[Automatic captions by Autotekst using OpenAI Whisper V3. May contain recognition errors.]

[SPEAKER_02]
good morning everyone and happy new year good morning happy new year good morning daniel happy new year we are in the studio this morning with christopher leon welcome you are our guest of honor today thank you very much and also alvaro quiles which is the head of stavanger ai lab yeah thanks daniel for having me here but uh yeah almost for one year now time really flies

[SPEAKER_03]
It does, yes.

[SPEAKER_02]
And it's your first time in the studio, so welcome to you both.
Thank you very much.

[SPEAKER_01]
Thank you.

[SPEAKER_02]
Awesome.
So, Christopher, despite your last name, Leon, I was 100% sure that this was a Spanish guy that was coming.
So when I went into the reception area here, I said, good morning, and he replies in fluent Stavanger dialect, and I'm like, what the hell?
It just shattered my...
shattered my image of what was going on because you're obviously spanish i am spanish um and so but leon i'm telling him he has some spanish nobility in him or something like that i've been meaning to do a dna test to see you know where my roots come from yeah you should definitely yeah
We could do an episode on DNA tests and AI.
That would be actually very interesting.
But we are here to talk about AI in maritime applications.
So would you please tell us a little bit about, because you work in Oceaneering, the name is quite fitting for maritime applications.
Could you tell us a little bit about what you do in Oceaneering?

[SPEAKER_03]
Absolutely.
So Oceaneering as a company is a mix between ocean and engineering.
It's a diving company from the 60s that developed into a technology and engineering company that has, you know, moved out of traditional diving underwater in harsh environments to developing robotic systems and operating, you know, at deeper, harsher levels through these remotely operated vehicles.
The business has evolved over many, many years out of RVs and into aerospace and defense and everything you can think of.

Every Tesla and Porsche today is built with an Oceaneering automated guided vehicle.
And we're an engineering powerhouse with a mix of innovative product design, but also operations and service delivery.
So myself, working in Oceaneering, I have the role as the strategic manager for our over-the-horizon operations.
which is the part of Oceaneering that takes the third evolution in our sort of diving services from the 60s, where we went out to the water with the humans and put robots in.
But now we're taking the humans completely out of the offshore field and operating these robots from the beach.
So we connect up to these ROVs.
They're big robots.
They're about the size of a van, actually, a lot bigger than people anticipate.
And we connect over satellite and 4G out to vessels and rigs all over the world, and we pilot them from the office, just like you would go to the office for any other office job.
So as strategic manager, it's my job to invest in core technologies, build out that product and service delivery and oceaneering, build out our onshore remote operations center network, which is these physical control rooms around the world where we actually do the operations,
and invest Oceaneering's capital in an R&D fashion to teams and methods and processes that we have aligned with our strategic goals, being electrification, automation, and remote operations of all of our products and services across all of our different industries.
So that ties really well into artificial intelligence because artificial intelligence has been one of the larger transitional tools that's come across our desks for a long time, actually.
And it's such a malleable technology that we can really work into a lot of our existing products and services, as well as use it as an accelerator to go even further and be even more visionary in our strategies.
So, you know, I have a sort of mix of responsibilities inside the company.
But I think artificial intelligence has made its way into almost every single one of them, actually.
So it's great to be here today.

[SPEAKER_02]
I mean, it's so cool.
Just the fusion between because we're sitting here, Alvaro representing academia and you represent the industry and me, the students.
And it's so cool to see the direct use of this technology.
And I mean, it's not just text written in a book.
It's something that's really, really useful.
Could you maybe dive into a little more?
So introduce us to the maritime sector.
What are the big challenges when you're operating in maritime environments?

[SPEAKER_03]
The list is very long.
What I like to tell people is that people think deep space is a difficult environment.
I would argue that the bottom of the ocean is just as harsh because you're operating at multiple hundreds of bar of pressure.

The pressure is absolutely immense.
There's no light.
There's no life.
There's no underwater 4G.
There's no connectivity underwater because of this attenuation in the salt water.
So it's a very difficult environment to operate in.
from a tangible perspective, we need to deliver perfect operations every single day to ensure that we deliver what we promised on and that our colleagues and our friends come home safely every single day from all the various jobs around the world, which is why the remote services business that I represent is so critical for a strategy because it's directly moving people out to the offshore environment.
But to look at a practical example of where we use artificial intelligence just this week is for the maintenance of our titanium robot arms.
It's a really important tool on the robots.
It allows us to interact with the subsea world through our robot arm.
We have two of them on each of our world-class RV systems.
And if they break down while you're at 3,000 meters of water depth, you have no choice but to take the entire system back onto deck
shut it all down, there's high voltage systems that need to be tagged out, there's hydraulic systems that need to be de-energized, they have to do all the maintenance.
So what we did this week is we took hundreds and hundreds and hundreds of pages of documentation of identified issues over years of operations,
PowerPoint slides from the manufacturers.
And we exposed this to a generative large language model and created an internal web application that our operators out in the field and our OROCs can use in real time to diagnose issues with our robot arms.
And it helps us do things faster, safer, diagnose issues before they become an operational problem.
And, you know, that's just a list of hundreds and hundreds of things that we've implemented just, you know, in the last 12 months from this week specifically.
So, yeah.

[SPEAKER_02]
That's awesome.
And these titanium armed robots, where are they?
Are they on the seabed?

[SPEAKER_03]
Yeah, so they're attached to the ROVs.
ROV stands for Remote Operated Vehicle.
It's basically a big flying car.
It's got thrusters on it, so you go underwater and you can fly around just like Iron Man would with his Iron Man suit.
And then the robot arms are attached to the front with a big suite of sensors.
You've got sonars, you've got cameras, you've got laser beams, all sorts of stuff to help the robot navigate and the operators understand their environment and situation.

and uh yeah it just sort of attests to the environment working in you know high energy high pressure high stakes as well in the oil and gas industry um there's there's uh it's it's it's a part of ocean airing's portfolio working for uh you know oil rigs and boats uh amongst other things and the day rates on a rig for example could be
millions of kroner hundreds of thousands of dollars if not you know a million dollars a day and if our robots are unable to deliver their services then that entire operation halts and that becomes a very expensive hiccup in our operations so it's uh it's high stakes everywhere

[SPEAKER_02]
That's so cool.
A little more money than we have on the line, Alvaro.

[SPEAKER_01]
Yeah, seems like it.
But if I may ask, so since I'm the AI guy with Stavanger iLab and so on, I'm actually quite interested in like the process of rolling out the AI kind of like tool that you were using in this context.
So could you elaborate a bit more on how was the rollout?
Did you try to prototype before?
Was this like a full scale, full blown or how did it work?

[SPEAKER_03]
Yeah, so we've got multiple flavors of AI that we've developed and deployed, all from easy administrative tasks in the company just to better organize ourselves, sharing information, finding information, consolidating information.
In that case, we've actually...
from an organisational standpoint, a utilised Microsoft co-pilot system internally in the Microsoft ecosystem through Teams and Outlook and the entire Microsoft 365 suite, which is fine for admin tasks, but that's a very difficult system to apply in very technical situations like our operations and our very specific niche applications.
So on that front, we have used all sorts of stuff.
OpenAI, the owners and operators of ChatGPT, they have healthy APIs on the back end that you can license out that we've integrated into our applications.
We have used GPT-4 models hosted in Azure servers around the world, for example, that we've created our own front ends for.
We've fine-tuned our own models, actually, with our own information, and we use a mix of vector databases for real-time
retrieval of data and injection context into the artificial language models, as well as contextual interfaces that, for example, in the robot arm example, lets you see a model of the robot arm in the same interface as the chat bot.
So you can click on specific components and that sort of informs the large language model that I'm here, I'm talking specifically about this valve with this part number at this pressure.
And that helps the AI sort of quickly drill into what the operator is actually looking for.
so and you know from a technical perspective deploying stuff into production is is a long process there's multiple barriers from risk mitigation security for example authentication api keys so we have a whole team you know we've got about right now on that specific module

about 10 developers who work specifically on productionizing our code that we've built in like our sandbox
where all the POCs come through and we do all our testing, maybe locally, before it stages up to them and they get it production-ready and deploy it to the entire company through our internal web application.

[SPEAKER_01]
Right.
So if I may ask another question, I was actually feeling that there's one thing that you were mentioning here, this context in particular and this injection of knowledge, of operator knowledge.
And that brings into the scene the name or the word data.
So how have you structured the data or how have you organized it such that you can use it in a, let's say, optimal way for all these models?
Because that seems to be quite hard for many companies nowadays and a big struggle.

[SPEAKER_03]
Yeah, what's nice about the way Oceaneering operates, how their business model works, is that we have a lot of very competent people.
Because we engineer the robots, for example, we manufacture them, we deploy them, and then we deliver the service.
We train up the pilots, and the pilots maintain the systems.
And then after many, many, many years, the robots are decommissioned by Oceaneering, and that's the whole life cycle.
So we have all the competency internally in our human organization to go and basically curate
very high quality data sets on the niche and technical sides of our operations and boil that down into basically situation by situation instruction sets that we give to different models in different contexts.
So from like a
very, very physical perspective or practical perspective.
That could be everything from, you know, just a text document where you pass a text document around a department and you get everyone to write in line by line, like all of the little secret niche things that they've learned over all the years, which is very sort of informal, but it gets a lot of information out of their heads and into a shared domain through the large language model.
But you could take in anything, you know, with multimodal large language models, you've got, you know, the ability to,
query everything from images to PDFs to comma-separated value files, CSV files, structured, unstructured data from anywhere, from just file repositories inside our servers or cloud repositories in OneDrive.
So it's very diverse.

[SPEAKER_02]
So what is your background?

[SPEAKER_03]

Myself?
You know, I'm just a jack of all trades.
You know, through Oceaneering, I've done a lot of things.
I was a technical supervisor for our offshore operations on the Norwegian Continental Shelf.
I've been offshore myself and piloted ROVs back in the day, which was like the operational and technical side of our operations.
And through migrating from my offshore role to my onshore role, I went all the way around Oceaneering and I did electrical engineering projects that ended up in the seabed, mechanical engineering projects that ended up in the seabed, software projects that ended up in the cloud and in production.
So I'm sort of like a quasi-engineer of all kinds of aspects, but really a master at nothing.
I work in a strategic role.
I need to know a little about a lot, but not specifically a lot about something.
That's so cool.

[SPEAKER_01]
I think that that's a really interesting perspective.
And I would actually like you to elaborate a bit more on, I think you were already hinting into it, but I feel like all this experience that you had from many different fields, how do you feel that it has shaped where you are today?
How are you bringing all of this into, say, for example, the implementation of AI, finding problems that AI can be used for?
Do you think that this has been useful and...

[SPEAKER_03]
I think it's been absolutely critical that I came into the company through the technical side.
You know, working as an RV pilot and working physically with these big mechatronic systems, you know, they weigh multiple tons in air.
It's everything from high voltage to fiber optic to hydraulics to mechanics, robotics.
And that, you know, after a couple of years working in these high stakes environments, it pressures you from a human biological perspective
to almost be able to look at a robotic system and see through it like a big x-ray going all the way through you can see inside the hydraulic pump you can see all the little pistons moving around how pressure is moving from one systems to other systems through filters and that insight uh you know is generic enough on these systems because you learn again like all these different sub aspects of of robotics you can apply it to anything
And then having that background and then being able to look at AI, for example, and knowing exactly all the different holes you can take this AI and plug it into to accelerate development or help with operational drawbacks, et cetera, et cetera.
I think it's been absolutely key.
So it's nice to have a strong technical background as well as a theoretical application to put on top of.

[SPEAKER_02]
I remember one of the first things, one of the first events I did in Stavanger AI Lab when I started about three years ago.

One of the things I learned was that the first thing you need if you're going to solve an AI problem is you need domain knowledge.
You need to know about the problem you're solving.
And that was that was it was it wasn't entirely obvious to me because I thought you just get a guy that can sit and hack away at a computer, a keyboard, and this guy will solve your AI, all your AI problems.
But of course, you need the domain knowledge.
So that sounds like you've you've gotten to build a very wide scope of knowledge, which that sounds incredible.
Yeah.

[SPEAKER_03]
Yeah, there's definitely a lot of training to be had internally in the company on specifically that topic.
Because, you know, artificial intelligence has become very, very hyped the last couple of years.
You know, it's all over the place.
ChatGPT has popularized it quite a bit in the last, you know, 24 months.
And everybody from your friends, your family, your uncle knows like kind of what it's about.
But there is a jump between that.
I think AI can solve all our problems to actually being able to technically understand how to apply that in your operations.
There is a migration there.
But I think more and more people are seeing the immense value add that comes from this kind of migration.
add into your operations and are taking the time to self-learn and to partner with universities, for example, which is what Oceaneering is doing, to spread information and knowledge both ways, in and out of academia.

[SPEAKER_01]
I might add into that that I definitely, I must say, first of all, that I definitely agree with Chris and Daniel here.
But I also have the same feeling that this, the key word here is this interdisciplinarity that we are bringing into play.
And I feel like it's especially important, as Chris was saying, what we see in SAIL is fruitful collaborations like those that are really relevant and lead to something good in terms of what we wish as an outcome is when technical people are really knowledgeable in what AI is capable of doing.
And people that really know their problems, really know what is exactly that it's failing here, what can I optimize, work together to reach a plausible solution for that problem.
That's a bit what Chris was depicting.
And I must say that I definitely agree.
But I actually find also interesting a bit.
So beyond this collaboration that Chris was mentioning, how do you see, Chris, in Oceaneering, for example, the adoption of AI?
So do you see that there is an increasing skepticism towards people that maybe are saying that the hype is not translated?

Or like the other way around, people that maybe in your company, as you're saying, with your exciting projects, you are now showing that, OK, we are going from hype to really realizing that this can be done in a feasible way.

[SPEAKER_03]
I think there's a bell curve.
I think there's a distribution of understandings of what AI is going to fundamentally do to your organization.
On the low end of the bell curve, there's people who just haven't been exposed to the possibilities, who haven't been indoctrinated through social media and through academia and that sort of stuff.
And that's on the low end.
On the high end of the bell curve, you've got people who...
don't understand from technical perspective how ai is applied so they they think that ai is this already super intelligent being that can navigate networks and can do stuff completely you know on its own fruition out of control and might modify things beyond human uh human interaction and and transparency
And then you've got the people in the middle who understand how it works, how it's contained, how the operations work.
And you're always going to see that kind of bell curve distribution in any kind of system.
But it's just about getting everybody trained up and understanding the reality of the technology.
It's absolutely fantastic, but it's not a magic wand.
You can just wave at anything and it's going to solve all your problems.
So it's a very interesting implementation problem.

[SPEAKER_02]
I need to jump on this possibility.
Alvaro probably knows what I'm going to talk about.
I'm a huge space nerd.
I founded this organization called UIS Aerospace here at the University of Stavanger, and we're now 90 members, and we're building a rocket that's going to space.
We're going to try to launch it into space.

[SPEAKER_03]
Nice.

[SPEAKER_02]
And I've always been really interested in the crossover between maritime and space, because like you're saying, maritime is a much more hostile environment in some cases.
In space, you have...
you have zero atmosphere.
And then down in the bottom of the ocean, you can have thousands of bars of pressure.
So could you say a little more about Oceaneering and the space branch?
Because you do have a space branch in Oceaneering.

[SPEAKER_03]

Absolutely.
I mean, again, Oceaneering is such a diverse company.
We ended up founding OSS, Oceaneering Space Systems Division, that sits in Houston.
We have an office on...
on Space Station Boulevard is the address of our office in Houston that does all of our space stuff.
And, you know, NASA astronauts on the International Space Station today, when they go out of the space station and do an external operation, when they're actually floating in space, They're usually doing maintenance on the outside of the space station.
That's with tools that Oceaneering have designed and delivered to NASA, to the space station.
Oceaneering employees are in the control center with NASA, assisting them and the astronauts with doing maintenance on the space station with our tools.
And if you go to our office in Houston, where our space systems division is, they've got a big glass atrium downstairs on the first floor where they've got about 40 years of NASA and space history in an indoor glass garden shed, in a sense.
We've got all of these pieces of aerospace history and technology laid out from cryogenic freezers that have been on the International Space Station for doing thermal testing.
to more mechanical systems, docking locks for locking modules and stuff to the outside of the space station.
Very, very cool, very diverse.
And we see a lot of interest now as space moves into this privatization period.
For the first time in human history, we're looking into in situ resource utilization on the moon, for example.
We're looking at a lunar gateway.
We're looking at asteroid mining.
And these are going to be private companies that are going to be leading these efforts and have been now through a lot of really fascinating companies out of the US, for example, privatized rocket industry.
And then Oceaneering is there, we're in the space, and we're taking a lot of our know-how from the sub-sub-robotics business, the harsh environment, the sort of salt, water, high energy stuff, and taking all that robustness know-how and putting that into our space systems division.
But also a lot of our
commercial know-how.
We have a lot of smart salespeople, commercial people, account directors working in our energy business that can directly help with the privatization effort in the space business.
Again, transfer of knowledge is another task that is perfect for large language models.
where you can create a big data set of reference information for how we structure our commercial contracts.
And then other sort of satellite divisions of Oceaneering that work in different industries that don't have any day-to-day overlap can access that knowledge internally in a way that is efficient and it's familiar.
Really cool, really cool.

[SPEAKER_02]
Fantastic.

Have you been to Houston, to the office?

[SPEAKER_03]
Yeah, yeah, loads of times.
I try to make a trip over there once a year just to meet everybody.
We've got offices in Houston, in town, for our main hub.
We've got the Space Systems Division, which is down by the NASA facility down the south of Houston.
We have an office as well in Louisiana as well.
It's a couple hours from Houston.
We do a lot of our manufacturing of big robot systems.
So it's almost like a conveyor belt of like five ton mechatronic systems going down, getting all their buoyancy and thrusters fit on high voltage systems.
So it's a really cool.

[SPEAKER_01]
But going back to the AI, I'm also really interested in the word transference of knowledge or how you were, in a way, mentioning.
So how do you feel, for example, do you think that the AI, in a way, things that you've learned to do and that work in the maritime side of things can be somehow transferred as well into the aerospace side?

[SPEAKER_03]
I think so, yeah.
It's...
It's very interesting.
I feel like from our perspective internally that that industry is going to need a couple more years to get all the gears running, all the privatization completely mainstream.
And transfer of knowledge is going to be the driving effort on that.
And I always tell my colleagues that I'm never going to die.
Because when I grow old, I'm going to clone my voice using AI.
And I'm going to take everything I've ever learned.
I'm going to put it into a large size model.
I'm going to host a web page with a photogrammetry scan of my head.
And people can just talk to me.
And it's going to feel like it's myself.
Because the large size model has captured my personality and my sort of semantic identity.
you know, little talky-talky niche things.
And that same kind of, you know, transfer from myself to a cloud happened from one part of an organization to another organization wing.

[SPEAKER_02]
That's a kind of creepy business idea.
You could have gravestones that have implemented AI and then you can go and talk to the dead people at the graveyard.

[SPEAKER_03]

We'll get on that.
Just after this podcast finishes, we'll put up a rough draft for a gravestone business.

[SPEAKER_02]
Good, I want 2%.
Yeah, sure.
If you have a large carry-on the next time you go to Houston, please put me in it with a little oxygen bottle or something.

[SPEAKER_00]
That'd be cool.

[SPEAKER_02]
That's really cool.
We have really a vibrant student scene here at the University of Stavanger.
And we have UIS Subsea, which make these rovers.
I'm sure you've
We've been in contact with them, probably.
And Ion Racing, which build race cars.
And then, of course, the fastest of them all, UIS Aerospace, which is making rockets.
And they've launched three rockets since it starts.
And now we are going to space, which
It would be really cool to hear your thoughts on the systems we're developing and stuff.
So we could talk about that afterwards.
Absolutely.
I'm really glad we could squeeze a little space in here.
I'm so happy.
I got chills when you were talking about all the space history, like 40 years of space history.

[SPEAKER_03]
That's so cool.
Oceaneering's slogan for many years has been oceaneering from sea to space.
Amazing, amazing.

[SPEAKER_02]
We have this project where we've been given some oil, some crude oil from Equinor.
And so when we're launching into space, it actually says Statoil because it's really old oil they got from one of the first fields.
And when we go to space, hopefully in 2026, we're going to take a little canister of oil and we're going to launch it into space.

[SPEAKER_00]
Nice.

[SPEAKER_02]
We thought we were original with that slogan, but apparently somebody thought of it first.
But yeah, cool.

One of the things I really find interesting about AI is that Norway is a small country, and we do have, if we're going to compete globally, we do have a manpower shortage, man and woman power shortage.
And how do you think AI could mitigate the fact that we have a manpower shortage here in Norway?

[SPEAKER_03]
It's really interesting.
I mean, you look at these big companies like OpenAI that are creating hyper data centers with hundreds of thousands of GPUs, and you're getting to a point where the model's becoming adaptable enough, smart enough, and the compute is becoming powerful enough that you might be able to look at substituting simpler administrative tasks
and transplanting that directly over to to a more independent artificial intelligence system, you know, maybe in the next couple of years.
I don't know what you think.

[SPEAKER_01]
So, well, I definitely agree here that it's in a way exciting, but at the same time, I personally feel that we are at an inflection point where many things are really insecure.
There's a lot of uncertainty as to where this is heading.
We saw, for example, I think it was yesterday, actually, from Meta on Facebook, this new announcement of, like, factuality-wise, that they will leave the population to decide what's actually real, what's not, in a way.
Yes.
And those are things that can be, from the perspective of many, perhaps controversial and not the right way.
So as I'm saying, it's a lot of, I think, uncertainty.
And maybe now the word regulations is when it really makes a lot of sense as to, okay, where are we heading?
What do we regulate?
Why?
But so how is oceanering maybe seeing the regulation side of AI?
Are you maybe moving in that direction as well internally or...?

[SPEAKER_03]
I mean, that's the big thing.
I mean, with so rapid developments, it's such a turnkey and disruptive technology.
There's so many moving balls.
And again, the epitome of sort of human organizational fallback is that we're just so many heads on this planet and it's very difficult to organize billions of people in a specific direction.
So, you know, Oceaneering, we have specific teams set out in our infrastructure team, our security team, whose only job is to try and capture and translate all of the existing guidelines for security, for deployments, for infrastructure into operations.
But it's changing fast.
I think it's got a long way to go for AI.
There's...

You see even OpenAI, for example, being another big player, initially starting the company as a nonprofit and just now pivoting their entire sort of mantra to becoming a private company, which kind of says a little bit about their perspective value creation that they're seeing in the technologies they're building and how they're gonna capture that moving forward.
It is a very interesting space for us as a company to follow and it's moving really fast.
If you look back 12 months from now, the entire scene was completely different.
So, you know, I wonder what the end of 2025 is going to look like.
Yeah.

[SPEAKER_01]
Actually, it sounds a bit old, but I recall when I started diving into AI, that was like around 10 years ago.
And by that time, no one actually knew what AI was.
We called it, the name was not AI itself, but rather pattern recognition, as in machine learning, if you were to be fancy about
at that point in time.
And now seeing it in perspective, as you were saying, it has really, the scene developed and changed.
It's just crazy in like the span of 10 years, seven years.
And basically I think the inflection point was ChatGPT.
And now my uncle is using AI.
My family as well is using AI.
So it's really crazy, but yeah.

[SPEAKER_02]
Could I have your predictions?
It doesn't have to be accurate, but where do you personally think we are in, say, 10 years?
Let's start with you, Chris.
Do you want me to start on that one?
With the experts sitting right next to us?
That's why you should start.

[SPEAKER_03]
I mean, I try to follow it as best I can.
Right now, I think there is a big energy problem.
You've had companies, not sure how much of this has actually made it to production, but you've got companies talking about
uh you know micro reactors that they're going to own or operate themselves just to power their data centers for all their gpus and there's there's big you know thermal like implications nuclear reactors potentially yeah there's a lot of power that needs to go into to just raw compute
so i think there's going to be like an arms race and i think a video is already on on creating uh just more efficient chips basically getting the same amount of processing power but in in in less wattage uh so it's gonna be interesting to see how that scales you know moore's law has been sort of our guiding uh sort of philosophy since computers were built but you can see just just the last couple years that entire foundation has kind of

melted away as we could have sort of hit the physical limitations of how small a transistor can be on a on a silicon disk i don't know 10 years is a long time so it's hard to put any predictions on it but it's uh it's going to be a very very influential technology in the next couple years definitely

[SPEAKER_02]
And what's Moore's law for the people listening that don't have a bachelor's degree in computer science?

[SPEAKER_03]
You've got to keep me right here, but it's that every X many years, the size of a transistor is going to, or the number of transistors you can fit onto a square centimeter or something is going to double or something like that.

[SPEAKER_02]
And what's the transistor?

[SPEAKER_03]
It is the tiny, tiny electrical gates that allow the processors in all of our smartphones and computers and the graphics cards that are powering these large-lang modules and AI to compute those ones and zeros that, through multiple layers of neural abstraction, become letters on a screen.

[SPEAKER_02]
So for the more spiritually inclined listeners, they're crystals, aren't they?

[SPEAKER_01]
Yes.
I think Chris would be a good fit as an assistant professor giving a lecture at some point.
Maybe we can talk about that.
I'm down.
I love this.
I love this so much.
Please invite me back.
Good explanations.
Now, but referring to the Daniel's question, I think, first of all, I agree with Chris.
It's a really tough question, especially seeing how things are developing and how fast they're developing.
And I'm not sure that anyone has an answer for that question, even those sitting at the top.
for many reasons.
But I personally, without really getting into what I would call controversial topics, I believe that or I want to think that rather than AI developing to, let's say, a point where we can't control the technology itself, we might come up with first ways that we can, in a way, reassure and make sure that we have a control over the technology and not the other way around.

And the other thing that I want to think is that the technology or pushing the frontiers of development, developing the technology, will at the same time push the frontiers of many other fields.
And that's related to what Chris was saying with energy.
Because I, for example, feel that that applies beyond energy.
And let's say it might apply as well to more on like the...
brain understanding, how our cognitive abilities work, even philosophically speaking, ethically speaking, historically speaking.
So I think there's many things that to push the frontiers of AI, one needs to incorporate.
And it's really becoming an interdisciplinary field.
Meaning that, for example, when we talk about artificial general intelligence, there's a broad definition of that out there.
And that, to me, only shows that we as humans, we don't have a common definition of what intelligence and what general intelligence is.
which is very interesting because then how can you ask and define a technology that has that intelligence when yourself don't have a clear idea of what defines that, right?
Or maybe many people have a different concept of it.
So I think it's a lot of interesting questions and a lot of things to understand, work on, and I think AI will help as well beyond the technology to that, or at least I want to think so.

[SPEAKER_02]
that's so cool i love those reflections and what a thing that i find really interesting is it seems as we evolve as humans the consequences of what we invent become just bigger and bigger and of course nuclear weapons were invented and that was that was um that was a turning point for humanity because suddenly the consequences of our actions become you know world spanning
And in the same way, AI will probably be even bigger than that if we can get past the not blowing ourselves up with nuclear weapons thing, which I think we should be able to manage.
But I really like what you're saying about that it's...
It's all about how we how we use the technology.
Right.
And and for every good thing you can use AI for, you can use it for bad things, too.
So that's sort of that's that's I guess where we're both academia and regulations and the private sector comes in to use AI responsibly.

[SPEAKER_03]
As I mentioned, on the grand scale, when you have this kind of disruptive technology, it's going to have implications, as I mentioned, on cultural levels.
But if we bring it all the way back to the other side, down to my world, where at the bottom of the ocean is dark, my dream, through our electrification, automation, remote operation mantra, is that we can get this compute to the edge on smaller devices, more energy-efficient devices,
So that instead of having to have a human being holding a joystick and flying a robot to a location and then using the robot arms to turn something or move something or cut something or weld something, we can offload all of that operational requirement just to a robot itself.

And on its own fruition, it can understand the environment around itself, make key strategic decisions.
on how it's going to do its operations, how it's going to execute using its sensors and its arms to both read and interact with the environment and allowing it to do so in a loop so we can just monitor it from a safe place onshore but you know have
Hundreds of robots sitting on the seabed, living on the seabed in a resident fashion.
They never come up.
They never come to breathe in a sense.
They just sit in their charging shells on the seabed and on demand based on a human command or a human input will go and dictate what they have to do, how, when, and then come back when they're done.
So this stuff is already possible today.
We have autonomous vehicles.
But a lot of these autonomous vehicles rely on millions of lines of code with hundreds of thousands of logically and sort of binary decisions.
If you see this, do that.
If that looks like a boulder, fly up.
But moving into more like an analog, neural-based intelligence for robots, I think is going to be an unlocking technology for a lot of new capabilities.

[SPEAKER_02]
The French word for boot is sabot.
And the word sabotage in English comes from the French word for boot, because during the Industrial Revolution, the workers would riot against these machines that were now stealing their jobs.
And they would throw their boots into it.

[SPEAKER_00]
Fascinating.

[SPEAKER_02]
So it became sabotage.
And do you think we'll have a similar thing with AI where people who sort of... Okay, you're mentioning these drone operators.
I am very sure that they will get other things to do, right?
Because as our knowledge evolves, the unknown also evolves.
But do you think that there will be...
Sort of a revolution where people who will be replaced by AI will sort of, I don't know, maybe they'll start throwing boots?

[SPEAKER_03]
That's an interesting question.
I mean, you talk about the industrial revolution.
You know, humanity has gone through many, many, many phases through our life on this planet where specific jobs have been created and cultural norms have been established you know amalgamated around specific necessities in cultural uh and societal um day-to-day life and that that evolves that evolves with our technology and evolves with with you know

our intelligence as a species and jobs you know what happened to the to the to the person who used to wake up at four o'clock in the morning to go light all of the lampposts with a little
whale oil lighter you know they invented electricity and you know that thing is that's a continuous part of our existence as humans is that we establish new systems new processes that make things redundant but also create new opportunities hopefully in the greater good of humanity yeah

[SPEAKER_02]
in in london they were called knocker uppers the really wake people up and and you also had the knocker upper for the knocker upper so you had a guy that needed needed to wake up the guy who's going to wake everyone up which is which is kind of interesting um are you uh alvaro you are you optimistic about the future do you think we will handle this new responsibility in a sensible way

[SPEAKER_01]
I am by design an optimistic person.
So I am optimistic.
As I said, my personal view, I do think and I hope that AI will indeed be used for the greater good.
And that entails that I feel like there needs to be a shift in mentality and in every kind of change socially wise.
I think that people need to understand, or some maybe see it before it happens, some others takes a bit longer.
But I think eventually this shift in mentality makes everyone see that as long as this is productive for humanity as a race, in a way, it's okay and we accept it.
But again, there will be changes socially wise, job wise, and so on.
In that regard, I'm positive.
So I think that AI will, of course, disrupt many job places.
But I think at the same time, I wish for a future in which an equal amount of jobs is created due to AI.
And that maybe means that we will, if not already, we will start soon seeing a new, let's say, wave of
specialized people, AI technicians, people that deal with how to structure the data, people that deal on how much quality does this data have, specialists that can inject this knowledge as well and understand that knowledge, or people that can even evaluate systems in a specific task that is very specialized.
So maybe you might have an engineer in the maritime sector, but maybe they don't do the job that they used to do.
They don't repair machines.
Rather, they repair data sources.
So I don't know.
It's a possibility.
But all I'm saying is that, again, it might require a shift in mentality.
But I think I see it positively.
And I hope I will be there to see this change and experience it myself.

[SPEAKER_02]
What about you, Chris?
Are you optimistic?

[SPEAKER_03]
Absolutely.
I think we're the same.
We have to be optimistic.
You know, there's no point not being optimistic.
You have to wake up every day and whatever function you have in your organization as a human or as a friend or as a family, you know, just in general.
Try to do everything you can to move things in a forward, positive direction.
And that's going to apply to any kind of disruptive technology.
You don't know, maybe in a couple of years, humanoid robotics, for example, takes off.
And that's another thing that's transplanting legacy workforce.
And it's inevitable.
It's better to try and be part of the flow and shape it in the way that you feel is morally and ethically correct than to just try to refute it and it's going to happen anyway.
So I think it's trying to be part of the solution, I think, is the answer.

[SPEAKER_02]
Awesome.
Well, I got to say, you are a fantastic representative and spokesperson for Oceaneering.
Thank you very much.
You're making me want to work there.
And that's not happened on that many occasions.

[SPEAKER_03]
So let me do a little plug on that.
That's my promo.
Is that, you know...
There's hundreds of thousands of companies like Oceaneering and we wouldn't exist without the smart people in the room.
We wouldn't exist without the visionary young people who just think just like us, the topics we've talked about today, that want to really contribute, build things, explore things, research things.
So if anybody is listening to this, I think that sounds like a good thing and that they want to be a part of,
Oceaneering is always hiring, and we have offices in 50 countries, so please come along.

[SPEAKER_02]
So where can people read more about Oceaneering?
Do you have a website?
We do.
Oceaneering.com.

[SPEAKER_03]

If you scroll down to the bottom, there's even an apply button.
Yeah, please use that.

[SPEAKER_02]
Well, awesome.
We are running out of time.
I want to thank you both so much for coming on here.
This was fun.
Let's do it again sometime.
Absolutely.
And to you listeners, a very happy new year, and we'll see you on the next one.

[SPEAKER_03]
Thank you very much.
Bye-bye.