bands and other concerts. And that's the way AI is going. So it can be a useful tool. Yeah. So how do you think AI has developed in the last, let's say, two years? In two years, it's again, it's been an exponential growth. If I look at something, you know, like which I used to read, take out one of my old books here, which was like, I used to read this one, it's called Eagle from 1983 and it cost three pounds at the time. So I saved up my money and bought a three pound annual from Eagle. And in there you would have science fiction characters and what they were able to do. And you look at where it is now and what was science fiction 40 years ago you know, when I was reading science fiction books and magazines is now science fact today. Yeah. think one of the easiest ones I used was Captain Kirk from Star Trek walking around with his iPad. Now, we now know it as an iPad, but when you first saw it, you're like, this is amazing. He has a piece of kit that he has in his hand and he can write on it, but it's not ink from a biro. And then he hands it off to a guru or whoever. And then all the information is there or he'll pick it up and ask for something to be displayed.

It's there. It was magic. That's an iPad nowadays. So the science fiction of yesterday is a science fact of today. But where it's going is, yeah, I think that's probably something we'll have to look into as well because maybe later on at the end of the podcast, we can have a kind of a crystal ball moment. But while we're setting up for that, it's just to show where we've gone to and where we are. And I think that kicks into, you where did the artificial intelligence start? So we show them where it started, but to know where it's going and how it will impact us, you have to look at two aspects. So one would be, we discussed earlier that the chips, this is going to drive the next chips. Nvidia at the moment is the leader on this, but we do see other countries investing heavily on these artificial intelligence chips because they can do so much and they can be used for good and for bad. I mean, if it is that good, then can it break?

Can it break security? Can it break passwords? So I was reading in one of the engineering magazines that the NSA, for instance, is now suddenly looking at developing anti -AI passcodes because it can break it in a couple of seconds that a normal computer would take thousands of years. So we're not at that stage, but we have to prepare for it. And that's one of the reasons why to understand what it is and what it can do, you have to go back to say the Turing test.

Tom & John (13:02.926)

Right. Explain to me what the Turing test is. So in the sixties in the UK, was a scientist at a Turing designed a test to understand when would artificial intelligence stop being artificial and being intelligent. So he would ask you questions and there's a number of rules around this and I won't go into it because it's a bit long and a bit boring, but if you want to read up on it, then you can. But he designed these tests that was being asked of computers at the and if they passed, then they were considered to be intelligent and not dumb machines. I think, again, there actually has been one machine. I forget the name from Google. Maybe some of the people can put in the comment what the name of the particular device was, but I think it's in 2021, it passed this test. And if you want to kind of understand this test more, you one of the great books I read was by an author called Philip K. Dick, who wrote the, do androids dream of electric sheep, which was later converted into Blade Runner. And in Blade Runner, when he's asking Rachel, I'm a bit of a geek because I know all these names on top of my head. But when he was asking the Android, the replicant, you know, trying to figure out was she or was she not, an Android, then he would ask her questions. And in the book that was called the Van Mark, the VM, you know which is basically roughly around the turin test. He was trying to understand was she a robot or was she real by asking her a series of questions. And that's kind of where we've, you know, we've come to today. So now we have the first one from Google that has passed that. So now that it has passed it, then you kind of have to wonder, well, what's next? And that's quite a crystal ball moment to understand. But it is helping to, you know, to take over a lot of the mundane tasks that are going on, especially with regard not marketing per say, but with regard to website management, it'll understand what you want to push out, when you want to push out. So you can automate a lot more features. And even, think they are now trying to get one like based on the Hitchhiker's Guide to the Galaxy where you had babblefish. It could translate in real time, but in the book you had to put a fish in your ear and no matter what language you heard, put it into English, but now you can speak into your phone and in real time it should allow you to have a conversation with someone in Spanish or Italian and then it will convert to them and then you can actually read what they're saying and then you speak and then it'll convert to them. So that's the way it's going. That's how it's going to help communications, especially. Yeah. And just to bring it back to logistics and the industry that we're in, how are logistics companies using AI? So one of the ways that we can use that especially is data crunching really. It's been able to, you

a multitude of information coming in from another multitude of sources. So if you look at pricing, if you're looking at, know, how do we move something from A to B, you know, it will allow us to actually perform these calculations faster and quicker. And it will hopefully assist us there to know what's the best way or give us an alternative that we would never have thought about. So from that point of view, it can automate a lot of the tasks. It can also analyze.

So like I mentioned earlier with Google, it'll say, you you're going from A to B. When you arrive at B, it then tells you the fastest route home is 53 minutes. So it could be that we ask it to move a container from A to B and then it will itself say, if you move the container back this route, you know, then it'll get there faster. But then we wouldn't have had to put a person on to research or to look at how we can move these containers around, but also for flights, for road it can actually take all of the different inputs and then suddenly come up with scenarios that we wouldn't have thought about or scenarios so quick that then we're able to provide this to customers, you know, without even having to go into a spreadsheet or another program. Yeah, I think we use it for route planning and for preventive actions. For example, when a container or shipment is on route, something happens, right? And then there's artificial intelligence basically advise the operator, okay, this and that is what you should do, this and that is the best option at the moment, right? Yeah, that's correct. think on those two, especially, we will be using more of it. And I think as it gets more intelligent and as we feed it more information, because at the end of the day, we still have to tell it what to expect. You know, somebody has to kind of guide it. It can then learn from there, but it's that base, you know, the basics it needs to understand of the questions, you know, like, you what is a cat? You can ask it that, but if it doesn't know what a cat is, it's not going to learn what a cat is. So you still need somebody to help it along the way. And I think that's where we are at the moment. And when it gets further, could it learn what a cat is itself? I mean, yeah, maybe. And that's something for the future we have to look into, but it's definitely something that needs to be driven, but needs to be monitored as well, because who knows, maybe you might think a cat is a cow and a cow is a giraffe. But we need to understand that as well. But that's something which is also exciting because it means you're dealing with something that could eventually think for itself, but then think the wrong things because it doesn't have the proper guidance. Yeah. think AI is, well, the semiconductor itself is just a supercomputer with amazing computing power. But in the end, as you said, it's up to us to basically guide and train it in a way that we want to use it. like with Boston Dynamics, know, they have the famous dog that they try to knock over. They have robots used for lifting, you know, heavy, repetitive, you know, motions. You know, and all this kind of ties into how fast they can process the environment around it, which is AI. Well, what I found really interesting was how Nvidia actually developed their own AI model, right, to help their own production process become more efficient. So they're using their own chips that they're producing, right? Running their own model to improve their own production and manufacturing. that's scary because it's robots building robots. Exactly. Exactly. That was mind blowing to me. Yeah, because I think that was again like going back to the books I was reading as young. was an author Isaac Asimov who actually have this DVD called iRobot from Will Smith actually, he stars in it, but it's based on one of Isaac Asimov's books. And he has a multitude of books on robots, but he comes at artificial intelligence from a different point of view in that he only has three basic rules. you know, I won't go into the rules here, but he has three basic rules. That means that there's always a failsafe. So when robots start building robots, there's always a failsafe for that.

John (20:20.01)

Again, we're probably a bit far away from that. mean, right now, logistically, how we utilize the AI, how we improve upon it and what we use it to do tasks. So like I said, the mundane tasks of constantly monitoring price watches, constantly providing feedbacks. So that if there is a change in

the market, then it doesn't need, say, you or I to pick up the phone, it can just be an automated message to another automated message on the customer side that will then send a flag to a real time person to say, you know, this has changed or this or that has changed or there's a problem on this route. And then, you know, we can then step in without having to waste so much time, you know, calling and ringing, you know, different people. And maybe they're on holidays or they're out or they're in a meeting. And that delay should be reduced significantly. Yeah, that brings us to the people aspect of AI and the growing technology.

A lot of people are, I don't know, maybe a little bit concerned about, okay, what does this mean for my future? What does it mean for my job, maybe? What do you think? Do you think it's going to fully replace certain jobs or? No, well, this is something actually that goes back to the invention of the, I think it was the wheat thresher in 1800s and it was a group called the Luddites and they were anti - technology. So they considered a wheat thresher to be

Yeah. And it was the worst thing that could ever happen to people because this was going to replace everybody's job. know, so the people that were out in the field cutting the wheat and then threshing it, then this wheat thresher came along and then suddenly you didn't need a wheat thresher, but then that person was cutting the wheat. So, and as you go through history, you'll see that, you know, there was always the case of, it's going to replace us. It'll do this. It just means that we didn't have to rethink where we want to put our abilities in terms of on the process where we can use better. I mean, the same with automation in the cars. So yes, there was an element that we didn't need people to put the windscreens on that was done by robots, but then the quality aspect had to come up because then you had to have a better quality control. And those people would put the work elsewhere on jobs that the robots at the time could not do because they were only decided to put on the door, put on the wall, but they would know where they put it on correctly or within the tolerance.

John (22:46.254)

They could be guided, but you know, there's something that only the human eye could see if there was something in the way. So we continually evolved. The question is over the last 40 years of my life, it's always been, it's going to replace us. But yet I still haven't seen anybody being replaced by anything. It just means that we take on the jobs that the robots can't do. And these jobs usually end up making the product safer. There's more quality controls, more quality checks. So.

I think even with the autonomous driving, you know, I think it's in Australia and some parts of the US where the truck is driving autonomously, but it still does have a driver in there. So when it gets to the end of the long stretch of road, the driver will take over because there's too many influences that can cause the AI that can't learn fast enough. And that's the conversation we had earlier about the car was at the railway crossing and then it sees a lot of cars. And then after five or six minutes, it realizes it's the train. Now it did learn that's great. But if you were in a car and you weren't paying attention and it thought, it's just cars. I can see a space. I'm going to drive through. It might try to get through the cars, but actually it's a train. So again, you I don't think it'll replace. I think it will help and it will get rid of the mundane aspects, So it's some very interesting developments there. Looking into the further into the future, what do you think is going to change in terms of Semicon? I think this is the next item that will drive Semicon beyond, well, again, Moore's law, but that's that is coming to the end in terms of materials because they're now looking at going from silicon to glass, but that won't happen for a number of years.

But what it will do is that the AI will actually drive the chips and the chips will now start going into everything. I mean, there'll be more of them used, so we'll have to ship more of them. The materials being used again, more of that. But they're bigger, so supply chains will have to change. How we handle them will have to change. So all of this is stuff that we need to learn. From a semiconductor point of view, it means that there's going to be a bigger focus we may have specialized AI production going on. So we have to see the processors or the analog devices or the AD converters or the power chips. But this is a new chip that we will have to learn what's the best way to move it, to ship it, how do we handle it, what products it's going to. But on the flip side, then you also have to think, well, since this is going to be going into, let's say, a washing machine, how does the design of the washing machine still look? Yeah, you will have your drum when you're cleaning your water, but does it need to be bigger? Does it need to have a bigger range of Wi -Fi? So there are impacts to come. But definitely it's going to drive us, I think, in a direction where production, mass production, will have to be the first. And then after mass production is done, then we see the fallout, not so much fallout, but the impact to the rest of the industry in terms of electronics and what it can do.

If this is able to say be integrated into an autonomous driving vehicle, then obviously the engineering of that has to change as well. So then how much power does it take? So there is, it will be a catalyst for more to come. And in two years, I think we'll probably see that catalyst come into reality, but we don't know what it is right now. Yeah. Very interesting. Thanks for sharing your thoughts on that. So just to recap, I think we've covered what AI is in general how the semiconductor industry has advanced those AI growth in general. And I think we've also talked about how we're using AI, how our customers are using AI. Is there anything else that you'd like to share on this? No, I just think that we're now at the cusp of a new arena.

I that there will be certain words will come out. Like we always have Moore's law. We always reference that with semiconductor, but I think with AI, we're going to have some new and interesting words coming out. And I think that will probably supposition itself with the likes of quantum computing. So I think there is something that when you put those two together, you're going to have a complete, you know, new, so animal, so to speak, to deal with, because then you're going to have, you know, really huge computing power with huge intelligence.

Tom & John (27:33.538)

So I think quantum computing will be used a lot more. Maybe that's something for a future podcast. How does quantum computer affect semiconductors? How does it affect what we do and how we're doing at the moment? But I think going forward, that whole element on quantum computing tied in with artificial intelligence and silicon will be driving that. But then obviously there's new materials coming out. So I think in the future is going to be an interesting space to watch because we've come to the end of the road semiconductors in what we know about them. Yes, they're getting smaller, they're getting faster, which is good. But what's really going to take us to the next level? And I think that's where the AI element of it coupled with the quantum computing is going to drive us to the next paradigm shift in terms of semi -con. Yeah, it's going to be interesting to see how that develops. Definitely. And how it integrates into our lives. mean, just from what I've shown there, shown, you know, probably younger readers won't, you know, they would have the comics on them.

On the iPhone or on an e -reader. I have an e -reader on the Kindle. I've moved them all onto the Kindle. But you know, you have three things there. The DVD is no longer because you can now stream from Netflix. The paper, well, that's on the Kindle and the old cassette player there is being taken over. It's an app. app. If you think of that, that's amazing that a piece of equipment that size with that

amount of technology in it for its day has now been replaced by an app. Which is software. Which is software.

So you've now seen the migration of the physical into the virtual. So it kind of brings a whole new arena to what we're dealing with. So which is why semiconductors are so interesting and why they're working in the logistics of it is such an important aspect because just from those three items on the desk, you know, that can all be, and I have the iPad here on my right. So all those three are now on that iPad. I can probably get a couple of thousand, well, a couple of million songs but I don't own them because they're in the cloud. So that's a whole lot of discussion then, which is servers. So it's going, but you can see AI now will drive this significantly. John, thank you very much for coming today. Really enjoyed talking to you and hearing your thoughts about AI. I look forward to speaking to you next time. Until then Tom, we'll continue and we'll just keep monitoring the etherways for artificial intelligence and see where we go. Thanks very much for having me.