

## ChatPDF Summary:

1. The first episode features guest speaker Everton Cherman, a PhD in machine learning and co-founder and CTO of Birdie.
2. AI is a field of computer science that aims to create intelligent systems.
3. The concept of AI dates back to the 1940s and 1950s.
4. Alan Turing is one of the most important contributors to the field of AI.
5. Turing's definition of an intelligent system is one that can fool a human being.
6. Machine learning is a subset of AI that involves training algorithms to make predictions or decisions based on data.
7. Deep learning is a subset of machine learning that involves training neural networks with multiple layers.
8. AI has many applications in the financial market, such as fraud detection and risk management.
9. AI can also be used to improve customer service and communication.
10. Companies can use AI to analyze customer feedback and identify areas for improvement.

## Renato

Hello Investors, Welcome to the first episode of Market Makers' special series on Artificial Intelligence, AI 360. A series in which we will explore everything that is happening in this new frontier of technology and how it is affecting and inserting itself into the world of financial markets. We will try to go a little deeper here than the buzzwords that you might be hearing out there, which nobody precisely defines what they are. You must have heard about artificial intelligence, machine learning, a lot of things. But here we are going to try to be a little deeper regarding what is going on. Well, this is a series of four programs in which we are going to define each program in a specific way.

## Renato

In the first one, today's program, we are going to talk about definitions, concepts, trying to get a good idea of what artificial intelligence is and everything that is involved in defining it. In the second episode, we will go a little more into practice. We will talk about an application of artificial intelligence in a more specific company. In the third program, we will talk to a company that helps build AI-based solutions for other companies. And the fourth one will be a discussion more about business models linked to AI. Well, this program is not only done by Market Makers. In all of the programs of this series, we will be helped by the founding partners of Aster Capital, who are a reference in the financial market when the subject is technology. That is why, as you can see, Rodrigo Nasser is right next to me. He is a partner and one of the founders of Aster Capital and has more than 20 years of experience in the Technology world. Before Aster, worked at Totus, as Development Director and also at Netshoes, as Technology Vice President

## Renato

But I'll let him introduce himself so you can already know his voice. Nasser, it's a pleasure to have you here. Thanks for being in the Market Makers with us in this special series, AI 360.

## Nasser

Thanks Renato! Man, it's a pleasure, specially to be able to organize the discussion of a subject that is so cool and that helps us think a bit more about the effects of this in the market, in the financial market. Thanks a lot!

## Renato

Well, nice. It's a pleasure to have you. And who is here with us, the first guest of the show, is Everton Cherman, PhD in machine learning. As you can notice, we don't speak much Portuguese here in Faria Lima, right? He is a PhD in Machine Learning from the University of São Paulo and the co-founder and CTO of Birdie. Everton finished his PhD in 2013. At the time, he was one of the youngest people ever to obtain a PhD in Brazil that year, and he has more than 50 publications on the subject in scientific journals of

this area, on machine learning. Since 2014, he works in the development of digital products focused on the use of artificial intelligence. Well, he is the ideal source for us to start defining what artificial intelligence is beyond buzzwords. But then we should let him introduce himself. So you can already keep Everton's voice. Everton, be welcome. And Nasser, are you ready to spend 4 episodes here with us?

**Nasser**

Yes, let's do it.

**Renato**

Then you can start with the first one.

**Nasser**

Everton, thanks man. For your time and availability to come and talk to us. First, first of all, I would like for you to tell us a little bit about Birdie, a company you are co-founder and CTO of, please tell us what Birdie does.

**Everton**

Great, First thanks for the invitation. It's a pleasure to be here talking about this subject. Obviously I really like the subject, so it's a pleasure to be able to share a little bit of what we know. Birdie was founded almost five years ago. I am one of the founders with three other people. We basically help companies exploit data, which we believe to be an untapped gold mine, being public data, private consumer opinion data, consumer feedback. Companies receive consumer feedback from different means and it is difficult for you to effectively explore, in its full potential, the data without artificial intelligence techniques, basically machine learning and generative AI, and all these buzzwords that we hear. And that's Birdie's goal: to transform Buzzwords into something effectively concrete, which brings results for companies. So, on the public side, we centralize consumer feedback in social and commercial networks, in application stores, forums, discussions. On the private side, support tickets, for example.

**Everton**

People come into contact with your company, with companies, via support tickets, via satisfaction surveys, via sellers. Well, there's a number of touch points. Organize, centralize, extract value, deliver it to the companies in formats of "how you improve your communication" in order to really demonstrate the good things people are saying about your product. What isn't good in your product and you should improve? Which features are missing? What can you improve strategically? So this is what we deliver using, again, methodologies, AI and trying to deliver to companies. We have large companies as clients, Microsoft, HP. Also smaller clients in Brazil and around the world. So we are a spread out company today, based in Silicon Valley, but we have a lot of people in Brazil. Today, I think the largest number of people are in Berlin, there are three people in Berlin. So we are a company that works remotely.

**Nasser**

Nice, man. Well, getting into the AI theme, I think we have a challenge here, Renato and I, as it is a very technical theme, of not getting into the technical discussion too much.

**Everton**

I will try.

**Nasser**

To do the translation to our world, especially the financial market world, right? Well, to start, that basic question: What is Ai? What is machine learning? What is deep learning? And how does one differ from the other?

**Everton**

Perfect. I think that the first point is that we have to go back a long time, when AI started. It started in 1948, 1950, so AI is not something from now, it's something that came from way back and is a field of computer science, basically today very focused within computer science, which has the objective of creating systems that we can consider intelligent, we have to consider this system intelligent in some way. Actually, this is Alan Turing's definition. There is even the Turing Computing Prize. He was one of the most important contributors of the field. He said: "for the system to be considered intelligent, it kind of has to fool the human being" in simple words.

**Everton**

If you are talking to a system and a human, obviously it has to be on the same interface, you can't be able to tell the difference, or you get it wrong on who it is. You often get it wrong, in knowing who is the human or who is the computer. So imagine you are talking to a chat, asking some things to this chat and someone answers it to you. You have to answer: is it a human or is it a computer? If you believe it is a human at least one third of the time, then it can be considered intelligent. This is a criteria.

**Everton**

But do we need machine learning to make the system intelligent? Not necessarily. So there are intelligent systems, that learn on their own, that learn from facts, that get better. And there are intelligent systems that don't need to learn. Those that don't need to evolve, learn, or at least don't evolve by themselves, don't use machine learning. To learn by themselves, they have to use machine learning. This is why machine learning is today the main technique, let's put it this way, to be able to make intelligent systems. Just for an example: what is an application that is an intelligent system, but doesn't have machine learning? You probably know very well the chess example. Kasparov against the machine. There was no no machine learning in that. It had only an absurd amount of computing power, being able to calculate the next moves.

**Everton**

But he didn't learn as he played, he didn't learn what was the best.

**Everton**

He simply was. But play against him and see if he's not smart.

**Renato**

Because chess is a closed space.

**Everton**

Exactly. And you can use the computing power, the computer has a big advantage against und. And Kasparov? The first time he played against Deep Blue he won. But he said: "Look, it might be the last time a human being will beat the computer, the state of the art computer". And in fact it was. Obviously today machine learning algorithms are also playing chess to use less computing power, to be more efficient, etc. But back then it didn't have it. So can such a system be intelligent? It can. Another cool example is a medical system. A system that tries to diagnose, to recommend medical diagnosis. You tell him your symptoms and he will give a medical diagnosis. It may or may not have machine learning. If you simply put some rules in there, it can be good and not have machine learning.

**Nasser**

These rules are what we call an algorithm, in the end of the day.

**Everton**

Exactly. He may have extracted the expertise of some doctor, put in some rules, that will seem to be a good diagnosis and may be indeed good. Obviously I wouldn't recommend someone to use it directly. That's like a recommendation, but it doesn't have machine learning. But then machine learning comes into play. Machine learning makes us learn automation. Doctor, what are the rules? I look

at cases, hundreds, thousands, hundreds of thousands of cases where the doctor saw these symptoms and gave this diagnosis, this symptom, this diagnosis. I give it to the machine and say "Machine, learn these rules by yourself". And then it becomes machine learning. That is, the machine is learning what is what, what the doctor thinks.

**Nasser**

So, in AI, we can say that you gave a set of inputs to a machine, that has a set of rules, which is the algorithm, and it forecasts a result.

**Everton**

Exactly

**Nasser**

So, this is AI. Then, within AI, there is machine learning. You give a set of rules and say "Machine, with this set of rules, make me..."

**Everton**

Data. I give data

**Nasser**

Ahhh, perfect.

**Everton**

I don't give him rules. He will tell me what the rules are. He can explicitly say a rule that I can understand. The human being can understand, which we call symbolic algorithms. Or he may give me rules that I won't understand, which are called neural networks. You can't really understand how he calculates it, but you can see that the output, the forecast is very good. I don't know how he did it. It's like, how did we think? How is our neuron thinking? We try to understand, but there is not much to do. And that is more or less what happens with neural networks, which is a subset of machine learning. That's what neural networks are.

**Nasser**

Perfect.

**Everton**

And Deep Learning is a subset of neural networks. What are, what is deep learning? A neural network can have only one layer. There is an input, it makes a calculation and gives an output.

**Everton**

When you start to add a lot of layers, it gets deeper in layers. And the people started to understand that the more layers you add, the more learning power you have. So people started to add a lot of layers and it became a deep learning. The layering was too deep. And today there is a movement to reduce layer complexity but increase the parameters a lot.

**Everton**

But that's deep learning. So deep learning is machine learning, that's one of the possibilities. There are many other possible algorithms that are used a lot. Obviously Deep Learning started to become popular because it started to solve more and more very complex problems well. So ChatGpt is deep learning. ChatGPT, the ones that generate images.

**Nasser**

MidJourney that generates images.

**Everton**

Deep Learning. Deep Learning. Generative AI is basically deep learning.

**Nasser**

So we have the large set of AI. Inside this set, you have machine learning, and, inside Machine Learning, a machine learning technique, which is Deep Learning.

**Everton**

Exactly.

**Renato**

There is a definition here that artificial intelligence is a field of computer science that develops systems and programs capable of performing tasks that would normally require human intelligence. What do you think about this definition?

**Everton**

I think the definition of AI is controversial, even in academia. But this is a widely used definition.

**Renato**

It's from ChatGPT.

**Everton**

This one is ChatGPT? I even talked to ChatGPT about this definition and he said that, to be artificial intelligence, it has to learn by itself. It is not quite like that. To my knowledge, it is not quite like that. Am I wrong? I went to research, etc. And then he started to justify himself afterwards. I think there are two kinds of systems. It needs, in some way, to solve something that a human does, but he doesn't have to think like a human, he can think the way he wants to think. He can do it like a human, but he doesn't have to think exactly, he doesn't have to reason as a human. The Neural Net, although it is based on the human brain, inspired, let's put it this way, it has nothing to do with what exactly our brain is, you know?

**Nasser**

Perfect.

**Everton**

But he is obviously trying to try to solve problems that human beings do. But what are not the problems of the human being? We start a philosophical discussion there.

**Renato**

So, at no risk of getting too metaphysical here, but you mentioned, the word "think" a few times

**Everton**

I did

**Renato**

What does this mean? Is the machine thinking or is it simply performing various tasks? The definition you gave of Deep Blue was very cool because I really think it was a very powerful calculator that calculated very fast things that could happen. It wasn't necessarily thinking. He was there performing some menial tasks, let's say. But you uses the word "think" a few times which I imagine is different. What is it the machine that thinks? What is this machine thinking?

## Everton

Perfect. We go back to Alan Turing. That is exactly what he is trying to answer. Does the machine think? Or does it not think? To be intelligent, it has to think. What is something that thinks? He said, "Look, I don't know how to define very clearly what it is that thinks, something that thinks. We ourselves, how do we define what we are thinking or not? But I know how to define behavior. The output of those who think."

## Everton

If I know how to define the output, I will measure the output. If someone thinks, someone thinks. If someone thinks he is thinking, then he is thinking. Someone is playing chess with a machine and says, "Wow, that's smart, he must be thinking". You know, is it really thinking? It depends. Then we get into the definition of thinking, you know? But then, in a practical way, Turing stayed on just the output. If it seems like it does an intelligent thing, so it thinks. This is the computing definition of the thing. If it looks smart, if it's doing a thing well, then it thinks. That's the computing definition.

## Nasser

It is nice that you brought the example of the Deep Blue. I was seeing *the example* of the evolution of the use of AI in other games. So, then we had the discussion with GO. Since GO has more rules than chess, the Machine Learning started to be used to be able to beat the world's best GO player.

## Renato

And GO is a board game?

## Nasser

It is a board game. Widely used in Asia, mainly by the Chinese. And this board game has more rules than chess. It is more complex in that sense. And the machine managed to beat the best GO player in the world. And lately we have seen an evolution of this that is Warcraft and Starcraft games, which are Massive Multiplayer Online Games and that have a big difference where you have more than one character playing, so you have teams playing. And the researchers say, gee, it is impossible for a machine to beat a human being because, in this case, you have the interaction with the environment, there are four players at the same time and the machine beat a human being playing Starcraft. In fact, today, what has been studied, and we will get into this discussion a little bit, many non-professional online players use the machine to beat professional players. So the machine helps to create strategies for a human being to complement his strategy and manage to win. Even Kasparov commented on this. Many non-professional chess players can use the machine to look like a pro and to learn how to play like a pro.

## Renato

I am from the time of the arcade, when it was easier to win against the machine than from your fellow addict who played it all the time. So we may see a moment when a computer. I don't know GO, but I think about poker a lot, even because poker has many things that are not the objective. It is also subjective, and in chess everything is open, everything that can happen is predictable. In poker, it isn't, because you can hide cards.

## Everton

The Bluff

## Renato

The bluff. The cards are random. In chess, it is not. Can a machine start winning in poker too?

## Everton

That is an excellent question. I asked myself that question. If the machine starts to be able to win, there are going to be a lot of robots playing poker on the Internet.

**Renato**

Doesn't it happen already?

**Everton**

I don't know, but I think it's more difficult, because it really has this human component of reading the human. Maybe he can work in statistics. Within statistics, he may win in the long run, he is cold and counts cards, counts cards. He is cold. Does it work? I don't know, in fact, I don't know, but. But there is that human component. How are you going to read that the person is bluffing? You have to understand the behavior. Then it starts to get complicated for AI in my point of view, at least today.

**Nasser**

Everton, we gave this overview on AI and I understand that we talked a lot about prediction, so, AI predicts something for us. But I wanted to focus on generative AI, the GenAI that we have talked a lot about, especially in the GPTs. Also natural language and the large language models.

**Nasser**

And why now, in 2022, 2023, especially with Open AI, why do we have this wow effect from people? To what do you attribute that? So I wanted you to go a little bit more into this kind of AI.

**Everton**

Ok. I'm going back in time a little bit too.

**Nasser**

Cool

**Everton**

This is 2022 and 23. To try to explain a little bit of the history on how we got to 2022 and 23. I promise I won't go back to 1940. Let's start in 2017.

**Nasser**

Perfect

**Everton**

What happened in 2017? A little known company... called Google. A cell within the company, called Google Brain, a research cell there, their core artificial intelligence cell, released a scientific paper showing a new... A new deep learning neural network component, called Transformers. You know those little cars.

**Renato**

Of course

**Everton**

There is nothing to do with that. Nothing. It's just for you to remember the name. Transformers started to change the story of AI.

**Everton**

What did they prove with Transformers? That they could reduce the layers of the neural net a bit, simplify them, get better results than all the algorithms we had until then. But not only that, with computing power orders of magnitude smaller. So we managed, with less computing power, a lot less, we were able to get better, state of the art results. And, due to simplification, there is

something extra: I can parallelize my training. Parallelize it more, I mean. It simplifies a lot the parallelization. So it's a much simpler net, and I can get more accuracy, less computing power to train the same algorithm, with state of the art computing power. And I can parallelize. So something that used to take, I don't know, a month to train with a GPU, with a computer. It now takes me, I don't know, a day to train with this, but if I parallelize it, in 24 knots, it takes me an hour, so look at the jump that happened, so I got better results right away. But I already have the computing power for all of that. So what can I do? Increase my models in terms of power, in terms of learning, put in a lot more data, a lot more data, a lot more data. I can make it ingest a lot more data...

**Nasser**

With the same computing power.

**Everton**

With the Same Computing Power, exactly.

**Nasser**

Exactly... Because here we have two parallels, right? We have one thing that is the volume of data.

**Everton**

Exactly

**Nasser**

So, obviously, the more data, the better for you to work on a model and you have the necessary computing power to train that data.

**Everton**

Exactly

**Nasser**

You are saying that, in 2017, Google within the... within the...

**Everton**

Google Brain.

**Nasser**

Google Brain, released a model that was able, with less computing power, to handle a large amount of data.

**Everton**

That's it.

**Nasser**

So that's the revolution that, in 2017, Google is able to present for, for humanity, for the world.

**Everton**

Exactly. Thereafter, a series of models began to emerge. One of the most well-known ones is BERT. BERT and GPT1 were at the same time, at similar times. The two were the first precursors of what we call Large Language Models, LLMs. Why did they get "large"? Because they were able to increase the amount of parameters that it needs to tune. I will get into what the parameter is in a minute. Then he started to get big. Before, models had, I don't know, thousands to a few million parameters. Because, if you increase it too much, you don't have the computing power. You need a lot of computing power.



**Nasser**

It is very costly.

**Everton**

It is very costly. And you couldn't see a real improvement as you increased it either. Now, you can put in many more parameters and, with the same computing power, you can do it with tens or hundreds of millions of parameters.

**Nasser**

Interesting.

**Everton**

But then it started to evolve. People started to see that with more, the more parameters you put in, the more data, the better it gets. So, today we are talking about models that have tens of billions to hundreds of billions of parameters, it is even said that the GPT-4 has a trillion parameters that are being trained. What is a parameter? Taking a step back here, think about a mathematical equation that defines a line. We have: "A" times "X" + "B". "A" and "B" are parameters that I need to tune. So two parameters to define the equation of a line. But you have trillions of parameters to tune. That's how it learns, by tuning those trillions of parameters. But you can't put it wildly. You have to put it in an architecture that is efficient, which is the Transformers.

**Renato**

If it was Google that came up with all this, why isn't he... There... the one leading this revolution?

**Everton**

Good question. We know what is out there, what has already been released.

**Renato**

True

**Everton**

So I would say that Google is very well positioned, because it does have things comparable to GPT three and four. It is re-releasing, for example, their ChatGPT, Bard.

**Renato**

Uhm

**Everton**

Bard. It's just that he's being more conservative when it comes to launching things. Microsoft, via Open AI, is being much more aggressive when it comes to launching.

**Nasser**

In other words, isn't it that Google is behind technically, in your opinion, compared to Microsoft?

**Everton**

No, it is not. Maybe it's even better. To be quite honest, I don't know. It's at least par for the course.

**Nasser**

It's interesting.

**Renato**

But for now there is no tool for us to use, right?

**Everton**

There is Bard.

**Renato**

But where is it?

**Everton**

Today, it is not available in Brazil, but it is available in Europe... no, in Europe I believe it isn't, but it is in the United States, and other several countries.

**Nasser**

It's interesting. Because you, as an investor of Microsoft, the people who have been following Microsoft for a while, you see Microsoft, you had a vision of Microsoft being slower to launch products, to get to Go to Market. But the company went through a really interesting transformation. Microsoft's CEO today, in my opinion, is largely responsible for that and they've managed to not only make a heavy investment in Open AI, ten billion dollars, but they're being very fast in their Go To market of launching the CoPilot solutions from GitHub, office 365 and everything else, where they've already embedded Open AI applications from GPT within their solutions. Obviously, anyone who looks at this superficially, has an understanding that Microsoft technically is better off than Google or even that Meta, I mean, facebook is lost.

**Nasser**

How are these three big players, Microsoft, Google and Meta in this world?

**Everton**

They are at the forefront of the AI technology. Regarding Google, we already talked about. If I had to bet on someone, in terms of technology, and framework, access to... search... the world's best search. I would bet on Google still, even though Microsoft came out ahead. But META, Facebook, is going with something a little different.

**Everton**

So we are talking about Google and Microsoft, with proprietary AIs. Meanwhile, Meta is going to a more open source side, it seems, because they have released, to the scientific community, a language model that they have trained.. Large, a very large model that can be used for what we call fine tuning. Fine tuning to do things like chatGPT. And the scientific community has used this to be able to evolve, because you need computing power to create these models, you need data. So not everybody has access and you need these big techs to build these models. So Facebook did that. At first, made it available for a specific group and it had to be registered, etc., you know?

**Everton**

But it leaked... This model, someone leaked it, and it ended up becoming open source. Now everybody can access it.

**Renato**

So an unplanned Open Source...They probably call it piracy.

**Everton**

And that, to me, in my reading, is a strategy to counter the power that Microsoft and Google have there.

**Nasser**

Interesting

**Everton**

In the sense that you have a whole scientific community, gee, you even have other companies trying to use this to reduce the gap of difference from what you have in public... Public models to the private GPT and Google models.

**Renato**

I just wanted to take a step back before we got into it. You said something around two questions ago that caught my attention. I got the feeling that whoever is developing AI sees the beginning and sees the end. They understand how it starts. But it's not possible to know exactly how it's done. What is happening there, inside the system, is not exactly mappable or mapped. I don't know if that's where that group of people who understand a lot about technology come from, when they ask to stop a little bit with this. Is it possible to know exactly what is happening? Or is it too complicated? Anyway, I don't know if I am right in this rationale.

**Nasser**

Complementing, people comment on AI hallucinations. AI Hallucinating, mainly generative AIs.

**Everton**

And image generation ones even more. You still can't know the details. There are too many details inside Open AI that we can't know.

**Renato**

You are not able to know

**Everton**

I don't know the detail. People outside OpenAI don't know the detail. But that's kind of normal, it is an intellectual property thing.

**Renato**

Ok, but the guy inside Open AI knows.

**Everton**

Yes, the guy on the inside knows.

**Renato**

The way the machine is thinking?

**Everton**

Not the way the machine thinks. That you can't know.

**Nasser**

It's that that thing you said earlier. The levels of a neural network, for example. You get lost in what you are generating. From what I understand from what you said...

**Everton**

It is a black box.

**Nasser**

Because the AI is predicting a word. That word can have a contextual, grammatical meaning, but those who read it may say: "wait a minute, this word doesn't make sense."

**Everton**

Well, yeah. Good point, Nasser. Indeed, what the model really does is to predict the next word. You predict one word, with that one word you predict the next one, then the next one and you can produce something that seems to make sense.

**Nasser**

Got it.

**Everton**

It might make sense, it might not make sense, it depends on some stuff. But then they managed to tune it so that it makes as much sense as possible, right.

**Nasser**

Through the output.

**Everton**

Through the output.

**Nasser**

But not for what is happening inside.

**Everton**

Yes, there are surveys. There are attempts to try to map the areas of the networks that think one way or another. For instance, in image, this layer, this first layer... it defines the edges of an image. The second layer... it makes shapes. It makes geographical shapes, it is responsible for understanding geographical shapes. This other layer says "this is a cat, this is a dog". So it tries to *explain* itself. It is more or less us trying to explain what and where is the rational or emotional thought in our brain. Do we know exactly? We are evolving. It's similar, you know. We don't know exactly what it is, but we try to explain it.

**Renato**

Okay, got it. Well, regarding the generative ones, I don't know if you have read about this also... the hand images.

**Everton**

With six, seven fingers.

**Renato**

There are perfect images of everything, but the hand images... They don't work. It's where we have the most number of hallucinations. Why can't the computer understand something like this, for example, yet?

**Everton**

It's hard to explain why it doesn't understand it. But that's kind of behind us now. AI's are already able to make these images. The edges were having problems. I think that it has a lot to do the attention it gives to each part. The attention given to extremities was lower than the attention given to the main part, the body. It started to generate things... And then the researchers kept improving and, today, I think that this is no longer a problem, they already manage everything, it is very realistic. There are images that are very hard to tell if it is AI or not.

**Renato**

Yeah, that Pope one. The first thing I looked at was his hand to see if it was right.

**Everton**

It was right, right? So it's not AI

**Renato**

Exactly.

**Everton**

Yes, but it probably can be.

**Nasser**

I found it cool that you compared 2017, as Google released a paper showing what the Transformer is and that it's even what the T of GPT stands for.

**Everton**

It's the Transformer. Exactly.

**Nasser**

I think it's cool to compare with 2017, because 2007, literally ten years before, there was the launch of the iPhone. 2007 is a very important year in the technology market, because there are several technical events that occurred. And... comparing in a grotesque way with what was the launch of the iPhone, more important than the iPhone was the possibility of having an AppStore with options of several things.

**Everton**

Many business models were born from this.

**Nasser**

And I remember. At the beginning of the iPhone, we had disappointing applications, like little games, something like that. To later reach what was Uber, and all these revolutions. From what we have seen of artificial intelligence today, are we not at the same moment? It is a platform for us to build things on top of it, a little bit like you were saying in Birdie, you use what you have of AI and Generative AI to build an application on top of it. This comparison of moments is just a coincidence of the 17 and the 07 or maybe we are already a few years ahead of 2017 and improving the use of AI as a platform?

**Everton**

Man, regarding the time, I don't know. Maybe in 2027 we will know. But for me it is pretty clear. We are in the middle of a similar revolution, maybe bigger than the cell phone, than the Iphone. What you can do with it is fantastic. And I have felt this for some time, for 15 years now, but we didn't have it. We tried and things didn't turn out so good. We lacked pieces. Today the pieces are more and more there. It can be done. So we are in a moment of inflection. This will, This will create stuff. Nubank exists in an app. Uber is an app. There's going to be a lot of unicorns coming from and using AI as a platform. I think the first range of unicorns are going to be those that are going to provide the picks, the tools. They're going to help others create the final applications. We need them. It's not just OpenAI, you need other things together to effectively create an application that uses AI, you know?

**Renato**

The financial market likes to talk about disruption a lot. What do you think is a sector that is more likely to suffer a disruption because of artificial intelligence, right now. The transportation sector with Uber and the banking sector with fintechs are examples of disruptions coming from the previous revolution. With artificial intelligence, which sectors do you think might be the disrupted ones?

**Everton**

The most obvious sector, when we talk about generative AI, is content generation. Generating content is something that is going to benefit a lot, to say the least. The productivity in content generation is going to be absurd and is going to increase dramatically. You can now generate a lot of content automatically. You can answer e-mail automatically. You can do a lot of things. You can generate things for marketing. You can do everything. So image, video, text, audio.

**Nasser**

Interview.

**Everton**

Interview. You can do user interview. Maybe not the one we're doing here. I hope not.

**Renato**

It caught my attention that you said "Benefited".

**Everton**

It can be very benefited.

**Renato**

Benefited, because those who are at the other end already think like "I'm going to be disputed for a job", that's what people will think, right? But you talk about benefited in the sense of productivity.

**Everton**

Yes, productivity. So if you don't use it, you will be disputed. If you use it, you will benefit from it. I think it is something along those lines, you know? Why not? You make one content a day. If you use AI, you will make 100, 10? Don't know, but you will make much more. You can get a lot more out of it.

**Everton**

You can also automate the content generation. Sometimes, it is very much a content making machine. Why don't you let AI do it? Let's focus on what is deeper, more human, you know? I think that is what is going to happen.

**Everton**

So, yeah, that's the area. Obviously it's a more obvious area. It's right there. But all areas are going to be impacted in some way. The financial sector is going to continue to be impacted. Retailers, e-commerces are going to be impacted heavily. All areas are going to be, man. It's hard to say something that's not going to be disrupted. Obviously, some areas less and others more, but it's just that content is so obvious in this sense that I believe it will be the first one.

**Renato**

Bouncing ball.

**Everton**

Yeah, the ball is bouncing.

## Nasser

It is interesting that you brought up two, two points here that... One is this, this question of, at this first moment, it seems that the main winner of AI are companies that build accessories or tools or components that allow the use of AI, so I think we talked about Microsoft, talked about Google, talked about Meta, Facebook. Obviously, Microsoft and Google have their cloud businesses, Google Cloud and Azure and you have these tools, maybe coming up through cloud to be delivered to companies. We know there are databases. NVIDIA, obviously, when you talk about parallel processing, you are talking about GPU, which is different from CPU. And NVIDIA is the largest manufacturer in the world, let's say, the best manufacturer in the world of GPU today. So, we can even see the effects on the financial market of these companies in relation to AI.

## Renato

NVIDIA hit 1 trillion.

## Nasser

One trillion of market cap, right?

## Nasser

Which is not at all trivial

## Nasser

Which is not trivial at all. I think because of that movement that you are talking about, no doubt. I think the first effects of those who lean on AI is who is building those results.

## Everton

NVIDIA. It's fundamental. The computing power in which it was spent 100 million dollars in order to build GPT4 is basically GPU computing power, which is what NVIDIA produces.

## Nasser

And then the second aspect that comes to mind is if all this stuff we're talking about here is going to be delivered as a service. So, bringing it to the world of application, given that Microsoft came out ahead and gives you the GPT 4 for you to use as a service in Azure. Or you use OpenAI itself, but, from behind, it is Azure that is there offering it to you.

## Nasser

I am a non-technological company, Renato has a more technological company. What is the difference? Because I will gain productivity. So, in content, for instance, as you said, I will gain an efficiency of X, Renato will gain X. If everyone really gains X efficiency, then there's no relative gain. It is like that analogy we joke about. If you are in a show sitting down and one person gets up. If everyone else gets up, everyone is now seeing the same thing.

## Nasser

What do companies or where do you see companies having access to the same technology, to the same computing power. Where is the difference? Because if I have infinite budget, and I can put money in, I buy this AI, buy the computing power. Where is the difference or who is going to differentiate?

## Everton

Perfect. So, the first point is that we are assuming that people are fully using all the stuff available. Okay, in this case, it will equalize. Everyone is using it, etc. Whoever doesn't use it will indeed lose competitiveness. But if everyone is going to win, how does one differentiate itself? What is the raw material of artificial intelligence? It is data. Public data everybody has it or can have it.

**Nasser**

Perfect.

**Everton**

But the private data, each company has its own. So this is one. I think it's a key factor. That is one of them. The data and how you structure it. So... Where, what and how you store it. Is it cheap or expensive to store this data? How are you processing it? How are you making that data available? Do you effectively use it to create products or to improve your product, your activity, to create products with it? So there's a little bit of culture, in the sense that you need to be able to test and experiment. AI data products, they need a fast cycle iteration for you to test and know that it is going wrong, because there is more than just the potential user, there is also the data that comes in and you want to make it work in a certain way.

**Everton**

And when the data arrives, nothing happens as planned. So you need to experiment and test.

**Nasser**

Ok, so an example. I have created an AI model for credit, for giving credit. I thought about the best algorithm, the best tool, whether I am going to use machine learning, etc., etc. Then the credit data arrived. I threw it in there. It's going to have an output.

**Everton**

There'll be an output.

**Nasser**

And what you're talking about is that, if a company doesn't have the culture of looking at that output and saying "Oh, it's right or wrong", and then coming back on that iteration...

**Everton**

That's it, I'd put it in two types of iterations. This one you just described is a methodological, experimental iteration, as you need to be able to predict what's going to be your accuracy, etc. It is fundamental, fundamental, you need to have it. You need to know how is your model, even if you use the ready-made models, such as OpenAi, APIs, whatever, you need to know what is your accuracy there, because it might be bad. So this is a business of experimentation. It exists and you have to do this, there is no way around it. But there is experimentation. In this example, it is a task or an AI product which already exists and is already done in a banking operation. If you give credit, you have to measure the risk, etc.

**Everton**

But many other products are probably going to emerge. These other products are going to make a lot of difference as well. You have two levels of things that are going to make a difference - you increase the accuracy of existing things. Excellent. But new applications are going to emerge also.

**Everton**

I don't know, I'm not the financial sector, so you guys correct me if I'm speaking bullshit here, but suppose I want to do a report on a stock in order to recommend it to my clients. Why can't AI do a pre-report, at least? Analyze the public data and the private data that you have to generate a report, a recommendation.

**Nasser**

And what you talk about culture is that this transformation changes the way of doing business. Before, this analyst didn't automate this part and now he has an AI doing it together with him. Does the company accept this concept of creating a new product based on AI, for example?



## Everton

Exactly... If it doesn't accept it, other companies will accept it and do it and it can be disrupted. It will gain an efficiency from something it has, but it can be disrupted by something that is much more efficient. Anyway, I think it is a bit of this, this culture of interaction, of experimentation.

## Nasser

This part is clear. When you talked about data, you talked in a way that it seems that all companies already do this, already, already have a simple data engineering architecture, already know how to work data governance and privacy, already know how to make data available internally. Even with the experience that you have working with large companies, since Birdie, as you said, has large companies as clients. Is this the reality of companies? What's your perception on this matter and what's the importance, as you commented, of data to work with AI?

## Everton

I think there are two... Let's divide the data into two, two types of data. You have tabular data, that's transactional data. This can be an Excel spreadsheet, a database, etc.

## Nasser

It is in a table.

## Everton

Yes, it is in a table.

## Nasser

Ok.

## Everton

And there's unstructured data, text, image, audio, you name it, all this data is much harder for you to extract anything from.

## Nasser

Ok.

## Everton

I think that companies are better prepared for tabular data that is already difficult enough, to structure yourself for this tabular data, but they are practically not at all prepared for the non-tabular data. In fact, that is what we do at Birdie. So we... We get the unstructured data, such as text and consumer feedback, be it text, video, etc, you know, unstructured. So we get it and then we talk to the companies. The vast majority of the data is all scattered in several places. How will we manage to centralize this? So, the first point is to centralize it in a single place, which can be a DataLake, or whatever. There are strategies to do this. The second point is that centralizing is not enough, you need to minimally prepare them for use. Like... Is there sensitive data in it? I want to make it available to my employees so that I can do something with it, you know?

## Everton

So, sometimes, I need to exclude sensitive data to prepare, do pre-processing, normalize, so there are a lot of points that I need to do and prepare. After that, there are adequate technologies for you to make this database available. I'm going to use a more technical term here, when we are talking about data for AI, there is something called vector database... Vector database. Because we can bring image, text, video, audio, everything into the same dimension. Then, we are able to compare image, video, everything, by vectors.

**Nasser**

Does the Company even work with vector database?

**Everton**

Does the company have this database as a vector? So that's the stuff inside the, the database, but the vast majority today are just getting started. Vector database is a 2018 thing.

**Nasser**

Got it.

**Everton**

It is post-Transformers, basically.

**Nasser**

Got it. So you have... Because this is an important point. You have, especially after what we have experienced or are still experiencing regarding digital transformation and the pandemic of people working remotely. The generation of new data in companies is usually non-tabular.

**Everton**

The vast majority, the vast majority.

**Nasser**

So you have customer conversations, you have meetings, you have photos, images, everything that you have previously said. Companies need to keep this so that it can use it with AI. So I understand that first, the company that has the best process, the culture of working this way to use what will be available to everyone, it will come out ahead, because it will be able to use this information, this data in the AI process and so on.

**Renato**

It has to be prepared, it has to have the data prepared, so that when artificial intelligence reaches its field, it knows how to use it.

**Everton**

Exactly. I think it is mandatory to have minimally... even for you to be different. You need to differentiate the data that you have. To put your data "in the game", you need to prepare it. I think this is it. This is an important point.

**Nasser**

For those who are in the financial market, how could you help a non-technical person? Or what should they ask a company or analyze in a company to understand if it is at a very bad level, at an average level or at a very good level?

**Everton**

Good question. So, I guess there's an easy question to ask. For example, think about Birdie's case, in which I have more expertise to talk about. I want to have access to my clients' feedbacks to know if the problem people are telling me is real? Is this problem really happening? I want to quantify it. Is this data pulverized? How easy is it to access? Do I have a lot of difficulty to access this data? If the answer is "Yes", then there is still stuff to be done.

**Nasser**

So if you ask for a client's history or a client's information and they start explaining that these data are too separated, then there's work to be done in this company.

### **Everton**

There's work to do. If I am having a difficult time accessing this data... Obviously there are legal issues, etc. But if you can deal with those legal issues...

### **Nasser**

Everybody has them.

### **Everton**

Yeah, everybody has them. If you can give people more access to this type of data, then it is a check that you are better.

### **Renato**

But going back a little bit to the disruption topic that we were talking about previously. The internet today is based on social networks, but information in general is based on search. Everything you do on the internet, you start with a search bar. This created an universe. Google lives today pretty much on content advertising around its search results and so on.

### **Everton**

It's their main product

### **Renato**

Exactly... eh... Can artificial intelligence and ChatGPT, these generative AIs, shake this pillar of the internet?

### **Renato**

And can we... in a year from now, instead of starting our life or anything on the Internet in a search bar, start it in a generative AI, for example?

### **Renato**

Think about it - 20 years ago, you might have started your internet journey on a beloved portal. Perhaps you ventured into Terra, or UOL, or even Yahoo. Today, this exploration happens through a search bar. But could this be shifting soon? Could our next adventures perhaps be within the framework of a chat?

### **Everton**

You might, you might, but I don't think it will happen. It's very unlikely. It can if our main search engine, Google, doesn't react and doesn't put AI into it. What I think will happen is that one thing improves the other.

### **Renato**

Uhum.

### **Everton**

Artificial intelligence will improve search and search will improve Artificial Intelligence. For instance, if you hop on Google and ask, "Who's the president of Brazil?" - Artificial intelligence will try to provide an answer. But at this point, it's not quite perfect, it might even lag behind if there's been a recent change in leadership. Search engines, on the other hand, might give you a better response. Yet, an interesting thing is, these kind of queries aren't even monetized by search engines. You might wonder why. Who would even buy that information? Who's the intended recipient? Is there someone out there willing to purchase it? Maybe, maybe

not. But, this particular type of information isn't monetized because the search engine directly offers it as an answer, without making you linger on the website.

**Nasser**

Organic. He doesn't direct to any website.

**Everton**

Organic. So there are a lot of questions that Google already answers because there are questions that are not worth monetizing, which is the quick answer. Why? Because it makes the user, the client stay there, inside the website. It is more important to stay on the website. "No problem, I will answer, you just stay here". And AI will help Google keep the clients on the website.

**Everton**

It will answer these questions better and better. And will help improve the search ranking and... Questions will be better answered because of the search engine, so there will be synergies, in my point of view. I don't see, at least in the short term, in a visible term, any disruption happening in the search engine. On the contrary.

**Nasser**

Renato commented something that is very important. Search was one of the cornerstones for a gigantic market called Digital Advertising.

**Everton**

Perfect.

**Nasser**

And we are already hearing comments that the prompt in ChatGPT, or in any other chat will disrupt the search bar. So digital marketing, digital advertising is going to change completely. From what I understand of what you are explaining, this chat prompt that we have today is not necessarily better than search. In fact, it uses search to function as well. Do you see it working without search, not having search behind it and be just a pre-trained model working there?

**Everton**

The technology must evolve for this to happen, because the amount of data that is indexed in Google per second is gigantic. GPT is stalled in 2021.

**Nasser**

Yes, September 21, I believe.

**Everton**

Yeah. So if it doesn't use search, it can't answer stuff after 2021. So what are you going to do? If technology evolves in the sense that you can index things and put them in the model as fast as Google does, we can think about this risk. But if it doesn't, then there is no way. And it is not trivial to do this, so I don't see it in years, ten years, I don't know, maybe 10 years is too much, but I don't see it. I think it's going to be synergistic, you know. Why don't you ask in the Google bar something.

**Renato**

Yeah. Why doesn't the Google search bar turn into a prompt?

**Everton**

Yeah, why can't it become a prompt?

**Nasser**

And why not mix the two.

**Everton**

It will mix, it will mix

**Nasser**

The efficiency and speed of search with the generational ability of something more contextualized, for whoever asked.

**Everton**

Even Microsoft is doing this with Bing.

**Renato**

Yeah.

**Nasser**

So, that's why I say. Google can be disrupted if everyone goes to Bing. But it's not going to happen... I think.

**Renato**

But it won't necessarily disrupt people's habit of looking for things.

**Everton**

I don't think it will. And, I mean, I have often used GPT, to ask things. Occasionally, I want to see the documentation of a piece of code. I ask "is it doing such and such a thing? Gee, I'm not getting it right". So I go to the code documentation, I google it.

**Nasser**

Of course.

**Everton**

If I had it all together, wouldn't it be much better? So I think it's going to be synergistic. I think one will benefit the other. Let's see.

**Nasser**

And I... I wanted to go back a little bit to the theme you were commenting on, going back to the data part, and with GenAI, there is something that I have noticed. And I wanted to ask, do you think this is possible? Or is it a hallucination?

**Nasser**

Which is the use of AI prediction to predict something. So the prediction of the prediction.

**Nasser**

So, for example, there is a case that I was studying a little bit and mainly to help with the data part. It's when you don't have access to personal data, or you can't have access to personal data and you ask AI to fill the blanks, to generate data for me about an information. So I know that Nasser is married, Given the fact that he is married, what other information do I have?

**Everton**

Can I predict?

**Nasser**

I can ask the machine to predict what other data I have and I can use that data to do my regressions, whatever it is, to try to predict a sale, for instance. That whole strategy, that discussion that we have about the more data, the better. And companies' big desire to get as much data as possible. It is not necessarily true anymore. Now I can ask AI to generate this data, is that it?

**Everton**

You certainly can. Obviously, if you give little context to what you want, the AI is more likely to hallucinate, because it will need to invent things. When it is inventing, it can hallucinate. Obviously, if you want to generate data, it can hallucinate, but there are ways to reduce hallucination. What it does best is fill-the-blanks. And fill-the-blanks is a way to generate content, so you can fill it. If I am married and I have some more information, I don't know, "I am 50 years old", probably a large majority of people also have something else, can't think about anything right now.

**Nasser**

Probably has children.

**Everton**

Children, you can say they have children.

**Nasser**

The children are probably at school.

**Renato**

I didn't understand. Why? Why would that be useful? In what sense do I need this information there?

**Everton**

There are some algorithms of Machine Learnings to which you need to pass "behaved" data, tabular, etc. If you only have three explicit data and you go through them you will get a level of accuracy. If you take these three explicit data first, and add another 10, 15, inferred data, you can have another level of accuracy. You can increase your accuracy. This is called fill the blanks. The user didn't fill this. But man, "I've seen it. He already told me this, that and I know this, so I already filled it in."

**Nasser**

So you don't need to keep asking the user, you don't have to go after the information. If it works, obviously.

**Everton**

A good example... In fact, we have tested this already. If I have you e-mail, I can already know your company's information, your e-mail is enough for me to know what your company is, if it has a product, what is the product, what are the product's characteristics. I can know all of that, just with your e-mail.

**Renato**

But with public data.

**Everton**

Yes, with public data, using GPT, GPT4. For example, if the person says it's from Nubank. I can know that it is a bank, I can... I can fill out a lot of things, you know, I can know what products they offer. You can do a lot of things because there is a lot of information about Nubank on the internet. So I am doing a tabular analysis. I know Nasser is from Nubank, so I can fill in things about his work. So this is possible to do. I can use it to do a lot of things, like an onboarding, for instance.

**Nasser**

You mentioned Nubank and the next question I was thinking about was a little bit like that, even to use Nubank as an example. But we lived... and still live... a great disruption in companies towards the technology model. For instance, if i was a retail company, now I am a retail tech. If i was a financial company, now I am a fintech. Health company... now healthtech. All of them now have the "tech" together.

**Renato**

You will have to start having "AI" at the end.

**Nasser**

I understand that this movement had a lot to do with companies acquiring capabilities and skills of a tech company, which is linked to what you were saying about working architecture, thinking product generation culture. Planning and management methodologies much more linked to what a tech company does than a financial, retail or healthcare company would do. Wherever this "Tech" comes from.

**Nasser**

So, think about Nubank, right? It's kind of this hybrid entity – a tech company that just so happens to be in the financial sector. So, do you think a company like this, a "tech" company, would have an easier time transitioning to AI? Like, is it smoother for them to adopt AI than it would be for a company that hasn't really made that tech shift yet? Or maybe, to circle back to our main point, does it not really matter because AI is becoming so widespread and integrated into everything we do that it won't make any significant difference?

**Everton**

Let's go back to some of the points we talked previously. Data. Maybe Nubank has less data than another incumbent bank.

**Nasser**

Bradesco, Banco do Brasil. Uhum.

**Everton**

It's not, however, just about how much data you've got or how accessible it is. I mean, Nubank is not just any tech company - they're geared up and ready to roll. So, in that respect, they've got a bit of a leg up, right? As for the sheer volume of data, well, I'm not so sure. And talking about Culture? It definitely got a leg up. Just look at Nubank's track record of innovation and disruption. They've already shown the world what they're capable of. And that comes from a culture of constant experimentation, a commitment to delivering strong products, and so on.

**Nasser**

Linked to the tech world.

**Everton**

Linked to the tech world.. So I think it is easier, yes, it is.

**Renato**

Halfway there.

**Everton**

Halfway there... they have less legacy, etc to surf on that. So, looking from the outside, I would say I think it does, it does. Nubank has advantages. Obviously you can make up the difference, but it's not so simple to make up the difference either. In Microsoft, for example, OpenAI entered and is changing things there.

**Renato**

Alright, as we start to wrap up our conversation, I've got a broader question for you. What's next on the horizon? Where is AI going and what's driving that journey? We've already touched on how parallel processing has really shaken things up, but what's the next big shift we should be on the lookout for? And when that shift comes, where do you think we'll end up?

**Everton**

Will we still be here, right?

**Renato**

Or will we have skynet?

**Everton**

Or Skynet. Is that what we'll see?

**Renato**

For the younger ones who don't know Skynet, find out.

**Renato**

Enter the matrix.

**Everton**

You're right, it's a tough call to make a prediction, just as it's tricky to guess the next big things on the horizon. But in my opinion, one of the major upcoming trends, in the short term, is the rise of open source. It's going to make a huge impact, much like it did with the cost of software development in general. Take Linux versus Windows, for instance, or open source languages co-existing with proprietary ones. Each has carved out its own niche, right? Currently, we don't see open source projects at the scale of something like GPT-4, and I'm bringing Google into the mix because I've tried it out a bit and know it's on par. Right now, they're all closed, they're private.

**Renato**

Even OpenAI is closed?

**Everton**

Yes, it is closed. It is "open" only in its name. There are some things open, but they closed a bunch of stuff.

**Nasser**

Closed means you have to pay for access.

**Everton**

You have to pay for access. Exactly.

**Renato**

So, they put on a toll



## Everton

Exactly. But there's this movement, kind of kick-started or spurred on by Facebook, or Meta as they're now known. They've got a language model and the whole AI scientific community worldwide is hustling to close the gap. I really believe this gap is going to narrow, you know? Give it a year or two, and things are going to be much tighter. So, in my view, we're about to see open source projects right there on the cutting edge, rubbing shoulders with the likes of GPT and so on. I reckon that's going to happen sooner rather than later. And, talking about GPT, it's pretty great with text, and can handle image-to-text and text-to-image tasks. But everything isn't all that interconnected right now, you know? Text, images, videos, audio - I feel these elements are going to be linked together much more tightly than they are today.

## Renato

Soon, there will be movies made by AI.

## Everton

This already exists, actually. Imagine this: you look at a picture and ask it a question. Then, based on that, it generates another image. Essentially, you can input and output in any format. You can feed in images, text from any source, any kind of image format. Now, it's sort of predictable that GPT-4 is heading in this direction because they've already done a demo of stuff like this. But it's not yet something that's available for the public to use. I think it's not fully mature yet, but it's definitely on the horizon. There's a ton of scientific research going on in what we call multimodal learning, where 'modal' refers to different types of data like text, images, and so on. So this multimodal learning, I think, is a clear frontier that we can see. There's going to be a lot more that machines will be able to comprehend - understanding text while also getting the video, the audio. It's like we're gearing up for our own Skynet here!

## Renato

And put us in the Matrix.

## Everton

Exactly. Just a joke, ok.

## Nasser

So, let's circle back to what you mentioned about open source versus closed. Why do you think it might make a difference for companies to have the option of working with an open source solution for their model? So far, we've talked about the model as something we don't mess with. It's too expensive today to retrain or tweak the model. But if we've got access to open source, the model becomes another variable that we can manipulate, just like the data. We can start tinkering with the model itself. Do you think that offers a competitive advantage to a given company?

## Everton

Absolutely.

## Nasser

And then that thing of AI being available for everybody changes a little bit too, right? I will be able to work on my own model.

## Everton

It is exactly like that. Obviously, if you are one API away from a really good thing, so you will think three times before doing it. What are my reasons for doing this?

## Nasser

Perfect.

**Everton**

Well, there's gotta be a reason to do it, right? Maybe the cost is what drives you. Training a large-scale model to be readily available for use isn't cheap. So yeah, one thing that's bound to happen is a decrease in costs. Whether it's by getting these models into open source production, or some other means, the costs are definitely going to come down.

**Nasser**

And then, of course, retrain it with my data.

**Everton**

With my data, exactly.

**Nasser**

So, let's say I've got my company's private data and I want to retrain a model. Right now, I can do that by shelling out some cash and using closed models that are, honestly, better than what's open source. What you're suggesting is that there's this ongoing battle, this race that we've always seen in the tech world, between proprietary and open source. And the end goal is that I'll eventually have open source options that I can use to leverage my data and tweak the model to better fit my vision, right?

**Everton**

That's it

**Nasser**

That's it, right? So this seems to me to have an interesting effect, at some point in the near future, for companies that want to go down this path.

**Everton**

No doubt. But, you know, there are pros and cons. If you're using a third-party API, you've got less control, and you have to send your company's data over to them. Maybe you're not so keen on sending your proprietary data, even though they assure you it's not stored and all that jazz. It's a bit of a trade-off, really.

**Nasser**

Perfect.

**Everton**

It's a bit of a trade-off, really. You don't know if you send it or not. That said, there will definitely be a lot room for open source.

**Nasser**

The same way we live... we are still living, actually, in the market of platforms as a service in the cloud market. You've got plenty of companies, even those under heavy regulation like healthcare providers and banks, that don't really use public clouds. They have their own private cloud through a third party, like AWS, Microsoft, or Google. But it's a private cloud and they have control over it. I reckon the situation is somewhat similar. Sure, I'll be sharing my data, which might be sensitive at times, but it's my model or the model is tailor-made just for me, or something to that effect.

**Everton**

It has to be. It has to be hosted in your cloud, and the data can't get to a third party server.

**Nasser**

So, you could do this with a proprietary model, where a company like Microsoft or whoever else provides it to you. But let's not forget that retraining a model like GPT is pretty pricey. Now, what you're suggesting is that, in the future, open source research aims to match up to these closed models in quality, right? So we'd be able to do all that tinkering with open source models instead.

### **Everton**

Obviously, the private ones themselves are also running for it, so the trend is that it gets cheaper. These models will get more and more accessible.

### **Nasser**

Now, touching on that second point you made about different types of data, like video. Take Google's image search for example. I can chuck an image into the search bar and it pulls up results. Doesn't that already exist? You mentioned image-to-image generation. What's the difference between that and converting an image to text and then back to an image?

### **Everton**

Yeah, you can google it via an image. But I can tell you, there are obviously already models doing that as well. I want to generate an image about such and such a thing. And they do it

### **Renato**

You want a new one, and not one that already exists on the internet.

### **Everton**

I want a new one. I will effectively generate it. And really that is a point of difference. I will generate things. I can pass an image and a text at the same time saying change this image to do such and such a thing. Or maybe "What is this image saying? I don't understand where this image is from". You can ask things about this image. And not just one input and one output at a time. You can give it more than one input. You can make any combination.

### **Nasser**

So, according to what you are saying, I can give it an image of a product or something and the AI will bring me perceptions of that image that I don't see in the description, or even I didn't perceive it. And that perception, that information, becomes a parameter for me to train forward.

### **Everton**

Exactly. That's also true.

### **Nasser**

And, technically, I remember you were explaining to me the way AI works with image, video and text. It is different. Mixing them today is complex.

### **Everton**

The architecture of the neural network is different, even.

### **Nasser**

Ahh, got it. So that's one of the points in which you think the research is evolving.

### **Everton**

Yes, they are doing things, but it's not at a production level yet, maybe GPT4 has something, don't know. So it's a visible frontier, but it's not in production, it's not productive yet. There are experiments, demonstrations, etc. A number of points. But no, it's not good yet.

**Everton**

We are talking here about GPT four, GPT three, which to put into mass production are still evolving as well, we can use it, etc. It has to be used, it can be used, but if the company does not want to pass the data through the API, what can we do? So there is an evolution still happening.

**Renato**

Nice. Well, I think we killed the topic, Nasser.

**Nasser**

We did.

**Renato**

Well, I would like to thank Everton Cherman, Birdie's CTO and co-founder for being here with us today. It was a pleasure to welcome you. I think we finally understood a lot of things, you know? A lot of buzzwords were going around and I think we finally understood them and their effect on the financial markets and on the companies. Thank you very much for your presence here at AI 360.

**Everton**

Thank you, Renato, Nasser. It has been a pleasure for me and I'm available to talk any time. Thank you.

**Nasser**

Thank you.

**Renato**

Nasser, thanks also for stopping by.

**Nasser**

Renato, thanks, man.

**Renato**

And you... Don't miss the next episode of the AI 360 series. We will talk to André Fatata, vice president of technology at Magazine Luiza, about practical applications of artificial intelligence.

**Renato**

Well, this episode of AI 360 from Market Makers, made jointly with Aster, is over. See you next time. Cheers, bye, bye.