Explainable Clinical Digital Twins: Simulating Drug Trials Before They Reach Patients Transcript

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Introductions and Guest Backgrounds

Good morning everybody. This is Signals Good morning everybody. This is Signals and Symptoms podcast. We are joining I'm and Symptoms podcast. We are joining I'm joining from Chicago. This is my joining from Chicago. This is my beautiful daughter Ira. We just came beautiful daughter Ira. We just came from vacation uh visiting Europe and uh from vacation uh visiting Europe and uh we had fun times at Disneyland in Paris we had fun times at Disneyland in Paris and Harris Harry Potter in London which and Harris Harry Potter in London which is interesting that how we are actually is interesting that how we are actually have to go all the way around the world.

have to go all the way around the world. Uh Harry Potter was very very Uh Harry Potter was very very interesting. I know I'm a big fan. Uh I interesting. I know I'm a big fan. Uh I know it's 25 years since the last time know it's 25 years since the last time you saw. I'm actually very grateful to you saw. I'm actually very grateful to my besties that are joining Harvey my besties that are joining Harvey Castro and Edward Marx. Uh as usual and Castro and Edward Marx. Uh as usual and then we are very honored to have our two then we are very honored to have our two guests that are here guests that are here uh and they are amazing work has been uh and they are amazing work has been done. So first I'm going to introduce a done. So first I'm going to introduce a little bit Dr. Da air. She he she could little bit Dr. Da air. She he she could actually of course given that I have actually of course given that I have been traveling there are no updates from been traveling there are no updates from the my side but we're going to go ahead the my side but we're going to go ahead and catch up on the next week. She has and catch up on the next week. She has done some amazing work. She's a director done some amazing work. She's a director of clinical AI internal medicine lead at of clinical AI internal medicine lead at at Zalenca and she is actually uh you at Zalenca and she is actually uh you know MRCP certified. Those who do not know MRCP certified. Those who do not know this is essentially uh residency know this is essentially uh residency pathway in United States when you do pathway in United States when you do your internal medicine and then go from your internal medicine and then go from there. uh she has been working on this there. uh she has been working on this amazing product from Janentech CDT amazing product from Janentech CDT clinical decision support but it uses clinical decision support but it uses digital twin the other counterpart that digital twin the other counterpart that is here is Dr. Mr. Amir Hashmi who comes is here is Dr. Mr. Amir Hashmi who comes from essentially a background of energy from essentially a background of energy and then has designed 400 megawatts of and then has designed 400 megawatts of energy solutions and now leading this energy solutions and now leading this effort. So which is interesting that effort. So which is interesting that there's an amazing cross-section over there's an amazing cross-section over here between how he is working through here between how he is working through the solute problems that he had in his the solute problems that he had in his prior life and now applying those prior life and now applying those principles on clinical medicine which is principles on clinical medicine which is always very interesting to us because uh always very interesting to us because uh as you know Edward uh Ed Marx is here as you know Edward uh Ed Marx is here who has been multiple uh different who has been multiple uh different solutions as board members in healthcare solutions as board members in healthcare and has always propagated that we need and has always propagated that we need to ensure that we bring all these to ensure that we bring all these intelligence from different areas into intelligence from different areas into healthcare and of course you know Harvey healthcare and of course you know Harvey Castro who's putting all these solutions Castro who's putting all these solutions in space now so again thank you so much in space now so again thank you so much for joining us uh Dr. Amir and Dr.

for joining us uh Dr. Amir and Dr. mayor. Uh and then um before we move mayor.

Why Digital Twins Matter in Healthcare

Uh and then um before we move into questions and everything, I would into questions and everything, I would really appreciate if you can do a better really appreciate if you can do a better job than me introducing yourselves

job than me introducing yourselves and your company.

and your company. >> Thank you very much. So I I can start. >> Thank you very much. So I I can start. So first of all, thank you very much So first of all, thank you very much once again for having us here. Uh we are once again for having us here. Uh we are also honored and um you know interesting also honored and um you know interesting uh profile. I'm actually a mechanical uh profile. I'm actually a mechanical engineer by profession.

engineer by profession. Uh but uh the the development is more in Uh but uh the the development is more in numerical techniques and uh later on numerical techniques and uh later on during my PhD I also employed that in during my PhD I also employed that in aerrow engine multiase flows. So it's aerrow engine multiase flows. So it's looks a little bit different but um if looks a little bit different but um if you are aware of mathematical modeling you are aware of mathematical modeling so this is what actually if you talk so this is what actually if you talk about the real simulation this is what about the real simulation this is what actually it is uh and that's why I was actually it is uh and that's why I was able to connect so briefly u after my able to connect so briefly u after my PhD I spent like four years in Saudi PhD I spent like four years in Saudi Arabia I was heading uh technical Arabia I was heading uh technical department projects department as well department projects department as well as business development as business development um for a local company who was very much um for a local company who was very much looking forward division 2020 at that looking forward division 2020 at that time and uh afterwards I joined GE first time and uh afterwards I joined GE first G power G power um there I was actually handling the um there I was actually handling the operations uh regional operations of operations uh regional operations of gastroin services and later on I gastroin services and later on I internally switched to GE distributed internally switched to GE distributed power which is now in your gener and power which is now in your gener and there's been about uh six seven years there's been about uh six seven years and um the last one and a half year um and um the last one and a half year um this is where after the advent of AI this is where after the advent of AI um um um uh I I could see that AI could play a uh I I could see that AI could play a very interesting role in in a digital very interesting role in in a digital twins and uh there were some very brief twins and uh there were some very brief let's say um sketches that I started to let's say um sketches that I started to do the complete system architecture how do the complete system architecture how a digital twin a journalized system we a digital twin a journalized system we can make and how AI can help so we are can make and how AI can help so we are using actually a configurator which we using actually a configurator which we call you know genesis. Genexis actually call you know genesis. Genexis actually comes from the word u or the sentence comes from the word u or the sentence let's say um journal engineering neural let's say um journal engineering neural enhanced um smart engineering systems or enhanced um smart engineering systems or smart industrial systems. So it's smart industrial systems. So it's background is industrial. Uh so the name background is industrial. Uh so the name is actually Genesis but then we replace is actually Genesis but then we replace SIS with XIX to avoid any copyright SIS with XIX to avoid any copyright issues and it's also good. that also um issues and it's also good. that also um matches well with with the company matches well with with the company excellence and um excellence and um so uh the first uh uh let's say uh so uh the first uh uh let's say uh things that I started doing I mean I I I things that I started doing I mean I I I let's say everything starts to go in the let's say everything starts to go in the right direction and this is where we right direction and this is where we thought June last year that we should thought June last year that we should have a company called excellence uh have a company called excellence uh because now because now um we need to make it more concretized.

um we need to make it more concretized. So that's more or less uh the So that's more or less uh the background. So the company you can call background. So the company you can call currently the headquarter is in calls currently the headquarter is in calls for but we have a company in America as for but we have a company in America as well and um yes um we'll talk more about well and um yes um we'll talk more about it. I'll now ask Dr. Da to also it. I'll now ask Dr. Da to also introduce herself.

introduce herself. >> Okay. First of all, thank you very much >> Okay. First of all, thank you very much for inviting us over. It it's truly a for inviting us over. It it's truly a pleasure uh to be with Brilliant Minds.

pleasure uh to be with Brilliant Minds. I've been following Ed Harro and Dr. I've been following Ed Harro and Dr. Jane from some time and you know it's Jane from some time and you know it's it's it's really wonderful having you it's it's really wonderful having you all uh here. So a little bit of my all uh here. So a little bit of my introduction uh by

profession I am an introduction uh by profession I am an internal medicine physician and I've internal medicine physician and I've been working for the last decade uh as been working for the last decade uh as an internist um like Dr. Jane introduced an internist um like Dr. Jane introduced that I've done MRCP UK and after that I that I've done MRCP UK and after that I was practicing independently was practicing independently [clears throat] [clears throat] [clears throat] having worked in the emergency ws having worked in the emergency ws critical care units be it ICUs critical critical care units be it ICUs critical care u you know departments and uh the care u you know departments and uh the medical ws I think it was a pretty medical ws I think it was a pretty roller coaster ride but yes the advent roller coaster ride but yes the advent of AI you know it it shifted us uh to of AI you know it it shifted us uh to that domain we are actually right now that domain we are actually right now but I think what brought me here in the but I think what brought me here in the world of AI I was the constant rigor you world of AI I was the constant rigor you know of how we can make medicine more know of how we can make medicine more safe more energetic and uh more safe more energetic and uh more concretize in terms of contextual concretize in terms of contextual reasoning. So that's how uh the the reasoning. So that's how uh the the concept of digital twins you know they concept of digital twins you know they they triggered us and uh that's how we they triggered us and uh that's how we just spent uh almost a year in the just spent uh almost a year in the developmental phase and now we are here developmental phase and now we are here uh with a product of its uh own. So this uh with a product of its uh own. So this is a brief introduction about myself is a brief introduction about myself here.

So amazing story both of you and uh very So amazing story both of you and uh very important um that I need to understand. important um that I need to understand.

I just want to be very careful out of a I just want to be very careful out of a things of uh save life AI which does a things of uh save life AI which does a lot of image analysis FDA approved lot of image analysis FDA approved products improving context through uh products improving context through uh ISAMD and then bolting it together. I ISAMD and then bolting it together. I believe the missing piece me personally believe the missing piece me personally and I'm very honest with everyone is uh and I'm very honest with everyone is uh digital twin and the benefit of digital digital twin and the benefit of digital twin as I understand it a little bit and twin as I understand it a little bit and I'm just again I need to understand it I'm just again I need to understand it much better and thank you for helping us much better and thank you for helping us and all of the ind our audience to and all of the ind our audience to understand it why digital twin in the understand it why digital twin in the first place rather than going through a first place rather than going through a regulatory process like first of all we regulatory process like first of all we do FDA approvals they have a do FDA approvals they have a test schema. Same thing with EU. I'm test schema. Same thing with EU. I'm going to use not Germany but EU has a a going to use not Germany but EU has a a significant sort of process as well. So significant sort of process as well. So Dr. Da and Dr. Premiere, how do you see Dr. Da and Dr.

How the Genexis Platform Works

Premiere, how do you see and why did you decide on investing in and why did you decide on investing in digital twin as compared to different digital twin as compared to different pathways for verification pathways for verification and what exactly you said bringing back and what exactly you said bringing back trust in a in a new pathway of AI based trust in a in a new pathway of AI based processes.

>> Yeah. So I can take that question. Um >> Yeah. So I can take that question. Um so according to my research I mean this so according to my research I mean this is something that is currently being is something that is currently being pursued. If you go via all the pursued. If you go via all the regulations then probably you are regulations then probably you are killing your innovation. So we also killing your innovation. So we also tried the other way around because tried the other way around because innovation uh [laughter] innovation uh [laughter] is just making rules what they know but is just making rules what they know but at the same time there are potential to at the same time there are potential to do something better. So digital terms do something better. So digital terms have been there for quite a long time.

have been there for quite a long time. So in the recent time due to So in the recent time due to computational effort to let's say computational effort to let's say increased computational power um access increased computational power um access easy access um you know people are easy access um you know people are getting more and

more interested right getting more and more interested right because previously it was there but even because previously it was there but even I worked with um during my PhD and you I worked with um during my PhD and you sometimes have to wait two weeks to get sometimes have to wait two weeks to get an answer and uh then the answer might an answer and uh then the answer might be wrong you know so uh now it has gone be wrong you know so uh now it has gone with more computation power much much with more computation power much much much better at the same time we we took much better at the same time we we took a very different approach. So we are not a very different approach. So we are not going actually um with the the going actually um with the the computational uh model we are actually computational uh model we are actually going with a deterministic or going with a deterministic or mechanistic model which we call the mechanistic model which we call the intelligence layer genus itself. So what intelligence layer genus itself. So what it does is actually it it actually makes it does is actually it it actually makes it understand the system and then it it understand the system and then it kind of let's say map or change into kind of let's say map or change into that system. So gen is the platform is that system. So gen is the platform is very broad and then we have you know for very broad and then we have you know for let's say industrial very briefly but at let's say industrial very briefly but at the same time we have for human organs the same time we have for human organs like cardio which is able to see uh and like cardio which is able to see uh and and and decide u almost like and and decide u almost like I I I want to be careful but I I I want to be careful but cardiologist as at the same time cardiologist as at the same time cardiotheric surgeon right so I I think cardiotheric surgeon right so I I think uh according to my research almost Every uh according to my research almost Every organization currently is going towards organization currently is going towards that aim and we are talking about that aim and we are talking about innovation. So that you cannot start innovation. So that you cannot start from FDA. If you start from FDA probably from FDA. If you start from FDA probably you are killing several aspects of your you are killing several aspects of your innovation and then you are coming up innovation and then you are coming up with the regular solution right you know with the regular solution right you know so what you need to have a big so what you need to have a big innovation and then FDA and we have seen innovation and then FDA and we have seen I think in the last couple of months I think in the last couple of months that FDA is always relaxing or that FDA is always relaxing or introducing new um let's say um changes introducing new um let's say um changes to to adapt to this new technology and to to adapt to this new technology and there was a post I think last week from there was a post I think last week from unlearn AI if I remember it correctly unlearn AI if I remember it correctly and they in their post mentioned that FD and they in their post mentioned that FD has reached out to them how they can has reached out to them how they can reduce this drug development period or reduce this drug development period or expedite and how AI can help. So I think expedite and how AI can help. So I think um this is more or less uh being done in um this is more or less uh being done in parallelly. You cannot of course you parallelly. You cannot of course you cannot have the FDA uh into some cannot have the FDA uh into some innovation that's is still in the innovation that's is still in the process. On the other hand you cannot process. On the other hand you cannot have an innovation if you start with all have an innovation if you start with all the regulations. So that that that would the regulations. So that that that would be my answer and I'm be my answer and I'm I'm happy to explain more if that makes I'm happy to explain more if that makes sense.

sense. sense. So u Kari I'm going to let you take over So u Kari I'm going to let you take over and then uh as I said uh I have so let and then uh as I said uh I have so let me explain my experience in digital me explain my experience in digital twin. We actually have an American twin. We actually have an American telecom company which is a great friend telecom company which is a great friend of mine and then we used our MRI of mine and then we used our MRI analysis that we do and I ported it over analysis that we do and I ported it over to him and he was able to map the whole to him and he was able to map the whole floor of a whole building with antenna floor of a whole building with antenna analysis and everything and then he's analysis and everything and then he's able to now project that into a digital able to now project that into a digital twin and just by shifting the antenna by twin and just by shifting the antenna by five degrees down up or sideways he's five degrees down up or sideways he's able to improve improve the throughput able to improve improve the throughput and decrease the latency of inside and decrease the latency of inside private 5G millimeter wave etc. which I private 5G millimeter wave etc. which I was just helping him out as a friend was just helping him out as a friend like hey this is how AI works [laughter] like hey this is how AI works [laughter] why don't you use this and his engineers why don't you use this and his engineers of course took over of course took over so the cross-section is always very very so the cross-section is always very very interesting so before I move forward are interesting so before I move forward are we um for our audiences can you redefine we um for our audiences can you redefine what a digital twin is in different what a digital twin is in different industries what the clinical is and then industries what the clinical is and then we move forward with your

question we move forward with your question >> yeah just to give everyone a little bit >> yeah just to give everyone a little bit of background.

of background. >> When we had a troubled uh astronaut in >> When we had a troubled uh astronaut in outer space, we literally had an issue outer space, we literally had an issue with uh the you the government trying to with uh the you the government trying to take care of astronauts. This was in the take care of astronauts. This was in the 70s uh early 70s and the engineers here 70s uh early 70s and the engineers here like how the heck are we going to deal like how the heck are we going to deal with these people in space? They're with these people in space? They're having an issue. So they replicated that having an issue. So they replicated that idea of what the parameters the idea of what the parameters the spaceship and that gave birth to this spaceship and that gave birth to this idea of the digital twin. So how does it idea of the digital twin. So how does it work here on earth and the rest of us?

work here on earth and the rest of us? Well, the way I simplify it is say it's Well, the way I simplify it is say it's literally a replica like it says of twin literally a replica like it says of twin but digitally in the essence of but digitally in the essence of healthcare where it's a little bit kind healthcare where it's a little bit kind of crazy when you think about it because of crazy when you think about it because us as humans have so much to life. How us as humans have so much to life. How are you going to replicate me? But in are you going to replicate me? But in essence we are in the sense that we're essence we are in the sense that we're looking at a certain vertical in this looking at a certain vertical in this case health and we're saying how would case health and we're saying how would this interact in real world and we're this interact in real world and we're doing all these things and example would doing all these things and example would be in medicine we would try you with be in medicine we would try you with different medications and this is the different medications and this is the way your liver would react this is how way your liver would react this is how you would digest these are your elements you would digest these are your elements and this is why the medicine would do it and this is why the medicine would do it this way and so what these the this way and so what these the individuals are doing is basically a individuals are doing is basically a digital twin u marks you want to add do digital twin u marks you want to add do you want to add it to that you want to add it to that >> no I think that's >> no I think that's very very well stated and it makes makes very very well stated and it makes makes a a total sense. I mean another quick a a total sense. I mean another quick example outside of healthcare because I example outside of healthcare because I was having this discussion with one of was having this discussion with one of my kids. They're building a house, my kids. They're building a house, right? And it's hard to visualize right? And it's hard to visualize um your home. Um but now they are um your home. Um but now they are recreating these homes in virtual spaces recreating these homes in virtual spaces like you're in a virtual space got your like you're in a virtual space got your on and you're able to walk through your on and you're able to walk through your home. It's a replica of your physical home. It's a replica of your physical home. you can make changes and home. you can make changes and understand the impacts and feel it. You understand the impacts and feel it. You know, you're like in it uh before you know, you're like in it uh before you make an additional investment or a make an additional investment or a change that you may not want to do. So, change that you may not want to do. So, so yeah, there's all sorts of examples so yeah, there's all sorts of examples from so many industries, but yeah, from so many industries, but yeah, the greatest potential as we're going to be greatest potential as we're going to be focusing on is a digital twin in focusing on is a digital twin in medicine.

medicine. medicine. >> Cool. That's exactly [laughter] >> Cool. That's exactly [laughter] the thing as well as uh just the thing as well as uh just car crash crash test for example. So if car crash crash test for example. So if you trash the cars all the time, you you trash the cars all the time, you will end up spending a lot of money and will end up spending a lot of money and also perhaps endangering people. So also perhaps endangering people. So that's why you validate with few few that's why you validate with few few extreme let's say examples. Then you extreme let's say examples. Then you have a digital twin that can replicate have a digital twin that can replicate let's say 80 90% perhaps more the same let's say 80 90% perhaps more the same and then you do all the testing because and then you do all the testing because you can do with with whatever speed you you can do with with whatever speed you want in in in the virtual environment, want in in in the virtual environment, right?

right? right?

Clinical Validation and Trust in AI

um and it's just some time uh that you um and it's just some time uh that you you lose but really not uh uh not not you lose but really not uh uh not not much money I would say or less money as much money I would say or less money as compared to real world test and compared to real world test and similarly as also how we said if you similarly as also how we said if you have a problem to deal with the space or have a problem to deal with the space or if you have to send let's say an if you have to send let's say an aircraft or astronauts uh you know you aircraft or astronauts uh you know you cannot go up and test you can do cannot go up and test you can do replicate the same environment test replicate the same environment test there and then it's much easier much there and then it's much easier much safer and it also involves lots of um safer and it also involves lots of um let's say consequences later. So that's let's say consequences later. So that's that's the whole concept of the coin that's the whole concept of the coin almost you can replicate almost you can replicate [snorts] and it's if you have enough [snorts] and it's if you have enough information about it information about it >> that is that is a key point. Um so um I >> that is that is a key point. Um so um I apologize. So first of all going through apologize. So first of all going through that very important process that first that very important process that first of all you were completely right if of all you were completely right if you're going to get stuck inside the you're going to get stuck inside the current compliance manufacturing system current compliance manufacturing system of FDA which again I keep reminding of FDA which again I keep reminding people that FDA doesn't even have a people that FDA doesn't even have a software as medical device pathway. They software as medical device pathway. They basically took the medical physical basically took the medical physical medical devices like catheterss and medical devices like catheterss and everything and converted into a software everything and converted into a software as medical device and so therefore as medical device and so therefore regulation is going to catch up very regulation is going to catch up very slow. So I completely agree and that slow. So I completely agree and that innovation that you're creating through innovation that you're creating through this digital twin requires you to get this digital twin requires you to get out of the box and then move forward.

out of the box and then move forward. The second thing of course uh I just The second thing of course uh I just wanted to concentrate is the the thing wanted to concentrate is the the thing that the genesis has done is essentially that the genesis has done is essentially creating an ICU mode and then they have creating an ICU mode and then they have real time again this is very hard to real time again this is very hard to achieve just to let you know and then achieve just to let you know and then Dr. DA can uh explain more about it and Dr. DA can uh explain more about it and then how this actually relates to then how this actually relates to basically building a digital twin right basically building a digital twin right there. So rather than me experimenting there. So rather than me experimenting on the patient as an ICU physician, on the patient as an ICU physician, experiment something on the digital twin experiment something on the digital twin hopefully and then of course they are hopefully and then of course they are able to go through a whole multi-organ able to go through a whole multi-organ system as well and then of course system as well and then of course longevity and lifespan is going to be longevity and lifespan is going to be something that again Ed is very something that again Ed is very interested in I'm interested in. Siman interested in I'm interested in. Siman his wife actually uh has created a med his wife actually uh has created a med spa as well and the idea behind it is to spa as well and the idea behind it is to push the boundaries of human excellence push the boundaries of human excellence physical excellence in terms of both physical excellence in terms of both longevity and etc. So Dr. Da the floor longevity and etc. So Dr. Da the floor is all yours as how you build this is all yours as how you build this technology from a clinical point of view technology from a clinical point of view so everyone can understand a digital so everyone can understand a digital twin and then b ICU twin and then b ICU and then real time and then of course and then real time and then of course imaging analysis imaging analysis >> right I think that's a very important >> right I think that's a very important question so I'm just going to start off question so I'm just going to start off with a brief uh background so that it with a brief uh background so that it can correlate with the question that can correlate with the question that you're uh just asking right now um you're uh just asking right now um [clears throat] [clears throat] [clears throat] usually when we are working in a usually when we are working in a clinicical practice as a physician also clinicical practice as a physician also we have been using multiple AI tools we have been using multiple AI tools also that are very very good they're also that are very very good they're excellent generating outputs generating excellent generating outputs generating test and generating guidelines but I was test and generating guidelines but I was of the opinion that of the opinion that at some point in time we all know that at some point in time we all know that patients are dynamic they're patients are dynamic they're continuously changing they're not continuously changing they're not working in silos like every organ is working in silos like every organ is interacting with another organ right so interacting with another organ right so if we talk about cardiovascular if we talk about cardiovascular cardiovascular

is interacting with renal cardiovascular is interacting with renal re real renal is inter interacting with re real renal is inter interacting with hypatic and so on and so forth. So hypatic and so on and so forth. So contextual medical reasoning was contextual medical reasoning was something that was missing when we were something that was missing when we were using XY Z AI tools. So they were giving using XY Z AI tools. So they were giving outputs, they were giving text but they outputs, they were giving text but they were not giving how the systems are were not giving how the systems are interacting. So there was the point interacting. So there was the point where the concept of clinical digital where the concept of clinical digital twins they they um you know they arose twins they they um you know they arose and since we all know that clinical and since we all know that clinical digital twins they they create a virtual digital twins they they create a virtual replica of the patients so let's suppose replica of the patients so let's suppose that we are facing a complex patient in that we are facing a complex patient in the ICU and he's having multiple issues the ICU and he's having multiple issues right uh like there are crossorgan body right uh like there are crossorgan body interactions going on there are multiple interactions going on there are multiple cascade failures going on so what this cascade failures going on so what this digital twin is going to do it is going digital twin is going to do it is going to pull or extract all the data from the to pull or extract all the data from the EMR let's suppose or let's say if you EMR let's suppose or let's say if you enter it manually as well and it is enter it manually as well and it is going to create a digital twin virtually going to create a digital twin virtually right in front of you and it will be right in front of you and it will be based on all those parameters that a based on all those parameters that a clinician really uh feels they are very clinician really uh feels they are very important for example the outputs that important for example the outputs that are being generated they should be are being generated they should be explainable they should be traceable explainable they should be traceable they should be uh you know trustable and they should be uh you know trustable and you you should always you can always go you you should always you can always go back and ask us and it should be back and ask us and it should be interogable. So what we have uh invented interogable. So what we have uh invented or what we have you know developed is or what we have you know developed is the genetics clinical digital twin. It the genetics clinical digital twin. It started off initially with started off initially with cardiovascular but when because I also cardiovascular but when because I also have a huge network of doctors you know have a huge network of doctors you know around be be it in the UK in the USA or around be be it in the UK in the USA or in the Asia Pacific region uh as well.

in the Asia Pacific region uh as well. So initially when we developed the So initially when we developed the cardiovascular twin [clears throat] so cardiovascular twin [clears throat] so it was working like a cardiologist or a it was working like a cardiologist or a cardiothoracic surgeon for that matter cardiothoracic surgeon for that matter but when we were in discussion with good but when we were in discussion with good cardiothoracic surgeons all over the cardiothoracic surgeons all over the world as well. So there it was more of a world as well. So there it was more of a supply and chain uh you know demand and supply and chain uh you know demand and supply uh mechanism working on like the supply uh mechanism working on like the cardiothoracic surgeon was of the cardiothoracic surgeon was of the opinion that Dr. SA if I have a patient opinion that Dr. SA if I have a patient of you know post cabbage day four and I of you know post cabbage day four and I want to see like how the patient is want to see like how the patient is going to behave in the next 1 hour so going to behave in the next 1 hour so how do I see that so there uh came the how do I see that so there uh came the concept of continuous monitoring or concept of continuous monitoring or continuous analysis of the continuous analysis of the cardiovascular ICU uh digital twin so cardiovascular ICU uh digital twin so that's how you know things uh got that's how you know things uh got developed and developed and so much so developed and developed and so much so on that we have uh you know separate on that we have uh you know separate digital twins to separate organs like we digital twins to separate organs like we have cardiovascular digital twin. We have cardiovascular digital twin. We have gastro digital twin. We have have gastro digital twin. We have neurological digital twin. We have a neurological digital twin. We have a whole body digital twin. And whole body whole body digital twin. And whole body digital twin is going to work like an digital twin is going to work like an internal medicine physician because like internal medicine physician because like we all know internist they work like an we all know internist they work like an umbrella. It covers all the sub umbrella. It covers all the sub specialtities of medicine and there uh specialtities of medicine and there uh comes the point where I feel so comes the point where I feel so passionate about internal medicine passionate about internal medicine because I'm not wearing single spec uh because I'm not wearing single spec uh spec of one particular subsp specialtity spec of one particular subsp specialtity rather I'm thinking I'm brainstorming as rather I'm thinking I'm brainstorming as a physician like what system would be a physician like what system would be interacting with you know another system interacting with you know another system and there comes the probable diagnosis and there comes the probable diagnosis the differential diagnosis and there we the differential

diagnosis and there we make a correct referral so making a make a correct referral so making a correct referral is also part of the correct referral is also part of the management plan so this is how the management plan so this is how the concept of digital twins that concept of digital twins that uh you know multiple speciality digital uh you know multiple speciality digital twins they they came into being and twins they they came into being and that's how you know the uh portfolio got that's how you know the uh portfolio got expanded and expanded. So we have expanded and expanded. So we have cardiovascular digital twin it will give cardiovascular digital twin it will give you the output that are going to be you the output that are going to be backed by guidelines. You can go back backed by guidelines. You can go back and ask you can trace back the citations and ask you can trace back the citations that they are referring to the medical that they are referring to the medical outputs that are generated by the outputs that are generated by the Genexis CDT. you can go back and ask and Genexis CDT. you can go back and ask and the great thing about Genexis CDT is the great thing about Genexis CDT is that you can talk to the digital twin that you can talk to the digital twin and this is something really really and this is something really really amazing as a physician because this is amazing as a physician because this is something that you are just something that you are just crossquesting the digital twin for crossquesting the digital twin for example I'm a physician I have a very example I'm a physician I have a very complex patient right in front of me and complex patient right in front of me and I am of the opinion that this I am of the opinion that this recommendation should be made or this recommendation should be made or this recommendation should not be made so I recommendation should not be made so I can talk to the digital twin and ask why can talk to the digital twin and ask why you made this recommendation so it is you made this recommendation so it is going to go back and give give you a going to go back and give give you a medical reasoning based on the facts, medical reasoning based on the facts, based on the citations, based on the based on the citations, based on the references that you can go back and ask.

references that you can go back and ask. >> I'm sorry. >> I'm sorry. >> Okay. So this is how the the core >> Okay. So this is how the the core pillars of uh you know uh AI in pillars of uh you know uh AI in healthcare that traceable, it should be healthcare that traceable, it should be explainable and it should be explainable and it should be interogable. That's how we are covering interogable. That's how we are covering the hallucination part as well. We are the hallucination part as well. We are covering the blackbox AI part as well covering the blackbox AI part as well and here you can talk to the twin. It's and here you can talk to the twin. It's just like we have a complex right in just like we have a complex right in front of us and it's a team of medical front of us and it's a team of medical experts from all over the world that are experts from all over the world that are brainstorming a single case. This is how brainstorming a single case. This is how you can interact with the twin. So when you can interact with the twin. So when we made this demo available uh to we made this demo available uh to multiple doctors you know uh globally be multiple doctors you know uh globally be it different continents like a doctor it different continents like a doctor from USA, a doctor from Singapore, a from USA, a doctor from Singapore, a doctor from Netherlands. So they kind of doctor from Netherlands. So they kind of simulated the case also. They generated simulated the case also. They generated hypothetical cases as well. few of them hypothetical cases as well. few of them they were kind enough to give us uh you they were kind enough to give us uh you know the real-time case scenarios and we know the real-time case scenarios and we ran it on the digital twins and we ran it on the digital twins and we shared the outputs and I as a physician shared the outputs and I as a physician also because when we working in a heavy also because when we working in a heavy loaded ICU when we have got 15 to 20 loaded ICU when we have got 15 to 20 critical patient right in front of me critical patient right in front of me there is a human uh chance of an error there is a human uh chance of an error that is very much there because you know that is very much there because you know it can be possible that the doctor is it can be possible that the doctor is also busy the doctor is not feeling good also busy the doctor is not feeling good that day the doctor is also not 100% that day the doctor is also not 100% with the market. This is something with the market. This is something working as a co-pilot right in front of working as a co-pilot right in front of you. But keep that in mind that the you. But keep that in mind that the physician in the loop will always be physician in the loop will always be there. So nothing is happen happening in there. So nothing is happen happening in an autonomous way. The physician in the an autonomous way. The physician in the loop, the consultant the loop would loop, the consultant the loop would always be there. So at the end of the always be there. So at the end of the day uh this medical dashboard is going day uh this medical dashboard is going to augment the physician's uh to augment the physician's uh efficiency. It is going to reduce the efficiency. It is going to reduce the cognitive load but at the same time the cognitive load but at the same time the decision is going to be in the hands of decision is going to be in the hands of the consultant. So, I hope this uh did the consultant. So, I hope this uh did clear a few of the queries that you clear a few of the queries that you might have.

might have. >> That was excellent summary. Harvey, I >> That was excellent summary. Harvey, I want you to go first and sort of ask want you to go first and sort of ask some more questions. Then, of course, I some more questions. Then, of course, I have a whole list and Ed, go ahead.

have a whole list and Ed, go ahead. >> Yeah. Well, I'll keep it simple and for >> Yeah. Well, I'll keep it simple and for my I'm really just curious. my I'm really just curious.

I'd like to I know you already kind of I'd like to I know you already kind of touched on this, but I'd like to know touched on this, but I'd like to know what are some of your key advantages of what are some of your key advantages of doing it and what are some of the the doing it and what are some of the the opposite? What are some of the handicaps opposite? What are some of the handicaps that you're having to go around? Like that you're having to go around? Like you mentioned the kidney's talking to you mentioned the kidney's talking to the kidney, the liver is talking to the the kidney, the liver is talking to the liver. So many multiffactorial. I'd love liver. So many multiffactorial. I'd love to hear your comments like how how are to hear your comments like how how are you getting around that or how you you getting around that or how you addressing it? What data are you kind of addressing it? What data are you kind of using?

using? using? >> So perhaps I'll I'll [clears throat] >> So perhaps I'll I'll [clears throat] briefly explain the architecture and briefly explain the architecture and then Dr. Da can forward. So u we have then Dr. Da can forward. So u we have currently a dittle twin all organ for currently a dittle twin all organ for example we have for cardio gastro neuro example we have for cardio gastro neuro nafro pulmonary you know u and then we nafro pulmonary you know u and then we have whole body which is more and more have whole body which is more and more like internist approach. So when you like internist approach.

Multi-Organ Digital Twins and ICU Use Cases

So when you talk about cardio do is it it is trained talk about cardio do is it it is trained like a doctor right so it understand and like a doctor right so it understand and not only the clinical side but also uh not only the clinical side but also uh the the surgical side. Uh number two how the the surgical side. Uh number two how it works. So it works like that. Uh when it works. So it works like that. Uh when you go to our cardio module, it is kind you go to our cardio module, it is kind of standard but it knows what to do. As of standard but it knows what to do. As soon as you enter, you are talking about soon as you enter, you are talking about 42 years old Asian or 72 years old uh 42 years old Asian or 72 years old uh European for example. So uh the core European for example. So uh the core architecture stays the same but then it architecture stays the same but then it has the normal for that age range. Yeah.

has the normal for that age range. Yeah. And that normal is coming from if you And that normal is coming from if you are giving uh uh the reports then the are giving uh uh the reports then the normal is of course patient normal right normal is of course patient normal right sometimes you don't have that sometimes you don't have that information and then Genexis is smart information and then Genexis is smart enough and it's asking AI that please go enough and it's asking AI that please go back search literature internet and tell back search literature internet and tell me for this 72 years old patient me for this 72 years old patient European with for example cardiovascular European with for example cardiovascular issues or hypertension or or a diabetic issues or hypertension or or a diabetic whatever What are the literature normals whatever What are the literature normals then right and that's that this is where then right and that's that this is where it's first of all comparing you know it's first of all comparing you know it's comparing what should be then what it's comparing what should be then what is currently happening and then the is currently happening and then the deviations are going through our model deviations are going through our model and then it gives you I think six or and then it gives you I think six or seven always um the relevant seven always um the relevant investigation the very top is is is the investigation the very top is is is the cards special cards like telling you cards special cards like telling you immediately if there is some emergency immediately if there is some emergency something you need to be done and then something you need to be done and then patient summary and goes deep down uh to patient summary and goes deep down uh to each and every explanation and the last each and every explanation and the last part is normally the documentation it part is normally the documentation it has used and uh then of course you have has used and uh then of course you have the co- pilot where you can ask okay you the co- pilot where you can ask okay you are suggesting this why not that

and are suggesting this why not that and then it will come back you can challenge then it will come back you can challenge so that's that's that's the that's the so that's that's that's the that's the general idea and now um uh Dr. can take general idea and now um uh Dr. can take over. So if you have multiple organ over. So if you have multiple organ let's say interaction then actually GenX let's say interaction then actually GenX is itself is an intelligence layer on is itself is an intelligence layer on top of AI. So it's it's actually not AI top of AI. So it's it's actually not AI itself but then it is asking AI you know itself but then it is asking AI you know to produce certain to produce certain um information from internet plus um information from internet plus wherever possible come back with an wherever possible come back with an information or references right and information or references right and that's why we are able to create let's that's why we are able to create let's say until now we have seen very say until now we have seen very reproducible uh results yeah and very I reproducible uh results yeah and very I haven't seen the hallucination because haven't seen the hallucination because I'm not Dr. medical doctor perhaps Dr.

I'm not Dr. medical doctor perhaps Dr. Da can um can can answer that in more Da can um can can answer that in more detail. detail. detail. >> So just to confirm as far as >> So just to confirm as far as architecture is concerned you're architecture is concerned you're basically have an orchestrator a basically have an orchestrator a conductor agent that basically goes into conductor agent that basically goes into multiple different sub aents and those multiple different sub aents and those sub aents one of them would be the sub aents one of them would be the patient context itself where the patient patient context itself where the patient lives uh which could be cardiology etc.

lives uh which could be cardiology etc. And then the second one is your medical And then the second one is your medical corpus which is essentially a PubMed um corpus which is essentially a PubMed um directory that analyzes does smart directory that analyzes does smart search evidence production with search evidence production with citations citations citations >> and then lastly of course we come to >> and then lastly of course we come to synthesis of both uh and then conductor synthesis of both uh and then conductor can actually orchestrate the whole can actually orchestrate the whole intelligence layer. Now the question of intelligence layer. Now the question of course is when we are building this and course is when we are building this and uh rag is what people use retrieval uh rag is what people use retrieval augmented generations augmented generations uh and that actually does produce now uh and that actually does produce now more better results given GLM 5.2 to more better results given GLM 5.2 to deepsek etc. and we are able to control deepsek etc. and we are able to control that but still um we see hallucinations.

that but still um we see hallucinations. How how were you architecturally How how were you architecturally you know can say we're going to come to you know can say we're going to come to the clinical the clinical utilization and clinical evidence and utilization and clinical evidence and reproducibility with Dr. Da from a reproducibility with Dr. Da from a clinical perspective because that's clinical perspective because that's where my biggest fear is my adoption where my biggest fear is my adoption fear Dr. problem is that I can build the fear Dr. problem is that I can build the stroke one, right? I I just built it, stroke one, right? I I just built it, but I wasn't able to reproduce it. I'm but I wasn't able to reproduce it. I'm just going to be honest with you now. I just going to be honest with you now. I am, but let's just say I never released am, but let's just say I never released it. And the reason that I never released it. And the reason that I never released it is that I don't have the problem with it is that I don't have the problem with the rag. So, and you have done a whole the rag. So, and you have done a whole body that is amazing work like it's body that is amazing work like it's fascinating what you're doing. Uh, but I fascinating what you're doing. Uh, but I just want to how do I just want to how do I create trust in your AI and how would create trust in your AI and how would you validate it?

you validate it? So perhaps one step backward I I hear So perhaps one step backward I I hear this very often especially I mean from this very often especially I mean from from from other colleagues sometimes. So from from other colleagues sometimes. So how it is different from chat GPT I mean how it is different from chat GPT I mean perhaps it can also do that my answer is perhaps it can also do that my answer is actually no for the same reason chat GPT actually no for the same reason chat GPT has rack you know retrieval augmentation has rack you know retrieval augmentation whatever sorry so and this is additional whatever sorry so and this is additional layer right so it can work probably with layer right so it can work probably with chat DPT it can work probably with chat DPT it can work probably with Gemini it can probably work with some Gemini it can probably work with some something else so you can imagine something else so you can imagine perhaps the most simplest way to have a perhaps the most

simplest way to have a card cardiologist because that's what card cardiologist because that's what the information once you create a the information once you create a digital twin genexis becomes in digital twin genexis becomes in principle cardiologist and these are all principle cardiologist and these are all hardcoded things and it is very smart we hardcoded things and it is very smart we have a python back end it's not only AI have a python back end it's not only AI and then it goes back you know um to and and then it goes back you know um to and fro and then it's actually asking AI fro and then it's actually asking AI what it needs to do and it needs to what it needs to do and it needs to follow certain instructions and those follow certain instructions and those instructions are hardcoded and that we instructions are hardcoded and that we can also always look at right so can also always look at right so properly properly properly properly And to be honest with you, cardi And to be honest with you, cardi cardiology is still one of the simplest cardiology is still one of the simplest uh let's say genetics what what we uh let's say genetics what what we created. I mean uh this pharma I think created. I mean uh this pharma I think it has about 50,000 uh uh you know lines it has about 50,000 uh uh you know lines worth of code 18 files you know uh worth of code 18 files you know uh industry is also very complicated. So we industry is also very complicated. So we have quite a lot of experience and the have quite a lot of experience and the best thing is it's there you can test best thing is it's there you can test it. If there is something needs to be it. If there is something needs to be done probably we just need to go back to done probably we just need to go back to our Python file where this uh our Python file where this uh cardiologist and cardiothoracic cardiologist and cardiothoracic surgeon is setting with all the surgeon is setting with all the information key information primarily information key information primarily it's understanding of the system what we it's understanding of the system what we talking about second what is normal for talking about second what is normal for the system then what are the the system then what are the abnormalities and if as soon as you have abnormalities and if as soon as you have these abnormal abnormalities what should these abnormal abnormalities what should be the way forward so so this this is be the way forward so so this this is you can say is quite hardcoded in you can say is quite hardcoded in Genexis. Uh we are using Python. Uh the Genexis. Uh we are using Python. Uh the front end is very simple HTML you can front end is very simple HTML you can open anywhere and and this is actually open anywhere and and this is actually uh interacting and AI is just being used uh interacting and AI is just being used for getting this information and I don't for getting this information and I don't think if you do try to do that the same think if you do try to do that the same like let's say a very complicated case like let's say a very complicated case in chat GPT charge GPT will not say no in chat GPT charge GPT will not say no and that's what AI is trained for. It and that's what AI is trained for. It will always come back with an with an will always come back with an with an answer and that's sometimes a problem answer and that's sometimes a problem right but you can you can imagine that right but you can you can imagine that it will not evaluate as a cardiologist it will not evaluate as a cardiologist you know and in our case it is actually you know and in our case it is actually information the deal to that it thinks information the deal to that it thinks um it it it cannot do anything else so um it it it cannot do anything else so you can the next next question even if you can the next next question even if in your cardiologist session you are in your cardiologist session you are asking a question the next question asking a question the next question would be how how should I reach from would be how how should I reach from Chicago to New York for example and Chicago to New York for example and charge GPD will not tell you no right charge GPD will not tell you no right right right right >> I completely agree Dr. grammar. The one >> I completely agree Dr. grammar. The one of the biggest problems with AI is I of the biggest problems with AI is I don't know. They just doesn't say it.

don't know. They just doesn't say it. And that is extremely important problem And that is extremely important problem that is hard to crack. I confirm that that is hard to crack. I confirm that with my own experience to everyone that with my own experience to everyone that this is amazing work that that can be this is amazing work that that can be done. And we're going to have a done. And we're going to have a separate, you know, internal, you know, separate, you know, internal, you know, one more where we're going to record one more where we're going to record your whole demo and make it available to your whole demo and make it available to everyone.

everyone. everyone. >> As you go along um but uh Dr. Dania, >> As you go along um but uh Dr. Dania, I apologize, Ed. I'm going to let you I apologize, Ed. I'm going to let you [laughter] ask questions. I'm sorry.

[laughter] ask questions. I'm sorry. This is just too fascinating for me. This is just too fascinating for me. Now, he he suggested that there are Now, he he suggested that there are basically a hematologist, a basically a hematologist, a cardiologist, and you know, all of that.

cardiologist, and you know, all of that. And then Google also sent out a paper And then Google also sent out a paper which is basically uh longunning agents.

which is basically uh longunning agents. Um Microsoft did the research on it, Um Microsoft did the research on it, published it. Their analysis was that it published it. Their analysis was that it is going to cost approximately $2,000 to is going to cost approximately $2,000 to $3,000 per patient per day to let the AI $3,000 per patient per day to let the AI run for it. Uh Dr. Ammer can answer that run for it. Uh Dr. Ammer can answer that later, but Dr. Da um he did the later, but Dr. Da um he did the architecture work. He's the brains architecture work. He's the brains behind building the software part. How behind building the software part. How are you first validating it clinically are you first validating it clinically for trust purposes and then secondly how for trust purposes and then secondly how are you expanding it into different are you expanding it into different systems and then the overlaying artifact systems and then the overlaying artifact right a cardiology patient comes in with right a cardiology patient comes in with low blood pressure congestive heart low blood pressure congestive heart failure but then on top of that now he's failure but then on top of that now he's developing acute kidney injury on top of developing acute kidney injury on top of that he's becoming hippatic failures and that he's becoming hippatic failures and now it is a complex problem that is in now it is a complex problem that is in evolution and That actually is one of evolution and That actually is one of the issues that we need to normalize in the issues that we need to normalize in terms of how the intelligence layer is terms of how the intelligence layer is evolving which is Dr. Amir explained evolving which is Dr. Amir explained beautifully in terms of that's where the beautifully in terms of that's where the real magic is. That's where Chad GPD real magic is. That's where Chad GPD will never get as a general foundation will never get as a general foundation model. We need niche models that you're model. We need niche models that you're developing.

developing. developing. >> But how are you clinically validating it >> But how are you clinically validating it >> with two layers? one is the first layer >> with two layers? one is the first layer and then the second increasing and then the second increasing complexity complexity complexity >> right I think first of all we need to uh >> right I think first of all we need to uh make it again and again you know make it again and again you know transparent that this is an innovation transparent that this is an innovation right I mean this is something new this right I mean this is something new this not something happening as of now in not something happening as of now in this much of uh in-depth knowledge that this much of uh in-depth knowledge that the Genex CD is providing so when we the Genex CD is providing so when we came up with this idea and when it came up with this idea and when it actually got a shape and the uh HTML actually got a shape and the uh HTML outputs the exports when we uh generated outputs the exports when we uh generated from the Genexis cdt when we ran complex from the Genexis cdt when we ran complex cases and keep that in mind that it's cases and keep that in mind that it's not basically used for non-complex cases not basically used for non-complex cases like flu, diarrhea or anything like like flu, diarrhea or anything like that. It is meant for the acute complex that. It is meant for the acute complex setting u scenarios. So when we ran setting u scenarios. So when we ran different sort of multiple cases that different sort of multiple cases that were existing in our um you know were existing in our um you know emergency departments or in the emergency departments or in the intensive care departments. So the value intensive care departments. So the value it gave out and the medical dashboards it gave out and the medical dashboards that it gave out we got it validated that it gave out we got it validated into uh initially uh through different into uh initially uh through different uh you know head of department through uh you know head of department through different doctors for example I'm a different doctors for example I'm a physician so I utilize my own personal physician so I utilize my own personal skills then we had a good network of skills then we had a good network of physicians specialist intensivist you physicians specialist intensivist you know surgeons on board they kind of read know surgeons on board they kind of read it in complete And uh let me tell you it it in complete And uh let me tell you it was a whole lot of critical analysis was a whole lot of critical analysis that we had done initially. It was just that we had done initially. It was just not like that you know we have a fancy not like that you know we have a fancy dashboard that looks really nice that dashboard that looks really nice that looks really heavy uh on the display looks really heavy uh on the display rather it was a critical analysis that rather it was a critical analysis that was done with the intent of finding was done with the intent of finding problems or errors right and then of problems or errors right and then of course we do cross check by using course we do cross check by using different um platforms as well that are different um platforms as well that are you know quite uh uh advanced in terms you know quite uh uh advanced in terms of you know giving a management plan and of you know giving a management plan and this is how the initial validation got this is how the initial validation got through like we got it validated from 50 through like we got it validated from 50 doctors let's say then it got increased doctors let's say then it got increased to 60 doctors and so on and so forth

and to 60 doctors and so on and so forth and then we are here right in front of you then we are here right in front of you because something uh that we were because something uh that we were thinking of that we should be developing thinking of that we should be developing is now in front of us and we believe is now in front of us and we believe that it is now market ready to be tested that it is now market ready to be tested in terms of pilots in terms of uh in terms of pilots in terms of uh entrepreneurs in terms of physicians in entrepreneurs in terms of physicians in terms of people like yourself who have terms of people like yourself who have got credibility on floor and who also got credibility on floor and who also have a lens to uh see how it is working, have a lens to uh see how it is working, what kind of uh outputs it is generating what kind of uh outputs it is generating and then the four pillars that I had and then the four pillars that I had mentioned you earlier because you know mentioned you earlier because you know those are very important anything that those are very important anything that the Genexis CD is reproducing it has to the Genexis CD is reproducing it has to be transparent it has to be traceable be transparent it has to be traceable you can go back and ask you can cross you can go back and ask you can cross check you can cross uh talk so from check you can cross uh talk so from these point onwards it kind of gained these point onwards it kind of gained our trust because trust is based on all our trust because trust is based on all of these parameters that I've just of these parameters that I've just shared with you so this how it uh you shared with you so this how it uh you know came into being and we further know came into being and we further expanded and expanded to the point that expanded and expanded to the point that we have not only one clinical rather a we have not only one clinical rather a wholesome of different and the question wholesome of different and the question that you had asked that how the cross that you had asked that how the cross organ uh system interaction it is organ uh system interaction it is dealing. So when we talk about acquiring dealing. So when we talk about acquiring this platform then of course it has to this platform then of course it has to be a package of you know different be a package of you know different digital twins for example in the ICU digital twins for example in the ICU setting setting setting likewise when we uh you know are making likewise when we uh you know are making a multi-disiplinary team we make sure a multi-disiplinary team we make sure that there is an intensivist or that there is an intensivist or internist on board along with that we internist on board along with that we have a cardiologist we have a have a cardiologist we have a pulmonologist we have a nefologist pulmonologist we have a nefologist working so likewise when this system is working so likewise when this system is integrated in the ICU setting then of integrated in the ICU setting then of course it has to be in a blend with course it has to be in a blend with whole body digital twin along with whole body digital twin along with cardiovascular. So this is uh where I cardiovascular. So this is uh where I would like to share a real lifetime case would like to share a real lifetime case scenario. We have got uh Dr. Harve scenario. We have got uh Dr. Harve Castra as an ED physician and you Castra as an ED physician and you yourself. So it was a case of whipples yourself. So it was a case of whipples procedure post whipples procedure. Okay.

procedure post whipples procedure. Okay. And post whipple procedure day seven And post whipple procedure day seven there was a klepsy infection right the there was a klepsy infection right the patient underwent septacmia. So the patient underwent septacmia. So the surgeon who was also my professor we surgeon who was also my professor we were in in good uh you know discussions were in in good uh you know discussions with him also. So he said okay Dr. Dan with him also. So he said okay Dr. Dan run this case because I want to see this run this case because I want to see this case from a medical aspect as well case from a medical aspect as well because so many things from the medicine because so many things from the medicine point of view is also working because point of view is also working because the patient is undergoing complications the patient is undergoing complications septasemia dehydration renal failure septasemia dehydration renal failure hypatic failure and I also want to see hypatic failure and I also want to see like he developed this complication on like he developed this complication on the day seven although until day three the day seven although until day three there was no anastmotic leak and the there was no anastmotic leak and the patient was doing well. I want to see patient was doing well. I want to see from the surgical aspect as well like from the surgical aspect as well like what went wrong and what needs to be what went wrong and what needs to be done next either we should go for the done next either we should go for the surgical intervention first while surgical intervention first while maintaining the hemodynamics of the maintaining the hemodynamics of the patient or rather it's a complete patient or rather it's a complete medical case so we ran it on our medical case so we ran it on our gastrodigital twin because whipples come gastrodigital twin because whipples come into that domain gastrointestinal into that domain gastrointestinal digital twin and we also ran it on the digital twin and we also ran it on the whole body digital twin so the kind of whole body digital twin so the kind of output you know it generated the whole output you know it generated the whole body digital twin made sure that it body digital twin made sure that it covers all the cascade failure analysis covers all the cascade failure analysis in loop in amalg ation in cross in loop in amalg ation in cross interaction. It

give you holistic idea interaction. It give you holistic idea of the management plan based on the of the management plan based on the guidelines that we follow. Be it if if guidelines that we follow. Be it if if you are in the USA region, you're going you are in the USA region, you're going to follow the US guidelines. If somebody to follow the US guidelines. If somebody is in the Netherland region, they're is in the Netherland region, they're going to follow the Netherland going to follow the Netherland guidelines. And likewise, it generated a guidelines.

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And likewise, it generated a gastrointestinal surgical output as well gastrointestinal surgical output as well where the physician and the surgeon came where the physician and the surgeon came onto the conclusion that yes, what we onto the conclusion that yes, what we did was right. It was auditable because did was right. It was auditable because of course if the patient suffers a of course if the patient suffers a mortality you have to face consequence mortality you have to face consequence because you need to be sure that because you need to be sure that whatever you did it was in the best whatever you did it was in the best practice for the patient it was in the practice for the patient it was in the best interest of the patient and you can best interest of the patient and you can trail back it it should be auditable. So trail back it it should be auditable. So it had that particular report also uh it had that particular report also uh facilitating the doctor and the facilitating the doctor and the authorities that yes what was done it authorities that yes what was done it was in the best interest backed by was in the best interest backed by headlines backed by citations and backed headlines backed by citations and backed by the cross-sectioning also. This is by the cross-sectioning also. This is how it uh works all together. When how it uh works all together. When you're sitting in a multi-disiplinary you're sitting in a multi-disiplinary department, it will behave like a department, it will behave like a multi-disiplinary tool. I I hope multi-disiplinary tool. I I hope >> maybe I can I can interfere a little bit >> maybe I can I can interfere a little bit because the t say a little uh because the t say a little uh differently or sits differently and differently or sits differently and maybe if there is audience uh they will maybe if there is audience uh they will see okay we did not even talk about see okay we did not even talk about simulating drug trials. So I'll just simulating drug trials. So I'll just complement what Dr. Da has said. um we complement what Dr. Da has said. um we we are actually um oriented ourselves to we are actually um oriented ourselves to the end users. So we that's why we kept the end users. So we that's why we kept the internist approach the cardiologist the internist approach the cardiologist said George but very briefly we have said George but very briefly we have used our neurological let's say uh used our neurological let's say uh neurological module uh to create a subm neurological module uh to create a subm module for psychiatry or well-being or module for psychiatry or well-being or we have used our human body module to we have used our human body module to create longevity or to obesity according create longevity or to obesity according to FDA. So these are all possible but um to FDA. So these are all possible but um currently because uh end user needs to currently because uh end user needs to needs to it should be useful for end needs to it should be useful for end user it should be easily uh let's say user it should be easily uh let's say become part of it uh his uh uh practice become part of it uh his uh uh practice operations rather than something new and operations rather than something new and then he can tell us perhaps in the next then he can tell us perhaps in the next step we can do something different and step we can do something different and that's something different as so we have that's something different as so we have done longevity using our human body done longevity using our human body module we have done also obesity module we have done also obesity management according to FDA for a doctor management according to FDA for a doctor in the states we have also done the in the states we have also done the psychiatry well-being module from our psychiatry well-being module from our neurology. So um yeah I'll leave I I'll neurology. So um yeah I'll leave I I'll leave it to you but uh if you like we leave it to you but uh if you like we can talk a little bit because the can talk a little bit because the audience might feel a little bit you audience might feel a little bit you know because know because >> I completed thank you for filling in the >> I completed thank you for filling in the gaps. Now I'm going to ask Ed Marks the gaps. Now I'm going to ask Ed Marks the question. Ed is not a physician and but question. Ed is not a physician and but he is a board member of many hospital he is a board member of many hospital systems. So Ed um as a pure patient when systems. So Ed um as a pure patient when you're wearing a patient hat uh and I you're wearing a patient hat uh and I know he has survived a widowmaker u know he has survived a widowmaker u himself. So all this information should himself. So all this information should only be in the hands of providers or only be in the hands of providers or should actually there should be an should actually there should be an interface for the patients and you would interface for the patients and you would appreciate it as a patient. And then the appreciate it as a patient. And then the second thing is um evidence is messy. I second thing is um evidence is messy. I mean no matter how many hundred mean no matter how many hundred citations I can do honestly at the

end citations I can do honestly at the end of the day my goal over here is to of the day my goal over here is to literally go beyond the guidelines like literally go beyond the guidelines like I mean that's where the magic is that's I mean that's where the magic is that's where a neurointensivist comes in and where a neurointensivist comes in and says yeah I know patient has 24 hours says yeah I know patient has 24 hours but 18 hours let's just go ahead and but 18 hours let's just go ahead and give the TNK discussing with the give the TNK discussing with the patients and everything but as a board patients and everything but as a board member of a hospital system how would member of a hospital system how would you approach this solution to come into you approach this solution to come into your system supposedly or how would you your system supposedly or how would you advise the rest of the board advise the rest of the board about whatever you heard?

about whatever you heard? >> Well, super fascinating. I have a few >> Well, super fascinating. I have a few thoughts and I'll try to share them thoughts and I'll try to share them really quickly but then get back to really quickly but then get back to questions for for our guests.

questions for for our guests. >> Um, one is, you know, what what's the >> Um, one is, you know, what what's the biggest killer of patients in hospitals biggest killer of patients in hospitals today? Some might say sepsis. Um, you today? Some might say sepsis. Um, you know what I say? It's uh culture know what I say? It's uh culture uh and governance which is part of uh and governance which is part of culture that that's the biggest killer culture that that's the biggest killer of patients today. We have all this of patients today. We have all this great technology like what we're talking great technology like what we're talking about right now and we're not about right now and we're not implementing it and we're killing implementing it and we're killing patients as patients are dying as a patients as patients are dying as a result. Uh so it's just crazy um that result. Uh so it's just crazy um that that no one's really uh calling it out that no one's really uh calling it out and and addressing it more aggressively.

and and addressing it more aggressively. Um I why why would you go to a clinician Um I why why would you go to a clinician if you have you know a serious like if you have you know a serious like we're talking about cardiovascular uh we're talking about cardiovascular uh situations disease and surgery why would situations disease and surgery why would you go to a clinician that didn't have a you go to a clinician that didn't have a digital twin of yours that that's crazy digital twin of yours that that's crazy um for all the reasons we already cited um for all the reasons we already cited it's crazy like even today it's crazy like even today >> perfectly put perfectly put like why not >> perfectly put perfectly put like why not like I mean if like I mean if >> crazy >> crazy >> crazy I can imagine like the next time I do I can imagine like the next time I do have some sort of serious, you know, have some sort of serious, you know, illness. Um hopefully many years from illness. Um hopefully many years from now. Um I wouldn't go to anyone that now. Um I wouldn't go to anyone that didn't have this capability that that didn't have this capability that that wasn't using a system like yours or a wasn't using a system like yours or a system similar to yours. Um the uh so system similar to yours. Um the uh so and then and then you know my and then and then you know my provocative provocative provocative statement and then we'll get to statement and then we'll get to questions is u you know something that questions is u you know something that that our guests were saying is well that our guests were saying is well because everyone's always careful and because everyone's always careful and they always say there's a physician in they always say there's a physician in the loop. It's a meant to be an the loop. It's a meant to be an assistant. But why? Like if this is assistant. But why? Like if this is truly, you know, h has this amazing truly, you know, h has this amazing capability, why do you even need, you capability, why do you even need, you know, uh a physician directly in the know, uh a physician directly in the loop like controlling the whole thing?

loop like controlling the whole thing? So, and like why we we don't have to So, and like why we we don't have to have a driver in the car or space have a driver in the car or space whatever. Okay. So, um where where do we whatever. Okay. So, um where where do we start? So, if you're counseling, so start? So, if you're counseling, so these are questions now that I have. So these are questions now that I have. So hopefully that addressed your questions.

hopefully that addressed your questions. You know, uh, Jenade, You know, uh, Jenade, >> no, you're you're absolutely on point. >> no, you're you're absolutely on point.

>> Why are we moving things? Where where >> Why are we moving things? Where where when? Like why not?

That's when? Like why not? That's >> we'll get them a demo in the US soon.

>> we'll get them a demo in the US soon. >> So So where where does someone start? So >> So So where where does someone start? So let's just say generically now, not let's just say generically now, not about your product specifically, but about your product specifically, but digital twin. So you're talking to digital twin. So you're talking to administrators, whether it's US or, you administrators, whether it's US or, you know, in the EU. Where where do you know, in the EU. Where where do you start? like because they need to start start? like because they need to start but I think what happens they get frozen but I think what happens they get frozen because it's like so overwhelming right because it's like so overwhelming right so how do how do you start so what's so how do how do you start so what's your counsel to h to how do we start and your counsel to h to how do we start and then what do you see as the major then what do you see as the major obstacles obstacles obstacles >> yeah so perhaps the first and second >> yeah so perhaps the first and second question I mean you are very very right question I mean you are very very right that if you have a digital twin and that if you have a digital twin and perhaps one step backward the patient perhaps one step backward the patient record management is kind of a static record management is kind of a static digital twin because that's that's what digital twin because that's that's what they have the complete history of they have the complete history of patient. If you have an intelligence patient. If you have an intelligence layer on top of that, that's where you layer on top of that, that's where you have something like Genexis and Genexis have something like Genexis and Genexis is able to decide autonom autonomously is able to decide autonom autonomously because because it then falls in a because because it then falls in a different category of FDA at the same different category of FDA at the same time we want it to be tested as much as time we want it to be tested as much as possible then let doctor decide if that possible then let doctor decide if that it can make autonomous decision or not.

it can make autonomous decision or not. So that I think we we are covered. Uh So that I think we we are covered. Uh the second point is exactly what you the second point is exactly what you have said. So for some people it's have said. So for some people it's overwhelming for some people it's it's overwhelming for some people it's it's against their business model you know against their business model you know because and and for some people in because and and for some people in Europe specifically uh the question Europe specifically uh the question starts from machines taking over ethical starts from machines taking over ethical uh uh decisions or ethical aspects and uh uh decisions or ethical aspects and so forth. So I would say uh everyone is so forth. So I would say uh everyone is discussing that um but the culture you discussing that um but the culture you mentioned one word as well the culture mentioned one word as well the culture is something that is actually is something that is actually um perhaps u is um perhaps u is slowing it down I would say slowing it slowing it down I would say slowing it down and and and the same procedures and down and and and the same procedures and and that's the same thing that I and that's the same thing that I mentioned to Dr. uh Janate uh in the mentioned to Dr. uh Janate uh in the beginning as well. So if you are having beginning as well. So if you are having your FDN compliance lens for an your FDN compliance lens for an innovation you will probably never never innovation you will probably never never never find that. Yeah. So the these are never find that. Yeah. So the these are the things and what we are doing about the things and what we are doing about it of course network and you are also it of course network and you are also part of that and then we are actually um part of that and then we are actually um uh now started to v visit conferences uh now started to v visit conferences because we believe that there there will because we believe that there there will be a mix of all the people and those be a mix of all the people and those people who are also early adopters. So people who are also early adopters. So what we are looking for and I think the what we are looking for and I think the right right starting point is the early right right starting point is the early adopters who would like to use it adopters who would like to use it because they are probably anyway using because they are probably anyway using open evidence which is just like very open evidence which is just like very generic like a reference some uh similar generic like a reference some uh similar to references or to references or um let's say perhaps jpd because I I in um let's say perhaps jpd because I I in fact in one of my case I also seen I fact in one of my case I also seen I visited doctor and it was like I think visited doctor and it was like I think 2016 17 I was facing something and I 2016 17 I was facing something and I think the doctor was checking internet think the doctor was checking internet for for few things. Yeah. So people do for for few things. Yeah. So people do look right. The only thing is now it's look right. The only thing is now it's just like you are talking to a very just like you are talking to a very smart uh assistant you know who is kind smart uh assistant you know who is kind of trained with the same expertise and of trained with the same expertise and it's not limited on the information and it's not limited on the information and this is where I think uh Dr. Janed also this is where I think uh Dr. Janed also mentioned so it is actually a little bit

mentioned so it is actually a little bit beyond all the guidelines. So if there beyond all the guidelines. So if there is something in of still some guidelines is something in of still some guidelines something is in in Japan uh uh happened something is in in Japan uh uh happened a few weeks ago and if if if it's a few weeks ago and if if if it's available online so there is a chance available online so there is a chance you might get even that recommendation you might get even that recommendation okay look you can do it like that and okay look you can do it like that and then of course currently the doctor is then of course currently the doctor is the one who is deciding as I've said the one who is deciding as I've said that it's also to do with regulation that it's also to do with regulation because as soon as you put it in in SMD because as soon as you put it in in SMD or um independent decision maker that's or um independent decision maker that's completely play different ball game uh completely play different ball game uh and that's I think FDA will also learn and that's I think FDA will also learn and and for for us perhaps not big and and for for us perhaps not big enough company but I think there are enough company but I think there are companies like dissolve system doing companies like dissolve system doing almost the same I think they have even almost the same I think they have even LinkedIn profile with Emma Emma twin I LinkedIn profile with Emma Emma twin I think which is kind of a complete think which is kind of a complete virtual uh digital twin of of um of a virtual uh digital twin of of um of a girl Emma so so it is um it is girl Emma so so it is um it is proceeding but I think we are lucky in a proceeding but I think we are lucky in a sense that we can say that we have sense that we can say that we have something that's working it's operation something that's working it's operation ational because we took a different ational because we took a different approach. It's quick so you can use it.

approach. It's quick so you can use it. Otherwise, if you go through the Otherwise, if you go through the computational methods, normally it could computational methods, normally it could take days before you get answers and take days before you get answers and that's why it's more research oriented.

that's why it's more research oriented. So, So, So, >> no, you're absolutely right. I want to >> no, you're absolutely right. I want to just clarify a few things for uh the just clarify a few things for uh the audience as well. We do believe at some audience as well. We do believe at some point in time physician work is going to point in time physician work is going to change and like the software work has change and like the software work has changed. We are moving from coding to changed. We are moving from coding to verification of code and then pushing it verification of code and then pushing it through. That is where the human in loop through. That is where the human in loop status is and then at some point in time status is and then at some point in time as Edward Mark said there will be less as Edward Mark said there will be less and less human in loop intervention and and less human in loop intervention and interestingly people need to understand interestingly people need to understand how things are changing. Uh people and how things are changing. Uh people and I'm going to use a very odd example but I'm going to use a very odd example but people as audience you need to educate people as audience you need to educate yourselves a little bit. It is not about yourselves a little bit. It is not about sending a drone in military who's going sending a drone in military who's going to you know put a missile on itself.

to you know put a missile on itself. That's that's happening. The the That's that's happening. The the question really always has been that question really always has been that when I decide to push the drone and that when I decide to push the drone and that is where the whole cascade follows. So is where the whole cascade follows. So human in loop never goes away because at human in loop never goes away because at the end of the day I have to decide the end of the day I have to decide which area to drone to send. So that's a which area to drone to send. So that's a very bad example. I'm sorry but what I'm very bad example. I'm sorry but what I'm saying is that that human in loop still saying is that that human in loop still arrives is for example which is arrives is for example which is currently you know geoence inside currently you know geoence inside Arizona making sure that all the lanes Arizona making sure that all the lanes are fors the weather is beautiful and are fors the weather is beautiful and therefore it is implemented in San therefore it is implemented in San Francisco and Arizona and not all of us Francisco and Arizona and not all of us so as you just literally using the way so as you just literally using the way example again is to understand how the example again is to understand how the AI develops and I completely agree at AI develops and I completely agree at some point in time we're going to have some point in time we're going to have level five exactly in in in humans as level five exactly in in in humans as well. Not to mention again the way that well. Not to mention again the way that my job changes is fine. It's also my job changes is fine. It's also important to understand that we are important to understand that we are going to consistently use AI and we need going to consistently use AI and we need them. There is significant shortage of them. There is significant shortage of physicians for God's sakes. We are our physicians for God's sakes. We are our jobs are not going anywhere. We

just jobs are not going anywhere. We just need these people to save these need these people to save these technologies to save lives as well.

technologies to save lives as well. Hari, I'm going to let you do the last Hari, I'm going to let you do the last question of the hour and then uh we're question of the hour and then uh we're going to bring you back together. Just going to bring you back together. Just me and you two. You're going to share me and you two. You're going to share your screen, show your platform to your screen, show your platform to everyone, and then we'll just throw it everyone, and then we'll just throw it on the web so that everyone can see on the web so that everyone can see including investors. Uh please make sure including investors. Uh please make sure you follow uh both of our guests on you follow uh both of our guests on LinkedIn and then um maybe integration LinkedIn and then um maybe integration opportunities, other opportunities that opportunities, other opportunities that we can work together. Harvey.

we can work together. Harvey. >> All right. First of all, thank you >> All right. First of all, thank you everyone on this call. I really everyone on this call. I really appreciate your time. Um, I just want to appreciate your time. Um, I just want to tie it back to the patient and my tie it back to the patient and my question to you guys is we're physicians question to you guys is we're physicians or health care professionals. We're or health care professionals. We're doing this for a reason. What do you see doing this for a reason. What do you see happening in the next two, five, 10 happening in the next two, five, 10 years, not because of your work, because years, not because of your work, because what you're doing in digital twin? How what you're doing in digital twin? How >> Would you like to take or shall I >> Would you like to take or shall I answer? I think you can go ahead and I answer? I think you can go ahead and I can cover it up with the clinical side.

can cover it up with the clinical side. >> So I I think this is already happening. >> So I I think this is already happening. I I would say west is little bit lagging I I would say west is little bit lagging behind. Uh we have seen uh China quite behind. Uh we have seen uh China quite advanced and there was a time when we advanced and there was a time when we were perhaps not taking it seriously but were perhaps not taking it seriously but now we have seen that there is a real now we have seen that there is a real progress. Yeah. Take uh any any aspect progress. Yeah. Take uh any any aspect is it's a real progress. It's also is it's a real progress. It's also changing the way we think. It's helping changing the way we think. It's helping each and every aspect. for example, um I each and every aspect. for example, um I am also using several AI platforms as am also using several AI platforms as co-pilot and and and that's why I was co-pilot and and and that's why I was able to do very quickly what I've able to do very quickly what I've achieved in this last 7 8 months because achieved in this last 7 8 months because otherwise it would have been um uh otherwise it would have been um uh engaging a small software house you know engaging a small software house you know and uh engaging some people and so and and uh engaging some people and so and so forth. So AI is helping so forth. So AI is helping if you are smart enough uh or if you are if you are smart enough uh or if you are curious enough and you can ask the right curious enough and you can ask the right questions questions questions every every aspect of the life um let's every every aspect of the life um let's say walk of the life or aspect of the say walk of the life or aspect of the life and I myself as I've said so I have life and I myself as I've said so I have the the IDT we call it genixis IDT which the the IDT we call it genixis IDT which is which is completely the the is which is completely the the industrial side then we have the industrial side then we have the clinical side where we have uh the the clinical side where we have uh the the dal of organs like um we just discussed.

dal of organs like um we just discussed. Then we have uh this pharma twin which Then we have uh this pharma twin which is actually based on our human body is actually based on our human body because we have seen that it could take because we have seen that it could take some drugs and interpreting something some drugs and interpreting something very very well toxicity and this is very very well toxicity and this is where we start building up and then we where we start building up and then we have the pharma then we have also and have the pharma then we have also and you know that that kind of the help you you know that that kind of the help you can expect also for for the patients so can expect also for for the patients so not 10 years from now I'm if you ask me not 10 years from now I'm if you ask me I'm very afraid because if I don't bring I'm very afraid because if I don't bring it in the market in the in the next um it in the market in the in the next um very soon because almost daily I see very soon because almost daily I see something new if not daily but perhaps something new if not daily but perhaps weekly there is something new happening.

weekly there is something new happening. So it is helping almost everything So it is helping almost everything almost um every every business there is almost um every every business there is is currently the buzzword I I I would is currently the buzzword I I I would say. So I would uh in the next 10 years say. So I would uh in the next 10 years of course it it will start to work very of course it it will start to work very very soon but in the next 10 years very soon but in the next 10 years probably um it will be such a big change probably um it will be such a big change as we have probably as we have probably probably not even five five years even probably not even five five years even before as we move from typewriters to before as we move from typewriters to computers you know computers you know >> I love it I mean that's what I keep >> I love it I mean that's what I keep saying the word uh we are moving from a saying the word uh we are moving from a digital transformation to an AI digital transformation to an AI transformation transformation transformation >> exactly >> exactly >> exactly >> that's exactly as big if lot bigger than >> that's exactly as big if lot bigger than the digital for transformation. Dr. Da 5 the digital for transformation. Dr. Da 5 years from now what do you see yourself years from now what do you see yourself [snorts] doing as an internal medicine [snorts] doing as an internal medicine specialist [laughter] specialist [laughter] as Hari was asking like what what what as Hari was asking like what what what what is the vision especially that you what is the vision especially that you are in this cutting edge amazing work are in this cutting edge amazing work that you have done uh uh it's just that you have done uh uh it's just mindboggling what you have done is is mindboggling what you have done is is fascinating but having said that fascinating but having said that what do you see yourself as a physician what do you see yourself as a physician in five years in five years >> I think my core DNA would always be very >> I think my core DNA would always be very very passionate for internal medicine.

very passionate for internal medicine. Uh like this is something that you know Uh like this is something that you know I had been doing and this is something I I had been doing and this is something I will be doing. But making sure that AI will be doing. But making sure that AI is being efficiently utilized in the is being efficiently utilized in the best possible manner so that what we are best possible manner so that what we are doing right now we can make it multiply doing right now we can make it multiply by 10 or multiply by 20 in the next uh by 10 or multiply by 20 in the next uh you know two years, 5 years, 10 years you know two years, 5 years, 10 years down the line. But yes the way we had down the line. But yes the way we had been working it is going to be been working it is going to be completely changed in the next couple of completely changed in the next couple of months to maybe two years. This is not months to maybe two years. This is not stopping because see if we if we remain stopping because see if we if we remain conventional or orthodox that okay this conventional or orthodox that okay this is not coming this is not coming AI is is not coming this is not coming AI is already there sooner or later we have to already there sooner or later we have to surrender to it but we should make sure surrender to it but we should make sure that we utilize the human power the that we utilize the human power the human brain to make it something human brain to make it something worthwhile and worth using like I'm worthwhile and worth using like I'm super confident about our product and we super confident about our product and we do hope and we do u uh you know see do hope and we do u uh you know see ourselves doing something um you know ourselves doing something um you know very much that is not being done in the very much that is not being done in the in the lost. So I think this is what I I in the lost. So I think this is what I I >> I think you're muted.

>> I think you're muted. >> Really grateful to all all of you, Dr. >> Really grateful to all all of you, Dr. Ahmed and Dr. Da for joining us. Ahmed and Dr. Da for joining us.

Exceptionally well done. We're going to Exceptionally well done. We're going to have a separate uh episode done and then have a separate uh episode done and then we're going to push all their platform we're going to push all their platform information into our Substack. Do a information into our Substack. Do a complete online live demo so that complete online live demo so that everyone can see. I'll trust it in front everyone can see. I'll trust it in front of you. Sort of some of these cases that of you. Sort of some of these cases that I have and this way people can utilize I have and this way people can utilize it, people can understand it, people can it, people can understand it, people can invest in it, whatever that case may be.

invest in it, whatever that case may be. Again, extremely grateful for you to Again, extremely grateful for you to join. Word of the day is do not join. Word of the day is do not surrender to AI, learn AI. Thank you so surrender to AI, learn AI. Thank you so much, guys. Thank you very much. Thank much, guys. Thank you very much. Thank you for having us. Bye.

you for having us. Bye. >> Take care. >> Take care. >> Take care. >> Take care. >> Take care. >> Take care.