Podcast Introduction and Guest Welcome

Good morning everyone and thanks for Good morning everyone and thanks for joining Signals and Symptoms podcast joining Signals and Symptoms podcast with our co-host Edward Marks and my with our co-host Edward Marks and my bestie. Uh Harvey is trying to join. I bestie. Uh Harvey is trying to join. I don't know if he's going to be able to don't know if he's going to be able to make it but we are going to go live as make it but we are going to go live as we go ahead with this. Uh first of all we go ahead with this. Uh first of all I'm so grateful that Agata is joining us I'm so grateful that Agata is joining us all the way from Switzerland. She's a all the way from Switzerland. She's a clinical AI scientist at RO and her clinical AI scientist at RO and her claim to flame is that by the way first claim to flame is that by the way first of all you should absolutely follow her of all you should absolutely follow her on LinkedIn. Her posts are very on LinkedIn. Her posts are very educational and amazing. She has been educational and amazing. She has been working as a senior clinical imaging working as a senior clinical imaging data scientist and one of the things data scientist and one of the things that I love about her post is this one that I love about her post is this one and this is something that I want to and this is something that I want to broad bring it up to everyone's mind is broad bring it up to everyone's mind is because what clinical eye should start because what clinical eye should start with is basically the decision not the with is basically the decision not the model. what is the wrong way and what is model. what is the wrong way and what is the bad better way and of course if you the bad better way and of course if you are following her she's going to tell are following her she's going to tell you exactly through her featured post if you exactly through her featured post if you go into her featured post this one you go into her featured post this one specifically is amazing that the role specifically is amazing that the role that will shape the future of healthcare that will shape the future of healthcare AI and that's where she talks about AI and that's where she talks about basically a you know a five-star basically a you know a five-star clinical grade AI person which clinical grade AI person which understands imaging pharma healthcare understands imaging pharma healthcare ownerships AI validations digital bio ownerships AI validations digital bio biomarkers and clinical data scientists biomarkers and clinical data scientists and essentially that what we have been and essentially that what we have been talking about the march towards talking about the march towards precision medicine is not going to be precision medicine is not going to be filled by one person. Uh but her filled by one person. Uh but her expertise Hello expertise Hello >> Janate are you sharing your screen?

>> Janate are you sharing your screen? >> I am. >> I am. >> There we go. Yeah. Um because you were >> There we go. Yeah. Um because you were referencing that doc that article.

referencing that doc that article. >> Oh uh are you able to see >> Oh uh are you able to see >> Yeah. >> Yeah. >> Yeah. >> again or no? >> again or no?

>> Oh I'm sorry. >> Oh I'm sorry. >> Yeah. Yeah. So this one is amazing that >> Yeah. Yeah. So this one is amazing that she what she puts together is what I she what she puts together is what I understand is the true future of understand is the true future of medicine. And then of course uh one more medicine. And then of course uh one more thing clearly she's from Switzerland thing clearly she's from Switzerland gives us an international perspective of gives us an international perspective of the march towards precision medicine as the march towards precision medicine as compared to US uh as well. So thank you compared to US uh as well.

Decision-First AI in Clinical Workflows

So thank you so much for joining. I really appreciate so much for joining. I really appreciate your education. I've learned a lot. So I your education. I've learned a lot. So I want to personally thank you for that.

want to personally thank you for that. And then moving forward I I apologize And then moving forward I I apologize for a broken introduction. I would love for a broken introduction. I would love to give you give us a proper long form to give you give us a proper long form introduction in the sense that why you introduction in the sense that why you do through you go through this uh and do through you go through this uh and clearly it's useful to people if you

clearly it's useful to people if you were wondering ever. So and then were wondering ever. So and then secondly um uh we're going to start with secondly um uh we're going to start with Ed uh questioning and then uh we're Ed uh questioning and then uh we're going to basically step back and going to basically step back and understand what we achieved till 2026 understand what we achieved till 2026 and what do we see in 2030. So thank you and what do we see in 2030. So thank you again for coming.

again for coming. >> Yeah thank you for having me today. >> Yeah thank you for having me today. >> Yeah yeah I'm >> Yeah yeah I'm many data scientist.

many data scientist. Oh my god. I I can [laughter] hear all Oh my god. I I can [laughter] hear all >> I'm going to dientist. >> I'm going to dientist.

>> So now you're getting the echo. >> So now you're getting the echo. >> Yeah. All the time. >> Yeah. All the time. >> I think Why don't you join again? We can >> I think Why don't you join again? We can take a break. We can We're gonna talk take a break. We can We're gonna talk about Ed's dog in the meanwhile.

about Ed's dog in the meanwhile. >> Yeah. I'm surprised >> Yeah. I'm surprised >> Isa hasn't jumped out of the >> Isa hasn't jumped out of the >> bedroom yet.

>> bedroom yet. >> That's okay. It happens. >> That's okay. It happens. >> Yeah, let's let's >> Yeah, let's let's sorry for this. sorry for this. >> No worries. No worries. Take a minute.

>> No worries. No worries. Take a minute. >> Yeah. So, Harvey did come on a little >> Yeah. So, Harvey did come on a little bit earlier and he says hello to bit earlier and he says hello to everyone and everyone and >> Oh, >> Oh, >> Oh, >> he's taking care of a couple things. He >> he's taking care of a couple things. He hopes to join us a little bit later. I hopes to join us a little bit later. I told him he should take us with him told him he should take us with him live. I can't tell you what he's doing live. I can't tell you what he's doing because, you know, don't want to violate because, you know, don't want to violate anything, but uh it's all good. But I anything, but uh it's all good. But I was like, you should uh have take us in was like, you should uh have take us in with you uh live. Um, so but hopefully with you uh live. Um, so but hopefully he'll pop in a little bit later.

he'll pop in a little bit later. >> Yeah, right now this is fine. Yeah. >> Yeah, right now this is fine. Yeah. >> Yeah, >> Yeah, >> Yeah, >> right now it's it's working.

>> right now it's it's working. Yeah, because I was surprised I I joined Yeah, because I was surprised I I joined and I was talking with another guy and and I was talking with another guy and it was okay and then at join it was okay it was okay and then at join it was okay and then you and something happens and and then you and something happens and >> it's all Jade. It's all >> it's all Jade. It's all >> it is it is actually my computer FYI. So >> it is it is actually my computer FYI. So I'm going to stop let's talk I'm going to stop let's talk >> and Ed can continue today >> and Ed can continue today >> or you can make mute then when you don't >> or you can make mute then when you don't talk that because it's kind of talk that because it's kind of confusing. Yeah then let's start. Thank confusing. Yeah then let's start. Thank you for having me today. Thank you for you for having me today. Thank you for the invitation. Uh I'm medical imaging, the invitation. Uh I'm medical imaging, data scientist, data engineer. Um and data scientist, data engineer. Um and yeah, I have a background in biomedical yeah, I have a background in biomedical engineering, medical informatics and engineering, medical informatics and medical imaging. Recently I have worked medical imaging. Recently I have worked at the intersection of medical imaging at the intersection of medical imaging AI um oncology clinical trials, data AI um oncology clinical trials, data infrastructure and data engineering and infrastructure and data engineering and biomarker development as well. Uh during biomarker development as well. Uh during my work uh at pharma uh I have been my work uh at pharma uh I have been working mostly on development AIdriven working mostly on development AIdriven solutions mostly focus on imaging but solutions mostly focus on imaging but not only also clinical data and other not only also clinical data and other data modalities to support decision data modalities to support decision making and get more insights in early making and get more insights in early phase clinical trials in oncology. But phase clinical trials in oncology. But my work was not really limited to to my work was not really limited to to this. Not only uh a huge part of my work this. Not only uh a huge part of my work was make data set mostly imaging data uh was make data set mostly

imaging data uh actually uh ready usable to develop an actually uh ready usable to develop an AI solutions and uh yeah a huge very AI solutions and uh yeah a huge very tedious work uh which is actually very tedious work uh which is actually very relevant after to to develop uh any relevant after to to develop uh any solutions and that experience actually solutions and that experience actually shape one one of my strongest conviction shape one one of my strongest conviction that AI alone is very rarely the real that AI alone is very rarely the real breakthrough. The breakthrough happens breakthrough. The breakthrough happens when the right data, the right model, when the right data, the right model, the workflow, the validation and the the workflow, the validation and the clinical decisions are all were clinical decisions are all were connected together.

connected together.

Data Curation, Standardization, and MLOps

And that is the difference between uh And that is the difference between uh very interesting uh very good uh very interesting uh very good uh technical results and something that can technical results and something that can really support and contribute to drug really support and contribute to drug development, clinical research and at development, clinical research and at >> Absolutely well said. And then this is >> Absolutely well said. And then this is again what we brought into the system again what we brought into the system and uh honestly at some point in time and uh honestly at some point in time I'm going to show you during this I'm going to show you during this presentation the three steps that she presentation the three steps that she talked about uh data uh cleaning talked about uh data uh cleaning basically uh curation of data for basically uh curation of data for training and then which is a big step training and then which is a big step because that's exactly what delivers to because that's exactly what delivers to the end goal of what you're trying to the end goal of what you're trying to do. [snorts] Um I'm going to start with do. [snorts] Um I'm going to start with the first question Agada and that is the first question Agada and that is what your post is all about should start what your post is all about should start with the decision with the decision and how do you define a decision and how do you define a decision in in your own words so that everyone in in your own words so that everyone understands that what you said that the understands that what you said that the difference between the wrong way and the difference between the wrong way and the better way. So u which is very better way. So u which is very interesting that you use did not use the interesting that you use did not use the word wrong way and the right way you use word wrong way and the right way you use the word wrong way and the better way.

the word wrong way and the better way. So I love that uh pun in there. So um so So I love that uh pun in there. So um so in the mean so what exactly um do you in the mean so what exactly um do you feel like is is why are we doing it feel like is is why are we doing it wrong which is very important and wrong which is very important and another of your post uh use the word another of your post uh use the word model as a commodity which is also very model as a commodity which is also very interesting way to put it together and I interesting way to put it together and I think uh these language again we live in think uh these language again we live in a language you know humans are a language you know humans are essentially language and now LLMs are essentially language and now LLMs are taking over and AI is taking over as our taking over and AI is taking over as our language surrogates believe it or not.

language surrogates believe it or not. So let's start with that and then then So let's start with that and then then go backwards and explain to the audience go backwards and explain to the audience that why this concept is so important in that why this concept is so important in from your from what you're describing.

from your from what you're describing. uh I think this this context is relevant uh I think this this context is relevant not only to AI but an clinical solution not only to AI but an clinical solution actually we need to start with the actually we need to start with the question uh with the real goal actually question uh with the real goal actually for whom we create this solution who is for whom we create this solution who is the end user in which decision this the end user in which decision this solution will support I can have an idea solution will support I can have an idea but actually yeah it can be even a rock but actually yeah it can be even a rock of science and it's sophisticated model of science and it's sophisticated model but if this will not support any any but if this will not support any any relevant decision of my end user then it relevant decision of my end user then it will be for nothing actually I need to will be for nothing actually I need to always start with like why do you want always start with like why do you want to build

this what is the decision that to build this what is the decision that uh it will support how it will support uh it will support how it will support your work it's like your work it's like a doctor and so on. For example, the a doctor and so on. For example, the only the measurement or the organ only the measurement or the organ measurement the rad for the radiologist measurement the rad for the radiologist it will yeah itself the number the it will yeah itself the number the volume it will give nothing but for volume it will give nothing but for example the the measurement of the example the the measurement of the lesion or the um the total tumor volume lesion or the um the total tumor volume or the differences between scans and uh or the differences between scans and uh if the patient is progressing on if the patient is progressing on responding. it will give some some responding. it will give some some information and it can support their information and it can support their work. That's why actually this this work. That's why actually this this first question actually and thinking first question actually and thinking about the end user and what are their about the end user and what are their problems and problems and if this solution will support and in if this solution will support and in which way uh it will support their work which way uh it will support their work their problems and uh yeah it should their problems and uh yeah it should support their decisions if it's like for support their decisions if it's like for um uh for pharma if I think about early um uh for pharma if I think about early clinical development like clinical clinical development like clinical scientists, medical doctors, biomarker scientists, medical doctors, biomarker scientists, scientists, scientists, uh how their work look like, what is uh how their work look like, what is their way of thinking, how they perform their way of thinking, how they perform normal their practice during clinical normal their practice during clinical trials, during their research work and trials, during their research work and if my solution can help them make it if my solution can help them make it faster, make it easier faster uh as the faster, make it easier faster uh as the the relevant question, biological or uh the relevant question, biological or uh clinical question and this is something clinical question and this is something that this model this solution should that this model this solution should [laughter] should help them that they [laughter] should help them that they want oh this is great I want to use it want oh this is great I want to use it >> and very often also I saw that we >> and very often also I saw that we develop a different solution but it's develop a different solution but it's like um it's not well defined and it's like um it's not well defined and it's not design fit for purpose for the end not design fit for purpose for the end user. Sometimes it's missing very user. Sometimes it's missing very very small part two or three very small part two or three post-processing step to produce the post-processing step to produce the results in the way that it will be results in the way that it will be helpful and understandable and usable helpful and understandable and usable for them because for example at pharma for them because for example at pharma imaging is is uh not so uh much imaging is is uh not so uh much understandable for for for much many of understandable for for for much many of people. Yeah. this imaging imaging but people. Yeah. this imaging imaging but it's so complex data and uh not all it's so complex data and uh not all clinical scientists clinical scientists or biomarker scientists understand or biomarker scientists understand really the imaging but for example I can really the imaging but for example I can produce the sol eye I solutions a produce the sol eye I solutions a solution based on image and create an solution based on image and create an output that will be understandable for output that will be understandable for them actually not like the image uh like them actually not like the image uh like for radiologist the image with for radiologist the image with annotation and with measurements because annotation and with measurements because for clinical scientists yeah it's like for clinical scientists yeah it's like this image I I I'm not imaging scientist this image I I I'm not imaging scientist I don't understand it that much but if I I don't understand it that much but if I produce the numbers and any graphs or produce the numbers and any graphs or graphics or plots or histograms and uh graphics or plots or histograms and uh and so on and analysis that will okay I and so on and analysis that will okay I see my patient here they progress here see my patient here they progress here this parameters go up Here this goes this parameters go up Here this goes exponential and and so on. Here is rear exponential and and so on. Here is rear linear linear linear correlation and so on. This can really correlation and so on. This can really help them make the decision if in help them make the decision if in absolutely trial or to design any absolutely trial or to design any analysis or get insights for the future analysis or get insights for the future trials.

trials. trials. >> Two quotations that I love about this is >> Two quotations that I love about this is one from Sergey Ben of Google. If you one from Sergey Ben of Google. If you cannot measure it, you cannot improve.

cannot measure it, you cannot improve. But then more importantly, what to But then more importantly, what to measure is the real question that you're measure is the real question that you're trying to go with. And that's where trying to go with. And that's where Harvey Castro start with the end in Harvey Castro start with the end in mind. So he keeps saying that work mind. So he keeps saying that work backwards, work backwards. And uh and

backwards, work backwards. And uh and the idea is that hey, first you need to the idea is that hey, first you need to visualize as you suggested like what visualize as you suggested like what exactly is the output that is needed for exactly is the output that is needed for an end goal. You define it properly and an end goal. You define it properly and you define it clinically with an you define it clinically with an inclusion criteria, an exclusion inclusion criteria, an exclusion criteria, whatever that may be. And you criteria, whatever that may be. And you have you actually create backwards. You have you actually create backwards. You work backwards and basically understand work backwards and basically understand if we need to actually use what kind of if we need to actually use what kind of tooling in terms of measurement. Is it a tooling in terms of measurement. Is it a dice score? Is it a you know a mask? Is dice score? Is it a you know a mask? Is it something that you need as a heat it something that you need as a heat map? Is it something that it requires map? Is it something that it requires clinical judgment? etc. I love that clinical judgment? etc. I love that approach. I think that is something that approach. I think that is something that also if you understand the workflow now also if you understand the workflow now and you can build these agentic systems and you can build these agentic systems which one of my AI engineers is going to which one of my AI engineers is going to join in a minute to show how save life join in a minute to show how save life AI is doing it. I would love your Agata AI is doing it. I would love your Agata your opinion on it as well. But uh that your opinion on it as well. But uh that is truly the core core benefit that is truly the core core benefit that we're looking at. Uh before I move we're looking at. Uh before I move forward, Ed, uh thoughts on uh as as a forward, Ed, uh thoughts on uh as as a as a board member of hospitals and as a board member of hospitals and hospital systems, what what do you what hospital systems, what what do you what what do you see in currently are lacking what do you see in currently are lacking in terms of this decision judgment and in terms of this decision judgment and then what she suggested a very simple then what she suggested a very simple crucial step which by the way she's so crucial step which by the way she's so right. I did the m same mistake in save right. I did the m same mistake in save life here just to let you everyone know life here just to let you everyone know just small stuff that I'm did not just small stuff that I'm did not encount you know encount you know plan for and then all the downstream plan for and then all the downstream work was actually done not wasted but work was actually done not wasted but again the idea is um that we really need again the idea is um that we really need to work with the end in mind and I think to work with the end in mind and I think I want your opinion Ed on your I want your opinion Ed on your experience as well in the community and experience as well in the community and then of course continue on the then of course continue on the >> I think I went the entire year without >> I think I went the entire year without someone having to tell me I was on mute someone having to tell me I was on mute until now. Almost. I almost made it. I, until now. Almost. I almost made it. I, as you saw, my dog made a cameo and so I as you saw, my dog made a cameo and so I I put everything on mute. But, um, we I put everything on mute. But, um, we came out with this book back in May.

came out with this book back in May. It's a European edition. Um, and it's It's a European edition. Um, and it's it's not a book about AI, but as you it's not a book about AI, but as you might expect, it's about innovation. And might expect, it's about innovation. And the majority of innovation this these the majority of innovation this these days, right, are related to AI. But days, right, are related to AI. But yeah, you got to start with the with the yeah, you got to start with the with the the problem in mind. You know, what the problem in mind. You know, what decision uh is is being impacted as decision uh is is being impacted as opposed to, hey, let's let's build this opposed to, hey, let's let's build this new thing, right? and and no, so from a new thing, right? and and no, so from a board perspective, we'd always ask that board perspective, we'd always ask that question when someone came in to pitch question when someone came in to pitch something for a lot of money for some something for a lot of money for some investment. And you know, a lot of investment. And you know, a lot of times, not a lot of times, but a fair times, not a lot of times, but a fair amount of times, it would be more about amount of times, it would be more about building something that was pretty cool building something that was pretty cool as opposed to, wow, what is the question as opposed to, wow, what is the question we're trying to answer? What what's the we're trying to answer? What what's the problem we're trying to solve? And so, problem we're trying to solve? And so, you always had to kind of take it back you always had to kind of take it back and kind of go backwards. So I I I I and kind of go backwards. So I I I I definitely like u the approach that that definitely like u the approach that that you're suggesting and I think the the you're suggesting and I think the the visuals themselves are are very well visuals themselves are are very well done although I'm sure they're AI in AI done although I'm sure they're AI in AI inspired um being an AI uh scientist or inspired um being an AI uh scientist or scientist yourself. So what's I I'm scientist yourself. So what's I I'm curious about you've been you've been a curious about you've been you've been a leader in this realm for some time. What leader in this realm for some time. What what's one thing? I know you might not what's one thing? I know you might not be able to share everything because of be able to share everything because of your employer, but you know,

what's one your employer, but you know, what's one thing that you're super proud of like thing that you're super proud of like that you've been able to do so far?

that you've been able to do so far? this is all this work about image this is all this work about image infrastructure and data standardization. infrastructure and data standardization.

I think maybe it's not so fancy like all I think maybe it's not so fancy like all these AI models that we developed and these AI models that we developed and patented and we had get publication patented and we had get publication which were very interesting and uh and which were very interesting and uh and nice but I think uh this work around the nice but I think uh this work around the data data data and data standardization I I'm very and data standardization I I'm very proud of because it's it's for me kind proud of because it's it's for me kind of the foundation like for everything of the foundation like for everything It's I like this analogy like you build It's I like this analogy like you build a house if you build on the sand or if a house if you build on the sand or if you don't have good fun you can build a you don't have good fun you can build a first floor ground floor first floor.

first floor ground floor first floor. Yeah. Sometime you you are okay. But if Yeah. Sometime you you are okay. But if >> there is um >> there is um um if there is small storm you can put um if there is small storm you can put some thing to make it stable still don't some thing to make it stable still don't crash but later crash but later in the future anyway it will crash. And in the future anyway it will crash. And we had uh kind situation like this. Uh we had uh kind situation like this. Uh but when we step back actually and came but when we step back actually and came back to the data foundations and make back to the data foundations and make the data standardization the data standardization and take a time to standardize a data and take a time to standardize a data and all the way how we transfer the data and all the way how we transfer the data with format and structure and harmonize with format and structure and harmonize and everything. It's actually simplify and everything. It's actually simplify everything afterwards and then you can everything afterwards and then you can build on the top build on the top a lot of AI solution and play and build a lot of AI solution and play and build another floor and make a house uh very another floor and make a house uh very high even like you build first five high even like you build first five floors and then in 10 years another five floors and then in 10 years another five floors. If you have strong fundament floors. If you have strong fundament uh then you can play it and you can uh then you can play it and you can trust it actually and this was kind of trust it actually and this was kind of game changer and uh I got amazing team game changer and uh I got amazing team to work on and uh I think this is the to work on and uh I think this is the Yeah. No, I I can appreciate that. Yeah, Yeah. No, I I can appreciate that. Yeah, you're right. You have to have the right you're right. You have to have the right architecture in place and the standards architecture in place and the standards in order to do the things you're doing.

in order to do the things you're doing. Otherwise, like I've been in Otherwise, like I've been in organizations that I that I've come into organizations that I that I've come into where we were doing some a few great where we were doing some a few great things, but they weren't sustainable things, but they weren't sustainable because there was no structure that because there was no structure that you're talking about. So, I was like, we you're talking about. So, I was like, we have to move. And I think this is true have to move. And I think this is true for AI in healthcare in general and for AI in healthcare in general and pharma in pharma as well is uh we have pharma in pharma as well is uh we have to move from pockets of excellence. Um to move from pockets of excellence. Um well we have to move from pockets of well we have to move from pockets of brilliance to an enterprise of brilliance to an enterprise of excellence. Pockets of brilliance to excellence. Pockets of brilliance to enterprise of excellence. Meaning if we enterprise of excellence. Meaning if we want to have every enterprise you know want to have every enterprise you know everyone doing great things and everyone doing great things and leveraging AI we have to have that leveraging AI we have to have that structure so that everyone benefits and structure so that everyone benefits and there are not these one-off use cases.

there are not these one-off use cases. and what you and the team have done um and what you and the team have done um has really helped that way. So I and I has really helped that way. So I and I appreciate you sharing all that appreciate you sharing all that information uh so freely on your information uh so freely on your LinkedIn which we did post the your LinkedIn which we did post the your LinkedIn profile in the comment section LinkedIn profile in the comment section for everyone to uh take a look at and uh for everyone to uh take a look at and uh definitely follow you. I I had one more definitely follow you. I I had one more >> after after time >> after after time >> time and we

had to >> time and we had to take this time we we didn't realize that take this time we we didn't realize that from the beginning. It was kind of the from the beginning. It was kind of the learning curve that it is important and learning curve that it is important and actually after we cannot actually after we cannot go further without stepping back to to go further without stepping back to to the foundation and to data the foundation and to data standardization, standardization, standardization, we cannot proceed. But I think like way we cannot proceed. But I think like way seven years ago like when I started in seven years ago like when I started in we were not aware about this and this we were not aware about this and this was like early time all this was like early time all this digitalization digitalization digitalization and using data and figuring out that and using data and figuring out that yeah data are very useful and we have a yeah data are very useful and we have a lot of data and we can make use of it lot of data and we can make use of it and so on. uh yeah this required that and so on. uh yeah this required that time but uh yeah I think we we couldn't time but uh yeah I think we we couldn't do that from the beginning it was we do that from the beginning it was we were not aware of it were not aware of it >> I mean absolutely amazing uh stuff it's >> I mean absolutely amazing uh stuff it's kind of important um which brings us to kind of important um which brings us to what we have done and why and that's what we have done and why and that's exactly the follow through of course exactly the follow through of course we're not ro and we're not as big but I we're not ro and we're not as big but I just want you to understand with the just want you to understand with the process that we have built is called process that we have built is called vision operations and we have moved from vision operations and we have moved from in save life AI from building basic in save life AI from building basic image analysis to what we call VLM which image analysis to what we call VLM which is vision and language model analysis is vision and language model analysis and then the first step as you suggested and then the first step as you suggested is essentially uh creating a dashboard is essentially uh creating a dashboard for data cleaning and everything. So for for data cleaning and everything. So for our first project uh like everyone does our first project uh like everyone does and we have 16 other projects that we and we have 16 other projects that we don't want to get into right now which don't want to get into right now which are company intellectual property but are company intellectual property but it's basically simply taking the chest it's basically simply taking the chest X-ray and making it as a draft uh and X-ray and making it as a draft uh and making a whole chest X-ray uh as a making a whole chest X-ray uh as a operational radiology report. So that operational radiology report. So that was the goal. So we define the goal and was the goal. So we define the goal and then we define the as you suggested and then we define the as you suggested and I just wanted people to understand what I just wanted people to understand what she's saying and why it is so important she's saying and why it is so important in a pure you know usable structure in a pure you know usable structure otherwise it becomes really hard to otherwise it becomes really hard to visualize this and it's extremely visualize this and it's extremely important lesson that I learned uh important lesson that I learned uh personally as well so the structure the personally as well so the structure the idea was that that radiologist will be idea was that that radiologist will be able to see a pre-built completed chest able to see a pre-built completed chest X-ray report and they will actually X-ray report and they will actually review it and then click Yes and no and review it and then click Yes and no and quickly go through this. So uh uh so quickly go through this. So uh uh so this is our data studio and that's this is our data studio and that's exactly what you suggested. We look at exactly what you suggested. We look at the open-source data then we look at our the open-source data then we look at our own data and then we automatically look own data and then we automatically look at the reports and the radiology reports at the reports and the radiology reports then become automated extraction in a then become automated extraction in a way that actually takes out all the way that actually takes out all the positive and negative findings. This is positive and negative findings. This is again all done automated because we just again all done automated because we just click okay use this data and once that click okay use this data and once that is done is done um then we move on to today's uh um then we move on to today's uh microphone issues are not actually microphone issues are not actually getting better unfortunately I don't getting better unfortunately I don't sorry uh Shahav can you uh speak up on sorry uh Shahav can you uh speak up on this one what you're showing I'm sorry this one what you're showing I'm sorry >> hi Hi everyone. So uh can you hear me?

>> hi Hi everyone. So uh can you hear me? >> Yeah. So this is our data studio >> Yeah. So this is our data studio basically and what the part of this data basically and what the part of this data studio is to take any type of raw data studio is to take any type of raw data and pre-process it and curate it and pre-process it and curate it according to what we want in according to what we want in fine-tuning. Uh it basically converts it fine-tuning. Uh it basically converts it uh removes duplicates and every type of uh removes duplicates and every type of processes uh we need before cleaning the processes uh we need before cleaning the data are defined in our agenting system.

data are defined in our agenting system. Basically there is a tool for Basically there is a tool for everything. uh for example there is a everything. uh for example there is a tool for converting diccom to PNG what tool for converting diccom to PNG what we require in finetine tuning so what we we require in finetine tuning so what we do is we give the raw data to an LLM and do is we give the raw data to an LLM and it decides that what what kind of it decides that what what kind of processes or procedures would need and processes or procedures would need and it would automatically uh clean the data it would automatically uh clean the data set and even report us about it just for set and even report us about it just for example that the data set I was showing example that the data set I was showing you was about uh was on CXR data set you was about uh was on CXR data set chest X-ray and if I would go into tools chest X-ray and if I would go into tools and here we uh this ready and it uh and here we uh this ready and it uh defined us everything that what kind of defined us everything that what kind of uh score it is has uh given to the data uh score it is has uh given to the data set how many rows he he has removed and set how many rows he he has removed and which were the faulty images and which were the faulty images and everything is done pre-process using uh everything is done pre-process using uh an LLM added score and you can even view an LLM added score and you can even view the trial and see that how and which the trial and see that how and which steps it performed basically and when steps it performed basically and when This data is ready. You can also This data is ready. You can also generate labels with the help of its own generate labels with the help of its own pipeline that's called autolabeling. And pipeline that's called autolabeling. And if you will go here, you will see that if you will go here, you will see that it has this it has this >> explain this uh this is um one of the >> explain this uh this is um one of the biggest innovations and uh coming out of biggest innovations and uh coming out of it is that when we have the AI extracted it is that when we have the AI extracted findings from a radiology report, we findings from a radiology report, we have what we call the god mode. And then have what we call the god mode. And then the god mode is that we use a very large the god mode is that we use a very large foundation level model to basically foundation level model to basically you know ensure that we actually have you know ensure that we actually have the correct findings and it does from the correct findings and it does from imaging to the radiology and then we use imaging to the radiology and then we use 15 different small models to basically 15 different small models to basically point it out. Um and again I don't want point it out. Um and again I don't want to show this over here because I just to show this over here because I just don't want everyone to know what we're don't want everyone to know what we're doing just yet. But what I'm saying is doing just yet. But what I'm saying is that that that you what you suggested that that that you what you suggested starting and end in mind data curation starting and end in mind data curation pipeline data conversion pipeline data pipeline data conversion pipeline data tooling is all automated from even if tooling is all automated from even if the data comes from an open source which the data comes from an open source which you know can have some major issues or you know can have some major issues or it comes from our own pipeline which is it comes from our own pipeline which is you know uh our priority uh our you know uh our priority uh our propriety pipeline of 1.2 into million propriety pipeline of 1.2 into million images and then we actually go back and images and then we actually go back and completely automate the data curation completely automate the data curation process and the final is essentially we process and the final is essentially we get three tiers tier one is you know 90% get three tiers tier one is you know 90% or so above labeled ground truth data or so above labeled ground truth data which does not require any radiology or which does not require any radiology or anything input Harvey are you looking at anything input Harvey are you looking at this we basically built a whole MLOps this we basically built a whole MLOps for this uh and then we move to the next for this uh and then we move to the next step uh is basically go ahead and show step uh is basically go ahead and show the model training training pipeline.

the model training training pipeline. >> Sure. So this is our model training >> Sure. So this is our model training pipeline. Uh here in model ops and uh pipeline. Uh here in model ops and uh whenever you have to train a model you whenever you have to train a model you just go uh click at new you choose that just go uh click at new you choose that what type of fine training you need. You what type of fine training you need. You need sfdpo you choose framework you need sfdpo you choose framework you choose the model here and then you would choose the model here and then you would go on and it is connected to hugging go on and it is connected to hugging face. You can uh give it any kind of face. You can uh give it any kind of model VLM, LLM, V models and it will model VLM, LLM, V models and it will automatically automatically select the automatically automatically select the model and it would tell you how much GPU model and it would tell you how much GPU need how much time it would take need how much time it would take according to the data set and it will according to the data set and it will automatically uh it has WB integrated automatically uh it has WB integrated within it and it would even monitor the within it and it would even monitor the whole loss function and give you a whole loss function and give you a

complete report when the model is saved complete report when the model is saved where it's saved where its adapters are where it's saved where its adapters are saved was it successful yes or no saved was it successful yes or no everything. you're giving too much everything.

Precision Medicine, Governance, and Data Sharing

you're giving too much detail out in terms of a public detail out in terms of a public information. [laughter] information. [laughter] So what what I'm trying to say is that So what what I'm trying to say is that um you I just want the audience to um you I just want the audience to understand what Agata has been talking understand what Agata has been talking about and what the industry at least me about and what the industry at least me and everyone that I know of is moving and everyone that I know of is moving for forward and not to mention the whole for forward and not to mention the whole LLM pipeline. What what we consider this LLM pipeline. What what we consider this is three major steps. um data curation is three major steps. um data curation when done of course that has 17 steps when done of course that has 17 steps but once you have the data curation we but once you have the data curation we have the testing we have the have the testing we have the benchmarking and the last one which is benchmarking and the last one which is the most beautiful one is auto research the most beautiful one is auto research because the way that we we serve because the way that we we serve fine-tuned models is called Laura heads fine-tuned models is called Laura heads l heads and then we can adopt Laura l heads and then we can adopt Laura heads accordingly and that what that heads accordingly and that what that means is that that it can change from if means is that that it can change from if the modality is just X-ray the modality the modality is just X-ray the modality is CT then chest X-ray is it the foot or is CT then chest X-ray is it the foot or is it the chest or is it you know X-ray is it the chest or is it you know X-ray what kind of X-ray same thing with the what kind of X-ray same thing with the CT and then eventually we're going to CT and then eventually we're going to come to MRI as well because what we come to MRI as well because what we believe in one large foundation model believe in one large foundation model which is great people believe that but which is great people believe that but then you have to have inference cost you then you have to have inference cost you have to understand electricity cost you have to understand electricity cost you have to understand server cost you have have to understand server cost you have to like I don't want to build another to like I don't want to build another hugging face right so what I'm saying is hugging face right so what I'm saying is that you have to understand that that you have to understand that inference is also extremely important inference is also extremely important and then of course the margin calls and then of course the margin calls because if I build a model I don't want because if I build a model I don't want to pay everything to Google so we are to pay everything to Google so we are building everything in inside ourselves building everything in inside ourselves to build margins anyway so what Agata to build margins anyway so what Agata was saying is that focus on the goal was saying is that focus on the goal what Hari keeps saying is put an end in what Hari keeps saying is put an end in mind and then walk backwards and this is mind and then walk backwards and this is exactly what we did and then we exactly what we did and then we basically automated the whole process of basically automated the whole process of what Agada is saying because if you what Agada is saying because if you don't have the end in mind. We don't don't have the end in mind. We don't have the right measuring tools. If you have the right measuring tools. If you don't have the right measuring tools, don't have the right measuring tools, everything else is falling everything else is falling Like everything moving forward is Like everything moving forward is So going back one more time, So going back one more time, testing. So we do baseline testing from testing. So we do baseline testing from a god mode foundation model because a god mode foundation model because that's the one to beat. Then we have to that's the one to beat. Then we have to do benchmarking with multiple different do benchmarking with multiple different models and then we decide which one models and then we decide which one which model have we have to fine-tune in which model have we have to fine-tune in that particular specific situation. By that particular specific situation. By the way, again, Harvey, uh I I know the way, again, Harvey, uh I I know you're on mute, but we had this you're on mute, but we had this discussion last week between Quinn discussion last week between Quinn uh open source models, which are which uh open source models, which are which we use what we call medium-sized models we use what we call medium-sized models like 3.6 billion parameters, sorry, 35 like 3.6 billion parameters, sorry, 35 billion, 27 billion parameters or Gemma, billion, 27 billion parameters or Gemma, which is the Google's, you know, which is the Google's, you know, fine-tuning because these are the two fine-tuning because these are the two open source options that I have. But open source options that I have. But anyways, I just wanted to put that anyways, I just wanted to put that perspective of hers and make everyone perspective of hers and make everyone understand that we are putting it in understand that we are putting it in practice. We have been putting it in practice. We have been putting it in

practice. Of course, it took us some practice. Of course, it took us some time. So again um um Agada thank you for time. So again um um Agada thank you for educating again u ro and everyone else educating again u ro and everyone else can also look into this automation can also look into this automation complete once you have the data we give complete once you have the data we give you all the way complete data and of you all the way complete data and of course models but more importantly for course models but more importantly for the audience to understand that how fast the audience to understand that how fast the flywheel is going. It used to take the flywheel is going. It used to take us month months to get that grounded us month months to get that grounded data and now it takes us days not not data and now it takes us days not not even days sometimes hours because it is even days sometimes hours because it is going that insane in terms of that which going that insane in terms of that which brings us to my question and that more brings us to my question and that more important question like how do you see important question like how do you see because this is this is mindboggling because this is this is mindboggling that I'm doing it sitting in Chicago you that I'm doing it sitting in Chicago you know a lonely neurologist so what what know a lonely neurologist so what what do you think is going to the future is do you think is going to the future is >> I think you're mute right now.

>> I think you're mute right now. >> now that this flywheel is out when >> now that this flywheel is out when people are can build. I mean it used to people are can build. I mean it used to be only available to larger corporations be only available to larger corporations with massive amount of people going with massive amount of people going through this process and now you know through this process and now you know startups like me which which is what a startups like me which which is what a rounding error for large corporations rounding error for large corporations essentially essentially essentially is able to do so now we're looking at is able to do so now we're looking at like and it's just mindboggling I'm just like and it's just mindboggling I'm just saying that I mean to me self like how saying that I mean to me self like how am I able to do it let alone I'm am I able to do it let alone I'm grateful to the Lord that I'm able to do grateful to the Lord that I'm able to do it and we're gonna save lives as our it and we're gonna save lives as our company stands. But but what do you see company stands. But but what do you see the future of AI and how would you do the future of AI and how would you do that precision? How what is your what do that precision? How what is your what do you look at the vision of precision you look at the vision of precision medicine finally that we have this fly medicine finally that we have this fly wheel and then what does the future look wheel and then what does the future look like to you?

like to you? >> Uh yeah first of all I strongly believe >> Uh yeah first of all I strongly believe in precision medicine and personalized in precision medicine and personalized healthcare. I think that's the healthcare. I think that's the definitely the the way to go and we are definitely the the way to go and we are slowly faster or slower going in that slowly faster or slower going in that direction because the the time where we direction because the the time where we had a drug and it is working for had a drug and it is working for everybody. I think this uh this will not everybody. I think this uh this will not come anymore especially to oncology to come anymore especially to oncology to any advanced therapies uh which are very any advanced therapies uh which are very expensive and even it's also affect the expensive and even it's also affect the patient body and so on then I strongly patient body and so on then I strongly believe that we should give the right believe that we should give the right drug and right therapy to to the right drug and right therapy to to the right patient patient patient and uh and in this uh in this direction and uh and in this uh in this direction and in personalized healthcare and in personalized healthcare definitely AI solution will play a definitely AI solution will play a crucial role crucial role and and and yeah I think without a I solution we yeah I think without a I solution we cannot go further and I think this is cannot go further and I think this is the the future of medicine and the the future of medicine and personalized healthcare a a AI I personalized healthcare a a AI I dedicated solution to to support dedicated solution to to support decision making uh uh to to support like decision making uh uh to to support like patient stratification patient stratification uh therapy response prediction.

uh therapy response prediction. Uh yeah, that's Uh yeah, that's my my answer for this question. I think my my answer for this question. I think very broad. I will not go to the very broad. I will not go to the dictates because we can we can talk for dictates because we can we can talk for for hours. But uh for hours. But uh I think I think >> I love it. No, so you're you're right. I >> I love it. No, so you're you're right. I mean it's a very un so let let me mean it's a very un so let let me clarify this and I'm going to put this clarify this and I'm going to put this question to Ed first. So Ed let me tell question to Ed first. So Ed let me tell you a study first. So the study is of you a study first. So the study is of large language foundation models and large language foundation models and then they basically gave a bunch of then they basically gave a bunch of images from radiology and they asked a images from radiology and

they asked a question with images and without images question with images and without images to basically create a report or a to basically create a report or a prediction and interestingly without prediction and interestingly without even providing the images the report was even providing the images the report was the same. Essentially they use the term the same. Essentially they use the term not even hallucilation that uses the not even hallucilation that uses the term mirage and the mirage was that that term mirage and the mirage was that that hey they are actually looking at the hey they are actually looking at the images. It took us a lot of time to images. It took us a lot of time to engineer AI models out of this mirage.

engineer AI models out of this mirage. By the way, it takes like insane amount By the way, it takes like insane amount of time for us to engineer out of it of time for us to engineer out of it which is again was a real challenge that which is again was a real challenge that we solved. But but what I'm saying is we solved. But but what I'm saying is that that um that's number one which that that um that's number one which brings us very interesting point. The brings us very interesting point. The learning of that study was that the learning of that study was that the clinical data that they had access to clinical data that they had access to the patient's cough, the patient's the patient's cough, the patient's saturation numbers, the patients, I saturation numbers, the patients, I don't know, Apple watch and Google watch don't know, Apple watch and Google watch and whatever was so crucial in and whatever was so crucial in understanding and as a matter of fact it understanding and as a matter of fact it was freaking interesting that they don't was freaking interesting that they don't even look at the chest X-ray and even look at the chest X-ray and predicted the pneumonia without it. So predicted the pneumonia without it. So what I'm saying is that that we always what I'm saying is that that we always talk about these data silos and then of talk about these data silos and then of course we always talk about Harvey is in course we always talk about Harvey is in and out today but he talks about AI and out today but he talks about AI governance. Um governance. Um what what do you see when when you take what what do you see when when you take this information as a board member and this information as a board member and then you need to evaluate these then you need to evaluate these multi-million dollar deals which you're multi-million dollar deals which you're going to get save life into. What I'm going to get save life into. What I'm saying is that how do you actually talk saying is that how do you actually talk to board members and other internal to board members and other internal evaluators of studies that that this evaluators of studies that that this complexity like I'm just going to be complexity like I'm just going to be honest with you there are people who are honest with you there are people who are building solution who doesn't even read building solution who doesn't even read some of these clinical studies and some of these clinical studies and mirage effect and all of that. So, so go mirage effect and all of that. So, so go ahead just just your your comments ahead just just your your comments comments.

comments. comments. >> Well, first on the on the last question >> Well, first on the on the last question to Agata is like uh in the and I think to Agata is like uh in the and I think in the age that we are in, you know, in the age that we are in, you know, asking for a five-year prediction is not asking for a five-year prediction is not is not wise. I'm always like one year we is not wise. I'm always like one year we we're we're good if we can get 70% I we're we're good if we can get 70% I think of what might happen in the next think of what might happen in the next year. It's kind of funny because I still year. It's kind of funny because I still see health systems. So, I'm I mostly see health systems. So, I'm I mostly work on the health system side, not life work on the health system side, not life sciences. So, I don't know what it's sciences. So, I don't know what it's like on life sciences, but in health like on life sciences, but in health systems, you know, they're still systems, you know, they're still crafting fiveyear plans, which crafting fiveyear plans, which kind of makes me giggle because um they kind of makes me giggle because um they have no idea, you know, no one does uh have no idea, you know, no one does uh what's going to be going on five years.

what's going to be going on five years. So, I always tell people to have a you So, I always tell people to have a you know, a year plan and continuously know, a year plan and continuously iterate on iterate on >> um so yeah. So to your Jana, to your >> um so yeah. So to your Jana, to your larger question, I I I can't mention the larger question, I I I can't mention the health system because I just don't know health system because I just don't know if it's public and if anyone wants it to if it's public and if anyone wants it to be public, but what I love and I was be public, but what I love and I was invited to be part of this. Uh so invited to be part of this. Uh so they're taking the board to their they're taking the board to their primary electronic health record vendor primary electronic health record vendor campus and doing a visit. Um and why are campus and doing a visit. Um and why are they doing that? to educate the board to they doing that? to educate the board to learn and they're going to learn about learn and they're going to learn about all of the types of things we're talking all of the types of things we're talking about and it's like an

immersive about and it's like an immersive experience and and that's what I that's experience and and that's what I that's what I always encourage Jana is like what I always encourage Jana is like because yeah you have to make these because yeah you have to make these tough decisions you know and they're tough decisions you know and they're smart people typically on a board but smart people typically on a board but but this is brand new territory for 95% but this is brand new territory for 95% of them and so you have to create of them and so you have to create immersive experiences like I love to immersive experiences like I love to climb mountains so I've climbed the climb mountains so I've climbed the highest five of the seven highest peaks highest five of the seven highest peaks in the world and like I love like before in the world and like I love like before I take on the Matterhorn or the Iger or I take on the Matterhorn or the Iger or the Yungfra, my favorite mountains in uh the Yungfra, my favorite mountains in uh Switzerland, you know, I'm I'm going to Switzerland, you know, I'm I'm going to do an immersive experience in uh well, do an immersive experience in uh well, Mount Reneer in Washington, which is a Mount Reneer in Washington, which is a great sort of uh great sort of uh uh step uh trial pilot test, if you uh step uh trial pilot test, if you will, um you know, before I take on will, um you know, before I take on something like that. And and so I think something like that. And and so I think that's what leaders have to do is not that's what leaders have to do is not just you know boards but the seauite of just you know boards but the seauite of these organizations you have to have an these organizations you have to have an immersive experience. It's it's not good immersive experience. It's it's not good enough to watch a YouTube video how to enough to watch a YouTube video how to climb you know or watch the iiger climb you know or watch the iiger sanction. It's not going to help you get sanction. It's not going to help you get to the top. Uh we literally had to the top. Uh we literally had executives use a green screen behind executives use a green screen behind them pretending they were climbing a them pretending they were climbing a mountain. That's how I got into mountain mountain. That's how I got into mountain climbing in the very beginning. I won't climbing in the very beginning. I won't go further in that story because it's go further in that story because it's not gerine to our topic but that's what not gerine to our topic but that's what got me into it. I was like, "Oh my gosh, got me into it. I was like, "Oh my gosh, they're talking about climbing a they're talking about climbing a mountain in our strategy and they're mountain in our strategy and they're using a green screen." It's like, no.

using a green screen." It's like, no. So, you got to you got to be immersive. So, you got to you got to be immersive. So, I applaud this health system that is So, I applaud this health system that is taking their team to their number one um taking their team to their number one um you know uh vendor if you will. And I you know uh vendor if you will. And I used to do the same thing as a seauite used to do the same thing as a seauite member where um I would take once a year member where um I would take once a year we would go to our five main strategic we would go to our five main strategic partners Janate and Agata and Harvey and partners Janate and Agata and Harvey and so we would learn from them and you know so we would learn from them and you know connect on a higher level. So you have connect on a higher level. So you have to do the immersive experience in order to do the immersive experience in order to truly understand. So Jane I hope that to truly understand. So Jane I hope that answered uh your question.

answered uh your question. >> No love it. Um and Agatha that's why we >> No love it. Um and Agatha that's why we bring this together is for people to bring this together is for people to understand from a technologist and then understand from a technologist and then by the way Harvey Castro is an emergency by the way Harvey Castro is an emergency physician medicine and he is also part physician medicine and he is also part of phantom space and then of course your of phantom space and then of course your guests like you educate the whole guests like you educate the whole community and exemplify what we are community and exemplify what we are trying to do from all stakeholders trying to do from all stakeholders because people forget it's a because people forget it's a multistakeholder game. Harvey is back in multistakeholder game. Harvey is back in his car. Harvey, the mic is yours. Honor his car. Harvey, the mic is yours. Honor to be here. Thank you so much for h to be here. Thank you so much for h coming [clears throat and cough] and uh coming [clears throat and cough] and uh sorry I missed it. I had my annual sorry I missed it. I had my annual physical so I had to go see the doctor.

physical so I had to go see the doctor. Unfortunately I almost moved it but uh Unfortunately I almost moved it but uh >> So uh I hope you did not miss the MLOps >> So uh I hope you did not miss the MLOps but I think we're going to set up a se but I think we're going to set up a se separate meeting for you to sort of show separate meeting for you to sort of show off the what we internally call MLOps off the what we internally call MLOps for whole complete vision. So Akata for whole complete vision. So Akata moving to the next question and then um moving to the next question and then um then I talked about precision medicine then I talked about precision

medicine and we talked about data silos. Give us and we talked about data silos. Give us an idea about Switzerland's an idea about Switzerland's uh infrastructure because in here in US uh infrastructure because in here in US we are I I have no idea there are 500 at we are I I have no idea there are 500 at least EMRs that I know of 500. There's least EMRs that I know of 500. There's no single data source for radiology or no single data source for radiology or anything. So show show people and make anything. So show show people and make us jealous that how Switzerland is us jealous that how Switzerland is [laughter] [laughter] [laughter] ahead of us in terms of data aggregation ahead of us in terms of data aggregation so that these tooling can actually so that these tooling can actually really distribute fast improve patient really distribute fast improve patient lives much faster than what we have lives much faster than what we have designed here.

designed here. >> I think Switzerland health care system >> I think Switzerland health care system and uh all here is is private. There is and uh all here is is private. There is no public. Then for everything you need no public. Then for everything you need to pay this is the main difference.

to pay this is the main difference. Uh to answer for your question to be Uh to answer for your question to be honest I'm not I haven't used that much honest I'm not I haven't used that much uh Switzerland health care system and uh Switzerland health care system and I'm not so so but I visited several I'm not so so but I visited several sites for work. Uh sites for work. Uh I think this digitalization is going in I think this digitalization is going in good direction. Also they are using AI good direction. Also they are using AI solution. What I have seen in some some solution. What I have seen in some some practice radiological practice of practice radiological practice of hospitals and uh uh they are very hospitals and uh uh they are very advanced and and open for for advanced and and open for for technology. Uh but yeah like yesterday I technology. Uh but yeah like yesterday I was in Germany at hospital and there are was in Germany at hospital and there are a lot of like paper works we we are a lot of like paper works we we are talking about AI but there is another talking about AI but there is another huge work still to do uh in huge work still to do uh in not especially in AI but in not especially in AI but in digitalization.

digitalization. digitalization. >> So just to give you my u experience a >> So just to give you my u experience a little bit um I have been approached by little bit um I have been approached by countries from Venezuela, Colombia, countries from Venezuela, Colombia, Mexico, Spain and of course we have been Mexico, Spain and of course we have been uh in contact with Qatar and uh uh in contact with Qatar and uh everyone. I think you're absolutely everyone. I think you're absolutely right. the the core difference between right. the the core difference between public and private uh at least in terms public and private uh at least in terms of reimbursement makes a huge difference of reimbursement makes a huge difference where the data lies. What happens is where the data lies. What happens is that that at some point in time uh the that that at some point in time uh the data essentially becomes the core uh data essentially becomes the core uh value proposition and of course since value proposition and of course since there is policy level control um on the there is policy level control um on the data itself is is essential and I don't data itself is is essential and I don't I understand that people keep talking I understand that people keep talking about and your opinion on it is it about and your opinion on it is it really the private and the public really the private and the public because all banks are private because all banks are private but it's so easy to move money but it's so easy to move money like what the hell is going on here?

like what the hell is going on here? Like do you understand what I'm trying Like do you understand what I'm trying to say? [laughter] to say? [laughter] So um So um uh having said that uh and you you have uh having said that uh and you you have been traveling Harvey I don't know if been traveling Harvey I don't know if you can hear in uh what are your you can hear in uh what are your thoughts on this so that we can you know thoughts on this so that we can you know in terms of Singapore experience of in terms of Singapore experience of yours and everything so that audience yours and everything so that audience can understand and does it does it feel can understand and does it does it feel like at some point in time we're going like at some point in time we're going Well, I'll jump in first. So, you know, Well, I'll jump in first. So, you know, when we did this book, you know, we had when we did this book, you know, we had 25 of the 42 European countries 25 of the 42 European countries participate.

participate. participate. Um, and so I got a little bit of a Um, and so I got a little bit of a glimpse. Obviously, it's not a complete glimpse. Obviously, it's not a complete volume, but I got a little bit of volume, but I got a little bit of glimpse. I I think everyone struggles glimpse. I I think everyone struggles just like the United States. Uh, even in just like the United States. Uh, even in in countries where medicine is sort of, in countries where medicine is sort of,

you know, socialized, if you will. uh you know, socialized, if you will. uh public uh even in those countries public uh even in those countries there's lots of silos that remain. Now there's lots of silos that remain. Now there are maybe a couple of handful of there are maybe a couple of handful of countries that are super small.

countries that are super small. Singapore Harvey could speak to that Singapore Harvey could speak to that have a lot of government control and can have a lot of government control and can you know top down do a lot of things to you know top down do a lot of things to try to make it tighter but by and large try to make it tighter but by and large most countries are very similar to most countries are very similar to United States uh separate data pools and United States uh separate data pools and then even in the countries which are then even in the countries which are heavily again I don't mean it in a heavily again I don't mean it in a negative in a political term but negative in a political term but socialized um they're also spawning socialized um they're also spawning private alternatives. England, great private alternatives. England, great example. Canada, great example.

example. Canada, great example. Switzerland, I know. Um, I think every Switzerland, I know. Um, I think every country I know where there's public country I know where there's public health system that's pervasive and health system that's pervasive and available to all citizens, there's a available to all citizens, there's a private underground uh that people are private underground uh that people are utilizing because of dissatisfaction utilizing because of dissatisfaction with the public systems. Um, so there's with the public systems. Um, so there's no perfect solution, but it would be no perfect solution, but it would be nice whether it was public or private nice whether it was public or private So now coming back to Agata U again and So now coming back to Agata U again and then now you have designed a system then now you have designed a system which is for a private company which is which is for a private company which is fair. Uh I will not put you at fault on fair. Uh I will not put you at fault on that. I'm just kidding. What I'm saying that. I'm just kidding. What I'm saying is that that let's say let's assume you is that that let's say let's assume you are now officially the health minister are now officially the health minister of Switzerland. How would you drive the of Switzerland. How would you drive the policy so that you can drive this new policy so that you can drive this new innovation innovation innovation for data for basically you know a for data for basically you know a continuous learning continuous learning >> the country I think I heard also I I >> the country I think I heard also I I forgot to mention about the initiative forgot to mention about the initiative in Switzerland but I'm not like yeah on in Switzerland but I'm not like yeah on on it really That's uh yeah uh that on it really That's uh yeah uh that there is uh they are working about the there is uh they are working about the database with the data set of the database with the data set of the patient that will be available uh patient that will be available uh somehow for research purpose uh somehow for research purpose uh anonymize of course and under several anonymize of course and under several conditions like to drive the innovation conditions like to drive the innovation in healthcare uh in in Switzerland in healthcare uh in in Switzerland and uh yeah I would imagine as well kind and uh yeah I would imagine as well kind of database of database with anonymize. Of course under with anonymize. Of course under restricted use under right governance restricted use under right governance actually that we can make use of this actually that we can make use of this data to share shape the future of data to share shape the future of innovation of healthcare and drive uh innovation of healthcare and drive uh the medics in in in good direction that the medics in in in good direction that we improve patient life and make an we improve patient life and make an impact uh in healthcare because just impact uh in healthcare because just keeping a data set sitting without using keeping a data set sitting without using and making the bigger storage and and so and making the bigger storage and and so on. This is yeah for for nothing. If we on. This is yeah for for nothing. If we can uh use it for good then let's let's can uh use it for good then let's let's let's do it and make it available of let's do it and make it available of course under several conditions for the course under several conditions for the right people uh to make use of it right people uh to make use of it research institutions or uh maybe also research institutions or uh maybe also also private to uh to to drive the also private to uh to to drive the same question to you. You are now same question to you. You are now officially officially officially uh head of health and human services in uh head of health and human services in [laughter] [laughter] Sorry, that that was a general that Sorry, that that was a general that you're talking about general generally.

you're talking about general generally. Um yeah I I would do whatever I can to Um yeah I I would do whatever I can to make healthcare available to everyone make healthcare available to everyone and um I don't know what and um I don't know what >> more towards u the data silos and >> more towards u the data silos and research and all of that from a research and all of that from a >> dig is doing what the government does >> dig is doing what the government does and that's create and that's create a lot of rules and regulations you know a lot of rules and

regulations you know to try to force people and organizations to try to force people and organizations to share data and I I ran into something to share data and I I ran into something super interesting this morning, but it super interesting this morning, but it was like 4:30 this morning and I kind of was like 4:30 this morning and I kind of forgot how they described it, but they forgot how they described it, but they were basically it's a famous theory were basically it's a famous theory where eventually the more rules and where eventually the more rules and regulations you have, the the the regulations you have, the the the entities that you're trying to control entities that you're trying to control with those actually become the drivers with those actually become the drivers of those regulations. It was super super of those regulations. It was super super interesting. I wish I could give credit interesting. I wish I could give credit to where I read it, but it was super I to where I read it, but it was super I woke up super early this morning and so woke up super early this morning and so I just got up and I was on the treadmill I just got up and I was on the treadmill and I was reading a few things and and and I was reading a few things and and that was one of these theories and they that was one of these theories and they gave some examples how that's happened.

gave some examples how that's happened. I was like, "Wow, that really does I was like, "Wow, that really does happen." So, uh, so you have to be happen." So, uh, so you have to be really careful. So, back to your really careful. So, back to your question, like what would you do? Man, I question, like what would you do? Man, I I hate to have a bunch of rules and I hate to have a bunch of rules and regulations. I think I would just come regulations. I think I would just come get rid of all of them and come up with get rid of all of them and come up with one. like if you don't share, you know, one. like if you don't share, you know, you're you're we're going to, you know, you're you're we're going to, you know, put you out of bit. You can't do put you out of bit. You can't do business. You have to share. And uh business. You have to share. And uh there's so many data silos that exist there's so many data silos that exist today because of competitive reasons and today because of competitive reasons and and you know, different different and you know, different different reasons. I want to get into it, right?

reasons. I want to get into it, right? You know, in this particular show, but I You know, in this particular show, but I think you almost have to make it make it think you almost have to make it make it happen. You have to take a a heavier happen. You have to take a a heavier hand and and make it happen because hand and and make it happen because we've been playing around with this for we've been playing around with this for years. And who who loses? The patients.

years. And who who loses? The patients. Patients die. People die because we Patients die. People die because we don't share the right data and that's don't share the right data and that's that's criminal.

that's criminal. >> So true. Um Boeing is an amazing example >> So true. Um Boeing is an amazing example of this. If you don't know FA is of this. If you don't know FA is basically run by Boeing if you let's basically run by Boeing if you let's just be honest. And same thing is uh I just be honest. And same thing is uh I don't know if you guys remember uh we don't know if you guys remember uh we had so many rules uh in developing had so many rules uh in developing anti-toark and anti- kickback laws which anti-toark and anti- kickback laws which ended up creating a whole industry what ended up creating a whole industry what we call mso which is basically to we call mso which is basically to circumvent those rules. So both of circumvent those rules. So both of Edwards uh is is absolutely right. one Edwards uh is is absolutely right. one overregulation leads to industry overregulation leads to industry regulation beautifully said and we'll regulation beautifully said and we'll find someone and then he and put find someone and then he and put it in the show notes and our stuff and then the show notes and our stuff and then secondly overregulation does not mean secondly overregulation does not mean that people are not going to foul play that people are not going to foul play so there is a percentage of foul play so there is a percentage of foul play that you have to expect and from that you have to expect and from policing to everything I mean government policing to everything I mean government is like that unfortunately we just have is like that unfortunately we just have to find the right balance and the right to find the right balance and the right balance in today's days technology is balance in today's days technology is that in my opin opinion u forced um that in my opin opinion u forced um sharing but make the patient own its own sharing but make the patient own its own records at the end of the day there's records at the end of the day there's just no other way around it in my just no other way around it in my opinion and and as you are you know opinion and and as you are you know guardians of your bank accounts you're guardians of your bank accounts you're guid guardians of your healthcare guid guardians of your healthcare accounts uh in terms of data I believe accounts uh in terms of data I believe that is the process I'm extremely that is the process I'm extremely grateful to Agata I apologize to the grateful to Agata I apologize to the audience today for

technical audience today for technical difficulties we're going to bring back difficulties we're going to bring back Agata one more time. Uh and then once we Agata one more time. Uh and then once we publish a whole clinical trial clinical publish a whole clinical trial clinical system through our internal vision system through our internal vision operations in MLOps, then we can operations in MLOps, then we can actually show and tell to everyone that actually show and tell to everyone that how this is the future. And then what I how this is the future. And then what I see in terms of this precision medicine see in terms of this precision medicine is that that we're not going to just is that that we're not going to just bring it to a vast radiology imaging bring it to a vast radiology imaging centers, but we're going to give it to centers, but we're going to give it to ED and then it will be essentially ED and then it will be essentially trained on ED's data uh consistently and trained on ED's data uh consistently and constantly. And that's where I constantly. And that's where I personally believe the future is. And we personally believe the future is. And we are marching towards it super fast. And are marching towards it super fast. And you saw the example that what we're you saw the example that what we're building at Save Life AI. Uh again, this building at Save Life AI. Uh again, this is now in my opinion not only possible is now in my opinion not only possible but uh we can send Ed a $500 to $600 box but uh we can send Ed a $500 to $600 box where his AI is completely private in where his AI is completely private in his house also and he can actually his house also and he can actually decide who he wants to share with and decide who he wants to share with and again acting as a patient over here in again acting as a patient over here in general. Again I'm grateful to everyone.

general. Again I'm grateful to everyone. Thank you Dr. Agata for joining us all Thank you Dr. Agata for joining us all the way from Switzerland. We'll call you the way from Switzerland. We'll call you back. Have a nice day. Thanks.

back. Have a nice day. Thanks. >> [cough and clears throat] >> [cough and clears throat] >> [cough and clears throat]