

# AI and You

Transcript

Guest: Przemek Chojecki

Episode 56

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Welcome to episode 56!

Today's guest is Przemek Chojecki. He is an AI entrepreneur with a PhD in mathematics, and a member of the Forbes 30 under 30 list in Poland. He did his PhD in Paris at Université Pierre et Marie Curie, then became a Research Fellow and a lecturer at the University of Oxford. After returning to Poland, he co-founded multiple AI ventures ranging from logistics to the fashion market. And I invited him to the show so you could hear the experience of someone coming from academia who decided to jump to the commercial space, and why they did that and what happened. Right now, he focuses on Contentyze, a platform that enables people to create and manipulate text content in all kinds of smart ways.

He has a new book, [Artificial Intelligence Business: How you can profit from AI](#), and there's a link to it in the show notes and transcript. We're going to talk about how some of today's AI that deals in text really works and what you can do with it. You'll hear Przemek mention the term 'DeFi' a couple of times. That stands for Decentralized Finance, which is a new paradigm of conducting financial transactions using a decentralized mechanism like blockchain to cut out the traditional financial mega-institutions. Here we go with the interview.

Przemek welcome to Artificial Intelligence and You.

Thank you for the invitation, happy to be here.

Now, you have a PhD in this field; what was your PhD thesis about?

Yeah. So, my PhD thesis was called p-adic local Langlands correspondence and geometry, and it was on the verge of algebraic geometry and number theory.

So, pure mathematics...

Pure mathematics, very pure...

Pure mathematics, and now you're an entrepreneur in artificial intelligence, now that's not a jump that a lot of people make, a lot of people stay within the orbit of academia, especially in pure mathematics because - heck that word "pure" has got a lot going for it, right? Who wants to become impure after that, so...

Yeah. Exactly.

So what was it that attracted you to AI and the commercial sector?

There are a couple of things I guess, so first of all switching from mathematics to machine learning wasn't that hard because in the end machine learning is very mathematical and making

that jump wasn't that hard. But much harder was actually going from academia to business in the end and that took me many years of growing frustration with the academic world to really make the switch. So, the main reason for me was that I really like to have faster feedback loops, and I would like to and I want to have more impact. And what I mean by that is, when I put my mind to something, I like to see some kind of interaction and results coming faster. And in the academic world, especially in pure mathematics, this feedback loop is super slow. Of course, it's understandable, we're solving hard problems and the whole process of publishing a paper, going through the review, peer review of that, going to conference and so on. It's understandable but it's definitely, in the end I decided it's not something for me and I don't see myself doing that thing for the next 40 years with the same group of people because in the end those are great people, but being constrained to this group of 200 people that you see at each conference around the world, it's not something that I wanted to continue for the rest of my life and that was the primary motivation. I really had a lot of fun with mathematics, I had a lot of great friends but I needed to say stop at certain point because I knew that I would be super unhappy if I were to go on with that for the rest of my life. And the natural point was that after I went to Oxford, I wanted to come back to Poland and see how the things changed because I was seven years abroad all together, five years in Paris, two years in Oxford, and after coming back to Poland, I decided that actually it's a great time to go into this entrepreneurial path and risk a little bit more. Yeah, that was a great choice! There was like many ups and downs along the way but, being again in my home country in a place where I was born, like that gave me a lot of motivation to make this switch, that probably would be much harder to do if I were to stay in the UK or go to the US because I was thinking about that as well.

And that's an interesting point; I want to pick up on that a moment, because a lot of people in the UK and especially the US would think that their environment was the one that was most conducive to entrepreneurialism, but here you appear to be contradicting that. And what's your experience been?

Yeah. To be honest that was purely because I knew the environment in Poland, so it was like coming from academia where I don't know anything about the business world, and going into business, so establishing my first company that actually seems much easier to do for me in Poland in a country that I know of. Right now what I'm doing, especially with Contentyze, because Contentyze is established in the UK, but I would never start with establishing a company in the UK in the first place because I wasn't confident in my entrepreneurial skills when I was starting. So, I wanted to start with the easiest possible thing and from my perspective, they just think would be try that in Poland, because if I fail there nothing happens.

Understood. So, you went in search of faster feedback loops, how did those show up, what's some examples of how you were satisfied by your move into the commercial sector with the opportunities that came to you?

So, there are many examples because, especially for example building Contentyze recently or before that building like other startups. I just had experience with real customers who can tell you right away whether something is working, something is not working. So, you don't have the phase of sitting for years, over the single idea and thinking whether that would work or not, and

in the end it might not work. So, especially building actual products, it's much faster and this is the thing that I like and without building the SaaS product, without consulting for a client, you get the feedback right away in a matter of days or weeks and not months or years.

And what sort of things have you done for those customers?

So, I started my entrepreneurial journey, basically with doing consulting. So, helping people either with the algorithms themselves, like starting with NLP techniques and then going more into helping them hire people, so being present during the interviews, asking hard questions about mathematical stuff and so on. So I started not building for myself but rather helping others, and then I spent basically one year after academia consulting for other businesses and then I decided that I actually want to build my own products because that gives me even more freedom and I can really do something on my own.

Now you've got quite a YouTube presence, talks about different aspects of AI that are something quite technical. What is it about that that appeals to you to want to get out there and have your face on video telling people about this?

I started YouTube basically out of curiosity - whether I can do it - because like I started many projects just like that and at some point I just started focusing on the things that I enjoy the most. So, my channel is mostly about online education, and so especially there are many things, I love online education, I think it's a great way going forward, and I talk about the various language models, I feel like there are a couple of... The most technical things are about the different transformers like GPT-3 and those kinds of models because this is what interests me the most because this is what we use at Contentyze.

Right. Now, GPT-3 is very hot, and- well, GPT-2 was hot but GPT-3 has really gone past that. And so you say you're using that at your company Contentyze. Is that right?

Not really. So, we have access to GPT-3 but actually we're using a modified version of GPT neo. So, GPT neo is the open-source version of GPT-3 that like appeared very recently and we have taken that, we have re-written that to make it much faster, and we're using that. And the reason for doing that is we want to have more control over the models because if you're just using GPT-3 then, you're basically dependent on the API, you're dependent on the price of model of Open AI, and you don't really... you can't really fine-tune those models that well, you can't fine-tune GP-3.

And what do you use that for?

So, basically the goal with Contentyze is to make writing as easy as possible. So, right now like eighty percent of our users, we have over four thousand users right now, 80 percent has marketing background. So, those people are writing blog posts, the copywriters, SEO experts, and people from the marketing and genesis bloggers. And they all have the need to write content regularly, so they need to write a blog post, and we want to help them with that.

Maybe you can help me understand something about GPT-2, GPT-3 here, because we've talked about this family of them. And I know that they're trained on a huge amount of data on the

internet. Is the GPT-3 engine the algorithm plus that data plus the result of training it or is it talking about the engine itself? Usually I think of a program as being distinct from the data that it processes and you can process different types of data with it but in GPT-3 it seems that the program is the data. Help me make that distinction.

No, so actually that the question is very valid. So maybe I can start with this. So, actually GPT-2 and GPT-3 are the same models, if you look at the architecture, so how the neural networks actually look like, they're pretty much the same. The only difference is the amount of data that Open AI researchers have put into those models, and that's the only thing, which means that it's really important, like the data part is really important here, it's not only about the architecture, it's also about the computing power that you give to those models and the data that you give to those models.

Okay. So are there different versions of GPT-3 that have been fed different data?

Kind of, because what you do is basically you think the same data but then you have, what's really the crucial condition here is the number of parameters and you can have more or less parameters and those parameters are basically changing based on training them on this data, so you can think about that as like reading those texts and the more parameters you have the more subtle those models will be.

Right.

So, there are different versions of GPT-3, based on how many parameters there are.

But they're still using the same data.

The same data.

Is that all languages or is it just English?

It's primarily English but... so the training set how actually Open AI got it was scraping the internet and following various links on Reddit, which means that even though they were looking for English tags, there are occasional texts from like French, German and other languages. And apparently that was enough for GPT3 to learn other languages as well. So, it doesn't write as well in German as it does in English but it can well translate English to German, German to French and so on.

Right. So is the hard work, the value proposition if you will of GPT-3, is it the algorithm? Is it the size of the hardware that processes this? Is it the data that it's given or is it the handholding that it is given in order to process that data? Because where I'm going with this is, I'm saying well, then why not take that, and feed it, Mandarin, Cantonese, and now you have something that could do those same things in that language.

So, basically all three things are valid here and are important. So, you have the architecture, so let me talk about that like one by one so it would probably clear up. So, regarding the architecture of those neural networks, this is something called transformers and it came before

Open AI, it was like created a couple of years ago, they just have taken that and created a very specific transformer for their needs, this is public like how the transformer in the GPT-2, GPT-3 case look like. So, you can take that, you can try to improve on that as well. So the difference between GPT-2 and GPT-3 is not in this architecture actually, so this was not the case. Then the second thing you can take is the data itself. So, here what counts is really the amount of the quality of data you can get and it's of course in gigabytes and terabytes of how much data you will download from the Internet of different articles and different domains. And there's different questions of how clean is this data, meaning how well those tags are prepared or whether they really cover all different subjects for the machine to learn, how language operates and so on. So, if you were to go for Cantonese then you would have to prepare this kind of data and I guess it would be maybe... so I don't know like whether it is hard or not. I'm like I don't know enough about the Chinese internet to really answer that question. But I as I would guess that probably it's not that hard because like Chinese internet is probably pretty developed. But, then comes the third thing, so once you have the data and once you have the machine learning model, this transformer, then you have to train this neural network on data, and that's when it gets complicated because actually to really train this huge model, by huge I mean there's like billions of parameters within the model. And then you have gigabytes and terabytes of data, then you actually need a lot of computing power, and that's where it really gets complicated because... so by rough estimate, Open AI has spent something like 10 million dollars, just on training the models, just on the computing power. So, that's actually the most problematic thing here right now, is that you really can't, if you're like a smaller company or like if you're like a group of researchers, like an individual researcher, then you can't really improve on that because you don't have the access to that kind of computing power.

Right. But, plenty of companies in China, and the Chinese government would; that would be trivial for them, and so there must be some interest there in taking a model like that and training it up on that kind of data.

To be honest I'm sure it's done. I'm just... because - if you have the access to the power so, like one of, you know, like Alibaba or like some of that Tencent or some of those big companies, I'm sure they've done it already.

Now, you have some other interests in AI, like art, is that a hobby for you?

Yeah. It's nothing more of a hobby, it's like just couple of hours per week basically, and that's I've been creating art using different style transfer methods for a couple of years now. But that was always on the side.

So what's AI art as you practice it?

So, I practice basically different style transfers method, so style transfer is basically taking an input in one image and then using a particular style taught on, for example, Picasso paintings or van Gogh paintings, and then redoing the original image. So, you can, for example take a photo of your cat, give that to the machine and then repaint that cat as would Picasso do, that's like the simplest example of what I'm doing.

It's like those music examples that were popular a few years ago where you would have an AI play Gershwin in the style of Beethoven or something like that.

Exactly.

You can render the Mona Lisa in the style of van Gogh.

Exactly, yes.

What sort of things have you done with that that you're proud of or surprised or amused by?

So, I tried with different pixelated art, so like pixelating celebrities' photos, that was fun...it's really a side hobby. I mean I've done many transfers to Picasso style because apparently like Picasso style tends to be pretty interesting when you just transfer standard images like cats, dogs or whatever, like humans in general. Also I've been taking like older paintings, like paintings of the old masters from 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup> century and redoing that with Picasso. That was pretty interesting as well!

Where can we see some of these?

So, you can actually go to the website [aianft.com](http://aianft.com).

Right and I was just about to ask if you can market these as NFT's but sounds like you're doing that, is that right?

That's right, yeah. So, basically that's what like made me, it motivated me more to actually make that into collections. So, I've been creating that before the NFTs but a friend of mine sparked the conversation and basically like introduced me to the NFT space and then I started googling that. Well, he bought one of the crypto banks, so you know like those, they were very famous recently so... And they were the initial NFT, they created the whole standard. And once I discovered that and dived deeper into the space, then it made sense for me to actually try to put the artworks that I've been doing, as NFTs, because it seems like a nice place for digital art, the art that is natively digital.

Right. I'll have to explain NFT's after the interviews but for now it's basically blockchain concepts applied to digital art.

I think that the easiest way to explain that is saying that it's kind of like proof of authenticity that given digital artwork, this is the original and all the other copies, that's the easiest thing.

Moving on, you've got a book out that is *Artificial Intelligence Business: How you can profit from AI*. Tell us a little about what got you into that because that's not academic territory either, that's straight entrepreneurship. Tell us what the book covers?

Yeah. Sure. So, the book is primarily like the overview of AI and current applications, basically written for business people, decision makers, and maybe some data scientists that want to have that broader overview from the business perspective. What got me into that is that was basically I started writing that before starting Contentyze. So, I was writing that back in 2019, beginning of

2020. And in general the 2019 was the year, I started to write quite a lot, I was always writing, writing was my passion as well as reading. And this book was basically the final piece of writing that I did. And also I used a little bit of GPT-2 at the time to generate parts of that, so that was also an experiment for me; can I write much faster using GPT-2 and other algorithms, and the answer was yes. So, actually I like published hundreds of articles on medium, using GPT2 and other algorithms, and they went pretty well in the end.

What is that experience like as a writer? I am intrigued, and working on my next book myself, and sometimes when I type stuff into Google and it suggests the next word, the next word is a good choice, and so are the next two; but this is going beyond that. What is that experience of writing with a transformer like?

So, it's pretty similar to actually Google suggesting you something but it can suggest the whole next paragraph. So, the way I was working with that and I'm still working is that, especially when I'm writing intros, like writing a general description of something - because it's good at broader subjects and not really good at very specific, very technical things. So, transformers are really good at continuing the thought you have started. And I often use it as kind of, especially when I'm blocked, thinking about where to go next from that kind of thought, it gives me possibilities for continuing that thought. So, I really literally just click Generate whenever I'm stuck and see what are the options and I can edit that, continue by myself or generate more. So, the way it works the best is probably generating the next 100 or 200 words from the place it started.

I see. Sounds good for blog posts I would say. And well... we're in a content hungry world. So this is definitely intriguing. So, talking about your book, talking about NFTs, transformers; you're on the leading edge here. So, if anyone can see what's coming up next, we should be asking you. What do you see as the progress in these areas, that you're familiar with in, the next two years say?

It's really hard to say, because basically it's hard to predict innovations, because I can say like GPT-4, I can say the obvious thing, so GPT4 what becoming, so bigger transformers, better models to write, that's on the AI front, but generally I believe in the world that is working smoothly without intermediary agents. Thanks to both blockchain and artificial intelligence. And what I mean by that, it won't probably happen in the next two years, it's more like five to ten, but what the blockchain allows you is basically have a way to... basically have legitimacy and have trust. So have a way to confirm some kind of transaction in a decentralized way without needing to have a bank, without need to have lawyers. On the other hand, what artificial intelligence allows you is being able to automate and optimize certain processes that are repetitive, boring, and basically that don't require human creativity to go on. So, altogether, if you take that together, then what I'm saying in the future is the world where you just have a very easy way to unbound your creativity, like humans primarily will be working with creative things or the mundane tasks will be taken care of by machines. But, that won't happen in the next two years because the problem is in general with - the point of entry is still pretty high.

Well, something will happen in the next two years, it's not all going to happen in the next two years.

Yeah.

That's an interesting pairing there of AI and blockchain because there's not conceptually a lot of overlap. One is a way of securing information and the other is a way of creating it. But, you're saying that these two things together create new possibilities and I think that you're onto something very important there. I wonder if you can say some more about, for instance what sectors of commerce would be affected the most by using these advances in both blockchain and AI?

Well, if I had to guess probably finance will be the first and the reason for that is... so we already have the huge DeFi movements of the centralized finance, because on one hand you have many different smart contracts that allow you to save more money, actually doing everything in stable coins. So, like you just transfer your dollars into USBT, USBC or something and then you actually get access to saving accounts which gives you like six percent per year, which is unheard of in a banking world. And actually it makes sense because you don't have the intermediary agent, you don't have to rent real estate for the banks, you don't have to hire people like bank clerks and so on. On the other hand you also have the same kind of revolution on the startup front with all the fintechs, you have a lot of startups that are doing using AI to actually, maybe suggest to the optimal portfolio for stocks or suggest you how you can save more money. And I see the way you could probably connect the two and that would be the first real connection, you could probably make some kind of a DeFi that's at the same time a fintech powered by AI. A lot of buzzwords but it's definitely... if something is going to happen on the verge of blockchain artificial intelligence that is significant, probably the first thing would be in the finance world, because that's where the money is literally.

And where do you see Contentyze going in the next couple of years?

I just want to make writing as easy as possible for anyone. So, my end goal for Contentyze to having a platform that allows you to write really easy. So, have a tool for basically anyone, so a little bit like Canva for writing. So, I don't know if you use Canva, I really like Canva for like presentations, and because, you know, like I don't have any graphical background but actually Canva allows me to create presentations really quickly and they're looking really well compared to the fact that you know, like I don't have this background. And I would like to do exactly the same thing for writing which means that content or just written words is the primary way we communicate. And I would like to have people have a tool that would allow people to write and have the average level of the written text much higher. So that even you have any kind of dyslexia or you can't write, for one reason or the other, Contentyze would help you to get better content. It would make your grammar better, it would write in the style you wanted to write.

This is like a Photoshop for language.

Yeah. Exactly, Photoshop for writing basically.

Oh, well, I must have a look at this. I'm still probably behind the times in my writing techniques; it's why it's taking so long to get this next book out.

Alright, Przemek, thank you very much for coming on the show, it's been a pleasure having you here for people that are thinking wow! This is so cool. I want to find out; first of all they want to find out more about what you're doing, where they go to do that?

Either Twitter or LinkedIn, I think that's I'm happy to connect with people on LinkedIn or just follow me on Twitter, that's super easy.

Great! We'll put your handles there. And then for people who are also young, starting out in this field, maybe they're in academia, or they're thinking: how do I get a leg up in that space, do I need a PhD in pure mathematics, or maybe they're working on one and they're thinking maybe I want to make the jump as well. What would you advise people who are trying to consider their options at that stage of their career development?

I think the best advice is just going out and trying to do things, even on the side and especially in the beginning you don't have to be 100 percent into something, you can do something as a side hustle in a way, just to try it, that was the way I was like quitting academia, like quitting academia literally took me three years to really do it properly. And just because I was scared, it's normal to be scared, especially if you're making these huge changes. So, going with small steps, one at a time and just learning something every day is probably the best thing you can do but learning and trying things is the best.

I think it's really illustrating just how accessible this technology is now. If you were in computing 40 years ago, you had to be at a place where they would give you access to this giant machine in an air-conditioned room that cost several million dollars and if you didn't have that then you weren't going to get to play. Now you can do it for a large amount of it for nothing. That's not to say that people aren't spending millions of dollars training transformers but you can still do so much as a researcher to develop a career without spending any of that, correct?

Yeah, that's correct. So, for example Google is great here because there's something called Google Colaboratory, which is like Jupyter notebook, working on Google cloud and you have and they're giving you access for free to... like a small GPU of, like I think 12 gigabytes of ram, which is which is fine for some applications and it's really great like, you wouldn't think that possible, like couple of years ago and literally people are writing papers using Google Colaboratory and they you don't have to pay anything to do research, you also don't have to... also you can go on YouTube, there are many videos about different machine learning stuff or like whatever technology you're interested in, you can go on Coursera, you can audit courses for free, so I think that's like the best tip I could get is that, any course on Coursera, you can go and audit it for free, which means that you won't get a certificate, but you will be able to see all the content of all the videos. And that's amazing, like you can literally get knowledge from Stanford, Harvard, and other universities for free.

Alright, so that was Google Colaboratory, which is I'm just looking it up here, Google Colab, lets you write and execute python in your browser, kind of like a Jupyter notebook, kind of...

Yeah, exactly, it's a Jupyter notebook on Google but you don't have to even with the worst laptop or whatever computer you're using, you have access to Google's GPUs and that's like the best thing for free, you don't have to pay anything so that...

Okay. These are great tips, people if you're waiting to get started on this, just go out there, look for Google Colab, start learning python for free from Coursera and other places, university have put their courses online and you can get started in this stuff.

Yes.

Przemek, thanks for helping us understand that, thanks for all of the information you've given us, and good luck with your art, your writing and your business.

Thank you very much. It was a pleasure.

That's the end of the interview. I think Przemek's experience with Contentyze illustrates how the field for narrow AI is exploding in this Gold Rush where people can claim a space like text content generation and rapidly establish a commanding presence. There are so many possible applications of narrow AI that could be equally transformative, it really demonstrates what Kevin Kelly said about how the model for the next 10,000 startups would be to "Take X and add AI."

We talked about NFTs in the interview, which are a total fad within computing right now, they're like some bratty YouTuber covered in tattoos busting onto the red carpet at the Emmys and bragging about their ratings. But let me explain what they are. NFT stands for Non-Fungible Token. I know, that doesn't help. A token is a chunk of data, and fungible means, "capable of being changed into something else," so a non-fungible token means that this is a piece of data that can't be altered. And the way that gets used is – well, it's something like that meme about telling someone fifty years in the past that, hey, you have this device in your pocket that can connect to anyone in the world and access any piece of information, and you use it for looking at pictures of cats and arguing with strangers. Because NFTs are used to establish an ownership of digital information. Just like the blockchain establishes ownership of some amount of cryptocurrency, NFTs use cryptographic protocols and the blockchain to record that you own, say, this image that someone Photoshopped of you dancing with Marilyn Monroe and sold to you. Which they will sell for a ridiculous price because the people who pay for these things generally have more money than they know what to do with, which is how come Grimes, a singer and Elon Musk's girlfriend, was able to get \$6 million selling digital videos that are..., well, creative... also weird – they have images of cherubs floating around a monolith covered in butterflies – don't ask - and have an original song by Grimes as the audio track. Let's not get into whether they're worth that. But you may be asking how come information, ones and zeroes, could be owned by anyone when ones and zeroes can be copied? You can watch, you can download those videos and you have exactly what the person who anted up \$6 million has. (And by the way, that's nowhere near the most expensive NFT ever sold.) It's not like the Mona Lisa, which there's only one of and cannot be copied and you can only see it in one place. So what's the point?

The point – and it's a very small point – is that the blockchain has recorded that the buyer of those digital videos is the owner of them, and everyone decides to agree that this is the case, and the blockchain provides an irrefutable record that they are the owner. So they have bragging rights. The record of their ownership cannot be changed because it's on the blockchain, and the cryptographic signature applied to the actual digital video itself ensures that the record is tied to that exact video itself and cannot be copied on the blockchain. You can do this with anything; for instance, Twitter CEO Jack Dorsey, tweeted a link to a tokenized version of the first tweet ever written where he wrote "just setting up my twttr" and the NFT sold for \$3 million.

If you're underwhelmed, join the club. I spared you some of the even more ludicrous applications like cryptokitties, which I refuse to explain. This is the latest way for Hollywood types to show that they have too much money. Maybe one day it will be used for something more meaningful, like establishing title to your house. But now you know what an NFT is.

By the way, on the last episode, I wasn't quite correct in what I said about Volkswagen and their cheating on the smog tests. There was deception, but rather than lie about their emissions, which isn't meaningful because the emissions are measured externally, they programmed the cars to detect when they were on an emissions test stand and changed the engine mode to reduce emissions at the cost of performance, which no one cares a or even notices on a test stand.

In today's news ripped from the headlines about AI, Google Maps – hands up everyone who uses Google Maps to tell you how to get from one place to another – is improving the accuracy of its prediction of when you'll get there through AI. It's already 97% accurate, using a combination of historical traffic patterns and live traffic conditions to understand current traffic patterns, but that's not good enough for Google; they want to understand future traffic patterns. If you think about, say, planning a drive from Bakersfield, California, to San Diego leaving at 5 o'clock in the morning, the traffic conditions in Orange County are going to be rather different by the time you get there, so a prediction based on the current conditions will be off. So they are using Graph Neural Networks from DeepMind AI, which also considers data on the time of year, road quality, speed limits, accidents and closures. This has increased accuracy by up to 50% in places like Berlin, Jakarta, São Paulo, Sydney, Tokyo, and Washington D.C. This technique is what enables Google Maps to better predict whether or not you'll be affected by a slowdown that may not have even started yet!

In next week's episode, I'll be talking with Charles Radclyffe, a serial entrepreneur who has focused his career on solving tough technology challenges for some of the world's largest organizations and was until recently Head of AI at Fidelity International. That's next week on *AI and You*.

Until then, remember: no matter how much computers learn how to do, it's how we come together as *humans* that matters.

<http://aiandyou.net>