AI Can Read Your Brain: Diagnosis, Drug Discovery and Brain Decoding Transcript

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Introduction and Speaker Background

We start with our superstar. So the first lecture is given by Harvey Castro. Many of you probably know him. I'm a huge fan and he will talk on the topic of how AI can read our brains.

He's not only a physician and entrepreneur, but he's also a healthcare consultant. He is a professor in Texas and he is about to start a new company in AI or working with AI in medicine.

Harvey, it's a great honor and pleasure to have you here and we're very looking forward to your talk about how AI can read our brains. Awesome. Well, I appreciate it, guys.

Let me share my screen and we'll get started. And first of all, it's an honor to be here, Guys. I really appreciate Alexander. He's a great person. Uh, admire his work.

So thank you for having me, Alexander All right. Lemme start my slide and then let me know if you guys can see that. Okay, good. All right, so let's start.

Big picture. So can AI read my brain? So I'm going to give you some background knowledge just so you understand. I know it's a bell curve. Everybody out there, some people use chat GPT.

Some people used Claude.

Why AI Matters in Medicine

American. There you go. All right. So what I like starting with that video is just to show you that that was almost, God, I want to say like April of this year or March of year where one of the co-founders of OpenAI literally just took a picture of his napkin of a website that he was thinking, entered it into ChatGPT and then it made you the website.

Now I'm going to give you more background knowledge just because it's so important that you understand GPT in general. And then we'll go into, can it read your brain?

And so here's another quick story of a poor child that after three years having leg pain, the mother was frustrated, went to 17 different doctors. Nobody could figure out what was wrong with this kid.

But the mom, bless her heart, she took all the information from the doctor's notes, MRIs, put it into ChachiPT and said, what is wrong my child? And what's amazing is ChatGPT said it was Tether Core Syndrome, went back to the neurologist, neurosurgeon and said, look, the Chat GPT says is this, and he went through all the films and says, you know what?

I now see it. Yes, this is correct. And so to me, This is a huge breakthrough for us. I know a lot of people are scared because what if it is reading my mind?

What if It has that kind of power? And just to give you some background, you're going to hear GPT in the world. You're gonna hear something really big that's about to hit.

That's called Google Gemini. Some people have heard of Anthropic Cloud, ChatGPT 5. There's so many things coming out. And so be aware that Chat GPt is just one of many.

These are the different sizes. Chat GPt has 1.76 trillion is the size of it. It shows in in graph here. Now, why is this important? Um, we shouldn't be scared of this technology.

I think I personally think we should embrace it. And here's a good example. The IQ of chat GPT, according to scientific America was one 55 to give you reference.

Uh, they say Albert Einstein was around one 70. Elon Musk is around 155. Bill Gates is round one, 55. Um. But the average population, as you look at this graph is between 80 and one 10 with the sweet spot being between 90 and a hundred.

Big picture is, if I had a technology that is going to help my IQ in the sense that if can create some product and then I'm using ChatGPT to improve that product or my concept, then, I have an aid that's there 24-7.

Real quick, in my mind, I always say AI plus human is better just than human, and the human better than the AI.

Brain-Reading Technologies and BCIs

Now in medicine, every 30 days, the medical knowledge doubles. So I need something to help me. If I were to read medical literature, it would take me about 21 hours every single day, And I would have to every day to keep up to date.

Now, this graph, just a big picture, look at the little red dot between 1 and 2 and just look this as the quality of a response. So we took an average person, asked them a question, say, hey, give me a respond, and it was rated between one and two.

Then we did the same thing with human experts and they gave us a higher quality than an Then we took the power of ChatGPT and asked Chat GPT, but we asked the human that then was not an expert to use it with Chat GP T and now look how much better that response.

So big picture. It's not going to replace us, And so now let's move towards the talk more. So AI reading our brain. This is kind of crazy. It's out there, but there's different things going on right now.

There's an AI revolution in neuroscience. Uh, there is analytical power here. Um, you have read some or have seen some interesting interfaces where it's the brain computer that is communicating.

And so there's so many potentials here. And obviously, this brings a lot of ethical questions. I'm going to give you guys these slides. You're welcome to it.

Uh, I have no ownership in any of OpenAI or any these slide. Just want to show just proof of concept. This was kind of interesting. It was a website. Um, and I put it on here, but the skinny is this.

So you could draw any picture you want on the left and then on right, it's making that. So to me, if it's already able to interpret some of these images into a real image, I mean, what can we do if we can start reading our brain?

And so there's different ways of doing that. There's this thing called fMRI, there are these EEGs that you put on your brain, on the head that helps see the signal that's coming out of your We mentioned earlier, there's these AI brain concept interfaces.

Everybody's heard of Neuralink, where Elon Musk wants to put a chip inside your brain and help you with certain things, which is amazing. And that's the advanced BCI, the next one.

Then there is predictive analytics of what is your thinking and can it come up with it? I'll show you some fun slides. Now, as a doctor, I have to show this, the skinny is our brain is just electrical activity.

We're sensing, we're smelling, We are tasting, sending signals back and forth to our brains. Every part of the brain sees things differently and is actually communicating.

And so we are taking advantage of that principle and we really creating neural networks the same way we were

creating discussions that way and it's kind of fascinating.

These are just quickly, just little slides out there. You know, this one was, again, you have access to all this, but just showing you that our brain is thinking, and we're able to kind of capture where in the brain it's thinking.

And then obviously, if we have disease in our brains, we know that that's a certain part of the brains that are responsible for certain parts of functions of life, then we'll know they're going to have trouble with that.

Now there's tons of studies talking about let's put some implants in the brain. Let's help people with diseases. Lets look at this to another level. Helping with patients with ADHD, anxiety, Parkinson's disease.

There's so many diseases that can be addressed with these types of networks and is it really reading our brain? And so, you know, the first question obviously a lot of people like is this accurate?

Is it reliable? Will this, is there any ethical issues here? How expensive is? This is their any long term issues? Well, people have issues because they're putting this in their brains, infections, obviously the ethical dilemma.

If it's really, really reading your brain and understanding what you're thinking, How ethical is that? Can we preserve our autonomy? So this is kind of scary stuff, and I agree.

Being able to predict Alzheimer's is huge. There's not many treatments out there, but the fact that if we know it's coming and we'd know what things to prevent, then how amazing it is to be able use this technology.

I have, as an ER doctor, I see tons of patients that are stroke-like patients. And unfortunately, these patients, obviously they can't speak. They can move their arm.

But how amazing if I was able to be able use a certain chip, or if could put a device on their brain, and now if they couldn't speech, because they have the device, they could think of their thoughts and start communicating to the computer.

That computer can be translated into text, into voice, then that voice can obviously communicate.

Decoding Brain Waves into Images

With the mental therapy, PTSD and other things like that, it's another function that we can help. Obviously we know that our armed forces are being traumatized and obviously mentally stressful and PTSD, but on top of that having function loss.

So why not be able to use these BCIs, these brain computer interfaces to help our military members? And so this is quite interesting. It's really complex.

And I'm going to make sure we leave some time here. But the coolest part of this presentation is the pictures. Now, we have this thing called magnetic encephalography.

And all it is, it's kind of like an MRI. It's able to look at the signals that are going out of the brain and able interpret those things. We're taking advantage of that.

Metta is really doing a good job decoding this and they're spending a lot of money. Meta is formerly known as Facebook. They're doing research. If you follow them on LinkedIn or Instagram, you'll see.

Again, I'm not promoting them. I just like this. These are Metaglasses. Made by Ray-Ban. The lens turns dark. What's cool is I can connect AI to this, and in the background I hear it.

So in theory, if you guys were asking me a question, it would hear it, talk to the AI, the A. I. would respond and put it in my ear. And then if I was walking on a conference.

But the reason I'm sharing these glasses real quick is to show you the potential. In the spring, I'll be able to look at my glasses, there's a button here, or I can verbally say, take a picture.

And then when it takes a picture, it will interpret that picture. Say I'm in Germany and I don't understand the menu, It would take a pictures, would translate it for me.

say I saw these amazing Mercedes Benz and BMWs out there and i'm like, what is that car? I could take picture and it would interpret. So if it could do these kind of things now, imagine the applications that we'll be able to do for our patients.

Now, this is now the really cool part. So how does this work? It's basically your brain is looking at the image, but then the computer is trying to figure out those waves and interpret it.

And then it's actually generating a picture. Crazy to me. This is the best part of the conversation. Really look at these images. Everything on the left is the actual picture.

And then the computer decoded those images and then made a picture, so the left is what's reality and the right is, what the Computer interpreted those waves and said, this is What I think the person is looking at.

So as you can see, This is pretty scary, but pretty cool. I mean this guy on the Left, he's wearing a tuxedo and this Is a guy in jeans. It's not quite the same, But it's kind of giving you the idea.

Here there's a horse and then there is this other thing that I don't know what that looks like but again it's an animal. This is where we are today and I thought it is kind of scary but kind good because again we can help.

Now these other ones did a better job. Here is a picture of an airplane and here is another picture. And so when I started thinking about this presentation, I thought, man, you know, there's always room for people to do things for bad, but let's look at it on the positive.

what if there was a crime scene and they found somebody that's a suspect and You're able to put this on them and their thoughts they're thinking of the crime seen or you're asking them questions This could be another lie detector and there's starting to show images of that that could help our police force that can help Our crime scenes to be able see figure out who did it.

It's really amazing to me and Now, as we look at it, how does it work? Again, it's just literally think of electric waves. We're interpreting. I know I'm making it really simple, but basically what it is, is these waves in our brain, we're detecting the images in the brain and those waves, and then we are putting it into algorithms that have studied that this wave shows you this picture, this other wave show you that.

So it has been lots of training. With time this is only going to get better. And there's a part of this that's called reinforced learning that as people are looking at this and saying, no, this is wrong.

This is right. And telling it why then the computer is learning. So if this where we are today, I can't imagine where will be in 12 months. Now, different studies out there.

Here's the device that you can see it's on the brain. It's trying to pick up those sensors, those images that I'm talking about those electrical waves.

Then it shows you kind of how it is being done. Here's another research lab showing you the same basic idea that they are looking at the waves and trying to figure out what those pictures are.

Healthcare Applications and Ethics

These sketches, images to brain waves, we're seeing huge advances. In healthcare, what are we going to be able to see? Well, I'm really stoked about seeing this being used in healthcare.

I know it's scary, but I am really excited to people that maybe couldn't walk, maybe are able walk again. People that couldn't speak for 30 years and they had a stroke or they have a bad car accident now, through AI, they're able to speak again and communicate with their loved ones.

I know in Parkinson's disease, putting a special stimulator on the vagus nerve can help them from stop trembling where they can eat to now they could grab something and eat and have that fine motor control.

So this is quite interesting. You know, we mentioned already the MEG versus the fMRI. Just think of different ways of detecting that signal. But I think in the future we're going to be doing a better job at this.

We're gonna be more interfaces for our patients in healthcare. I, I know there's, you know a lot of ethics behind this and, and there are guardrails that we must keep.

And obviously the GDPR and HIPAA here in United States, We've got to make sure that Again, I'm looking at it on the positive side. Once we address all those things, how can we help humanity?

How can help others? And so I am going to fly through these because I really want to spend time just talking about Q&As and making sure that we kind of understand this.

Big picture. Keep an eye on this technology. It's definitely growing. I know that what you guys were probably expecting is like talking about Apple. Apple has the newest iPhone 15 now has AI in it.

it's about 34 million parameters and basically it does a really good job with autocorrect or when you text it can predict what your doing. I have a Mac computer here on my right, and that Mac new computer has AI in it where it's having those algorithms.

Microsoft next year has announced that, well, unofficial, that their new Windows 12 will have ChatGPT inside the computer. So it is literally going to be reading what you are doing, understanding, being an assistant.

Chat GPT just came out with GPTs that now you can create your own assistant, about two weeks ago I was at a conference and this guy was showing me a product that in the surgical room with your eyes wherever he looks it can control a mouse and hit enter so that way when he's a surgeon and not touching you know anything that can he sterile he can't touch anything now with his eyes he And I thought, you know, if that's literally reading your eyes is really looking at where you're fixating.

You know this technology is it's it in its infancy, but at the same time, it is exponential. So the things that we're able to do today, I think even six months from now, is going to be more.

And so as we look forward to the future, we've got to make sure we balance, obviously, that innovation with responsibility. Our call to action to our scientists is to put those right guardrails to ensure we comply.

But at the same time, you want to be sure that the public receives this. If the pubic resists this, then some of the people out there may say, well, no one's going into this it's too early.

I really think in medicine we're going to see some huge strides. So let me finish here. Oh, real quick. If you're interested, I have a course on AI in healthcare.

It's under 100 bucks. That's pretty cheap, but it's going over a lot of stuff. Feel free to hit me up. I a cheat sheet on how to use GPT in health care.

Again, this is free. This is a download that I did. Had over 100,000 people download this, But it is using AI and healthcare, and then I'm going to leave it here for Q&A.

And then before I start that, look at the time. I'm on all the social media, but this is really cool. Um, I love AI. Obviously I cloned my voice. And what I do is I took an article from, um, let's say a lot of JAMA or some medical

article.

I feed it into chat GPT and it gives me a fake conversation of exploring that article, But then I use my clone voice and my business partner's voice And it uses that transcript.

And then we put a podcast, all of that in less than 10 minutes. It's amazing. Now, how do I see that? In health care? I really think this is going to be great because if I have a patient that I want to do education, I can clone my voice.

They can hear me. If I'm discharging them home and they weren't sure what I said, could put it all in as my clone voice and, you know, obviously GDPR compliance and all that, and then give them a file of.

That information. So really fascinating stuff out there. And then open it up for questions and answers. So thank you, Alexander. I appreciate it. Hopefully that met somewhat your expectations, but thank.

You are we are. Thank you so much. Great. As always, and a lot of new ideas and Developments. So we have a couple of questions in the chat and thank you for also giving us a few minutes to ask you these questions.

And maybe I can start with the first question because you know the AI pin being introduced last week or two weeks ago.

Future Devices and Q&A

How do you see the future? Will it be a smartphone? Glasses? A pin you put somewhere? In the environment? Just reading our brains? What's the next step beyond the smartphone.

I do see it as… Right now, these smartphones are very expensive. But I feel like in the futures, our device will depend on our environment. For example, you and I are going hiking in Germany.

I may want to wear the pin because I want my hands free and I'd be able to talk. Say my wife wants to go to a fancy dinner in Germany, then she may wear a bracelet that's a phone and then see she switches.

She may be at work and like, I really need my data screen, so I'm going to use the iPhone. So my point is this. I think the future is going be we're going have multiple devices and it'll be kind of like talking to your iPhone and switching to iPad and switch into your computer.

It'll the same thing, but it will be your mobile. Because every situation will require a different garment and so I think that will be the future now as far as AI Oh my gosh, I'm really excited because this thing Will have more memory higher GPU power or CPU power and my point is this I see a feature where we're gonna be able to put CPR and We put it inside the phone.

So regardless if there's internet or not the CPR is on here So then if someone is down and I am not a doctor You can look at your phone and the phone will say, okay, this is how you do CPR.

And then someone else in theory can hold it and can see if you're doing it right or if they're not doing that right. It'll be all on the phones. So the future is just unreal to me.

The future's bright. A lot of questions in the chat. You covered some already AI in everyday activities in let's say five years from now. probably answer that and maybe you can also comment in the chat later.

But Fabian Wallneuver has a very interesting question, I think. So addressing the complexity of the brain, what can AI contribute to neurology research that our brains can't?

So will we get an insight into depression and mental health? disorders from a completely new perspective, and then how do we use it for treatment? Yeah.

No, this is a great question. So think of it this way. If you haven't heard of this, look up GPT graphs. But basically, think about this. As a doctor, my job is to take the different facts and put them together and say, This is what's wrong.

The nice thing about the power of GP or AI is it can put large data. huge, huge data that my brain can't really correlate all these things and then be able to say, you know what, there is a correlation between this and this.

Here you go. And then let the human look at it and be like, I don't know if I agree or I, don' let me explore. Let me study it. That is how we're going to start finding new solutions for depression, new treatments.

There's this thing called Alpha Fold by Google. Look it up. It's really interesting. What they did is they mapped out all the different proteins and how that works in our body.

But think of it this way. Think of of all the different proteins and think of a lock and key and how that works and basically the skinny is this. The computer is telling us that here are the keys and we know here the locks and now we can start developing drugs 90% cheaper and were able to do things because AI is helping us put these correlations together that we don't understand because the information is so big.

Hope that made sense. Definitely did. And another question regarding the images derivative from the brain waves. Why are some so much more accurate than others?

So is it the computer science or is the sensors? What's the difference? No, that's an awesome question. I personally think it's a combination of two. You know, two, three years ago, we couldn't do some of this stuff because the sensors weren't that good.

The chips weren''t that. Good. Our chips are getting better. And then at the same time, We're doing what's called reinforced learning. So we're saying, no, this is not good information.

It's two things, garbage and garbage out. Sorry. Look, the information that''s coming in is better, so we''re able to get better output. we are having humans literally look at every image and saying, okay, this one's wrong.

This is why, and then going back to the algorithm and fixing it. And so you start doing this pretty quickly. The AI is also teaching itself, which is kind of scary, but kind