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FERNWEH INSIGHTS An Eye on AI

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Rodrigo Liang on transition to post-AI world (1/4)



The cofounder of SambaNova – Rodrigo Liang – describes industry’s shift from a pre-AI to a post-AI world, including use cases, his company’s role, and the measures incumbents must take.

Founded in 2017, Palo Alto-based artificial intelligence start-up SambaNova Systems came out of stealth mode just over a year ago and is shaking up the AI space by enabling its customers to join the AI revolution and transform their business in weeks rather than years with its signature Dataflow-as-a-Service. Last summer, the start-up raised \$678 million in series D funding, bringing its total funding to more than \$1 billion and raising its valuation to more than \$5 billion.

Behind that early success is Rodrigo Liang, SambaNova’s cofounder and CEO. Before founding SambaNova, Mr. Liang was a Senior Vice President responsible for spark processor and ASIC development at Oracle. He led one of the industry’s largest engineering organizations responsible for the design of state-of-the-art processors and ASICs

for enterprise servers. Fernweh Senior Vice President, Paolo Baldesi, recently spoke with Mr. Liang about the rapid evolution of AI technology and applications, SambaNova’s business model, and where he sees the industry and his company headed.

According to Mr. Liang, the shift from a pre-AI to a post-AI world mimics the shift in computing from isolated systems to the internet about two decades ago. He said, “Initially the internet seemed like basically email, maybe a web page, maybe a little bit of light browsing on commerce, but today it’s at the center of everything we do. Every business, every person touches the internet every single day.” Companies that chose not to embrace the internet two decades ago are gone or operating at a disadvantage. The same fate, he predicted, awaits companies that

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are slow to embrace AI's potential, "because it will be the fundamental technology that powers businesses and everything, we do every single day."

Reflecting on that potential, Mr. Liang offered a broad spectrum of use cases. Already, companies are using AI for robotic process automation, including text recognition, such as a bank extracting data from contracts. Language translation and generation enables a system to interact with customers so fluently they may think a human is helping them. In health care, image processing is enabling systems to read scans for radiologists, as well as supporting drug discovery and physician diagnostics. In retail, AI is behind recommendation systems that offer products based on customer data and behavior.

On the topic of hardware development, Mr. Liang returned to his analogy of AI and the internet. Before the internet, advances in computing technology were led by

advances in hardware happening in response to the needs of a few computer scientists. Then with the internet, billions of users were interacting with computers, and systems were ill equipped to handle the diversity of input and needs. Mr. Liang predicted that the scale of users will again grow exponentially: "Systems won't be human at all. Every car, every cellphone, every doorknob, every traffic light, every device out there is going to be smart. And every smart device is going to send something to some server that has them respond with some intelligence." With so many devices that means instead of seven billion human users, we'll have "700 billion devices talking to this computing ecosystem." And, he notes, "the world again is grossly under provisioned to handle that."

With change happening so fast and on such a scale, incumbents must prepare for AI or be left on the sidelines. Mr. Liang stressed that now is the time for incumbents

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to establish a strategy. However, he cautioned, “Most of the advancement [in AI] is behind the scenes.” In contrast to the internet revolution where other players could observe what was happening on websites, AI technology is far less visible. Mr. Liang said, “A lot of businesses are in a very competitive environment; you're all trying to find an advantage. So if you have something good and some way to capture those eyeballs, capture those dollars, capture the attention, why would you tell anybody else?” This situation requires incumbents to invest in talent and with partners who can help them gain an early advantage.

Mr. Liang also shared his experiences with SambaNova, beginning when he and “two of the most brilliant minds in the world”—Kunle Olukotun and Chris Ray, professors at Stanford – conceived their business idea. The three of them realized that old architectures would not serve users in the AI era; rather, new solutions would have to start with data efficiency.

Based on software’s purpose and machine learning’s needed data, they created a software stack that does “what the customer wants, when they want it.” The early customers began reporting that their applications were running 10 times faster.

From that starting point, the company addressed a key feature of AI which is that it has not only hardware and application software but also “a new layer called models” which in Mr. Liang’s words, is “why we ended up thinking of this differently from everybody else.” While the largest companies have experts in model creation, smaller organizations do not, and SambaNova is “prepared to cover that gap” – that is, building a model and training it to perform at the desired level. Customers using this service can get the model from SambaNova and immediately put it to use solving problems.

Mr. Liang closed by describing his aspirations for SambaNova as a “trusted adviser.”

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He noted that his company's focus is primarily on meeting the needs of large enterprises, helping them "figure out how to go from pre- to post-AI and accelerating into it, and building surfaces that give you the advantages and benefits of AI." He stressed that his company stays abreast of developments in the technology and modeling so that customers can focus on their business. It's a value proposition that may interest many players who are still in the pre-AI phase.

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Chetan Dube on the AI Imperatives Facing Businesses (1/4)



Chetan Dube – the founder of Amelia, a company at the forefront of artificial intelligence – explains why AI not only is becoming an essential technology but also may transform human lives for the better.

Chetan Dube left academia so he could directly change people's lives with artificial intelligence. The Indian-born expert in cognitive computing had moved to the United States to serve as assistant professor of applied mathematics at New York University. While there, he determined that a career in academia would have less impact than building a business that brings the most advanced AI applications into practical use.

Mr. Dube then formed IPsoft Company, which launched Amelia, an AI-powered virtual agent that offers cognitive, conversational solutions (chatbots that can actually chat), along with an automation platform for enabling customers to rapidly streamline and automate processes to team human workers with virtual agents. The company, founded in 1998, grew to about \$100 million in annual

revenue by 2020 and was renamed Amelia.

Mr. Dube's goal is far more ambitious than mere revenue growth. He sees AI as a means to free employees from mundane tasks so they can focus on being creative, thereby contributing to economic expansion and better quality of life.

Fernweh Senior Vice President, Paolo Baldesi, recently spoke with Mr. Dube about what makes AI an imperative for businesses today where the technology is already having an impact, and how it can improve the lives of employees as well as corporate bottom lines.

Starting in response to a question about the state of the art in AI, Mr. Dube acknowledges that early applications have fallen short of hopes. Quoting John McCarthy, known as the father of artificial

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intelligence, he says, “Human-level AI turned out to be a lot harder than anticipated.” Nevertheless, he says, AI is “just at the tipping point,” about to reach “human-level comprehension” of human language. Already, companies in banking, financial services, and insurance (BFSI) are using AI with health care and hospitality coming on board rapidly.

Asked about his expectations for the future, Mr. Dube cites analyses concluding that roughly half of the workforce in 2025 will be digital, rather than human. He adds colorfully that within five years, companies will have hybrid workforces where “you will not be able to distinguish if it’s a human or an android.” He notes that physical dexterity is approaching that of humans, two-dimensional renderings of digital workers are consistently good, and three-dimensional rendering is getting closer to accurately reading and displaying emotions. He says, “The only frontier that has been left is

trying to get to that elusive Turing horizon, where truly thinking machines could be possible If you can really start to emulate and abstract what’s coming out of human brains, then you can really start to get these AI systems very close to and indistinguishable from humans, and that’s the world you will be in in the next five years.”

On the topic of AI’s risks, Mr. Dube identifies the key risk as not adopting AI. He notes research finding 45 percent margin enhancement at companies adopting AI, versus 35 percent margin compression at companies that don’t adopt it. Digital front runners – companies that overhaul processes and create “an entirely digital model of delivery powered by a hybrid [human and digital] workforce” – enjoy the bigger margins, while those that are reluctant to embrace digital technology, including AI, “face existential crisis.” Mr. Dube calls this a “digital Darwinistic curve,” explaining the fate of companies

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that don't evolve: "The risk curve is the inverse parabola on this case, because the risk of non-adoption is far higher than the risk of early adoption. So there is some truth to the edict that if your competition has AI and you don't, you're dead, and I think that's what we're starting to see in the marketplace." He notes that early adopters of AI have been in banking, financial services, and insurance (BFSI), where managers tend to be adept at assessing risk and can clearly see that "the risk of my current adoption is far less than the risk of my not adopting such disruptive technologies," especially when they get expert guidance in selecting the right technologies.

On the upside, AI can help companies by bridging the current labor and talent gaps. This is especially significant for industries such as banking, hospitality, and retail where the quality of customer care is a major factor in purchase decisions. Mr. Dube offers the example of a Peruvian telecommunications company that

has a hybrid workforce – digital and human agents in its call center. On a recent day, the Net Promoter Score for digital agents exceeded that for humans. Mr. Dube concludes, "That's where you know that the technology is at a tipping point, where you can start to see that the companies that adopt digital modes of delivery and foster a hybrid workforce will have such positional advantage in their cost of delivery and in the quality of customer care that they will be able to edge out the ones that haven't adopted such models."

Some humans have qualms about a future in which AI is doing work that once required human brains and hands. In particular, could or would AI workers share human concern for ethics? Mr. Dube has a straightforward answer: "If we are responsible encoding ethics and good values into AI systems, 52 percent of the workforce is actually going to be on the good side where it's ethically programmed." As a writer of algorithms himself,

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Mr. Dube adds, “I’m a big believer in the fact that algorithms generally don’t stray off course.”

Companies also should consider how they can make their employees’ lives better by using AI to take on the drudgery of mundane tasks. This makes work more interesting and adds to the creative thinking that drives growth for the company. Mr. Dube offers an example: “We have seen insurance companies that have actually said, “Now that we have digitized our models of delivery of basic customer care and basic origination, why don’t we come in with just-in-time insurance or risk-adjusted profile insurance” He further predicts that “talent doesn’t take flight” when AI is handling the tedious parts of the job. This gets to what really inspires Mr. Dube, the question he seeks to answer in the affirmative: “Can these [AI] machines come along in this hybrid society and break those shackles [of subsistence living] ... and let man soar in dimensions of creative expression?”

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Professor Hany Farid on AI and Deep Fakes (1/4)



The father of digital forensics – Hany Farid lays out the consequences of failing to consider technology risks, along with ideas for slowing the spread of misinformation.

Over the last few years, users of social media have been seeing compelling images and videos that are fake: the people in them are fabricated, or real people's images are inserted in places they have never been during times when they weren't even living. These productions are surprisingly easy-to-use applications of artificial intelligence (AI) and machine learning (ML). But according to Hany Farid – a professor at the University of California, Berkeley, with a joint appointment in electrical engineering and computer sciences and the School of Information – the so-called deep fakes represent the latest iteration of a longstanding pattern in technology: first a technology is developed and becomes widely available, and only then do the developers consider damaging applications of the technology.

Fernweh CEO Nick Santhanam recently spoke with Professor Farid about the uses of this technology and ways to manage the risk.

The professor, who has been called a modern-day Sherlock Holmes and the father of digital forensics, specializes in forensic analyses of digital images and deep fakes. Since 2016, he has collaborated with DARPA in the development of technologies to combat such content created and spread by terrorists. Prior to that, he worked with Microsoft on the development of PhotoDNA, a tool for disrupting the global distribution of child exploitation imagery by comparing images with a database of previously identified material.

According to Professor Farid, we are saying the third wave of AI technology, and each wave “made huge promises and underdelivered.”



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This third wave is the result of major advances in neural networks used for predictive tasks, as well as in computer vision and computer graphics. Behind these trends are ultrafast GPUs, massive data sets, and optimization techniques for training the networks.

At the core of the advances are convolutional neural networks designed to analyze images.

The problem, said Professor Farid, is that “almost right out of the gate, very early on in this latest wave of machine learning, you saw people using machine learning and deep neural networks to create so-called deep fakes.” For example, a person we see on a website can be completely synthesized by generative adversarial networks. Similarly, a TikTok video can show a famous actor inserted into a performance the person was never involved in. Samples of a politician’s voice are scrambled to form a message he or she never uttered. In each of these examples, said Professor Farid, “underneath the

synthesized images, audio, and video is some type of machine learning, big data, artificial neural networks, and the ability to distort reality.”

Of course, nonfactual images have long been a part of creating entertainment, satiric works, and propaganda. “But what has changed here,” continued Professor Farid, “is the democratization of access to technology that used to be in the hands of the many.”

As the process gets easier and requires less computing power, we are likely to see more frequent and more successful attempts to use the creations to move markets, shame individuals, and even trigger wars.

He adds that there is a more significant problem which he calls the liar’s dividend: “When you live in a world where any image audio or video can be manipulated, then nothing has to be real, and anybody can dismiss inconvenient facts by saying, ‘It’s fake.’”

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A further concern is that defending against these risks is exceedingly difficult. An organization that is successful 99 percent of the time is still damaged by the other 1 percent and even 99 percent is hard. Professor Farid explains, “On YouTube today, there’s some 500 hours of video uploaded every minute; there are billions of uploads to TikTok and to Facebook every day. At that scale of audio, images, and video online, you simply can’t forensically analyze your way out of that.”

His advice is to think about the problem from the other side, the content creator’s role. Content creators should consider their need to be trusted, and to achieve this, they would benefit from employing control capture technology. The professor explained the process: “At the point of recording on my device – whether that’s a mobile device or a camera or whatever it is – my device authenticates the material by grabbing the date and time and GPS location of all the

pixels, creates a compact digital signature of all that material, cryptographically signs it, and then associates that signature at the point of record.”

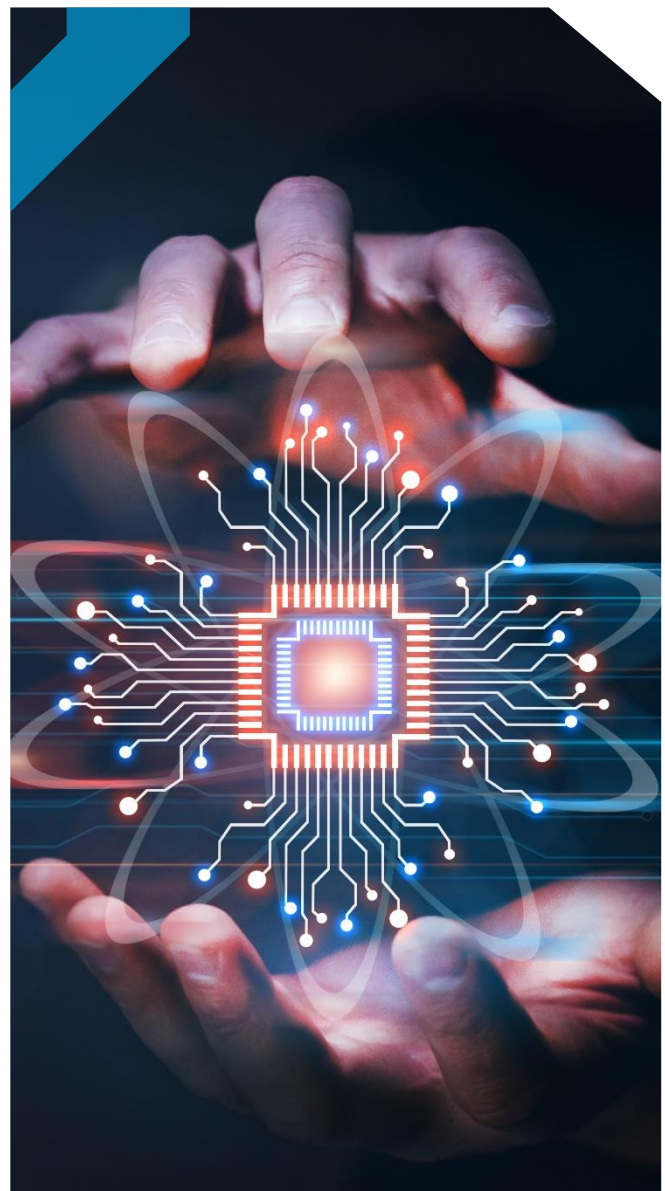
On an encouraging note, Professor Farid pointed to the Coalition for Content Provenance and Authenticity (C2PA), an effort spearheaded by Adobe, the BBC, Microsoft, Twitter, and other organizations to develop this protocol allowing the creators to authenticate their work. But especially until this has been implemented, he noted, it is the responsibility of those receiving content to view it with a measure of critical thinking. Recognizing that some content is intentionally created to stir emotions, he said, “We have a responsibility to understand that just like wearing a mask prevents the spread of disease; not sharing, not retweeting, or not liking also prevents the nonsense from proliferating online, and that’s on us.” He also advocated for governments to

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“rein in” platforms, holding them accountable for lies being spread on social media. Returning to the problem of failing to prepare for risk, Professor Farid commented, “People will say to me, ‘Wow, you really saw the future, didn’t you?’ And the answer is no, I didn’t. Suddenly, we woke up, and we’re in this information apocalypse that is having real-world consequences for our democracy and our society and our physical health.” He said a “defining problem of the next generation” will be how we can “harness the many wonderful things about technology and the internet, of which there are many,” while also acknowledging that “there are some really bad things being done with technology,” that it is “being weaponized against individuals and societies and democracies.” He concluded, “We have got to get a handle on this. I think we have been too slow in responding. My hope is that some of the work we’re doing is one part of that equation – to try to harness some of the power

and mitigate the harms.”

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