

NBA All-Star Technology Summit

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AI AND THE NBA

AHMAD RASHAD: Again, thank you. Very nice of you.

There was a time when the letters AI represented an MVP guard from the Philadelphia 76ers named Allen Iverson. But I already told you guys about that early on if you've been here all day. We talked about Allen earlier.

Today AI, the technology, is changing everything about how we live and how we work. Here to help us make sense of all of this is our first keynote conversation, moderated by a longtime friend of the Tech Summit and also of mine. Please help me welcome CNN's John King.

(Applause.)

JOHN KING: Ahmad, thank you. I'll take it away. You like being Wemby, or you like being Ahmad? Working on that back there? All right, great.

Good morning, everybody. How you doing? Lights are bright, aren't they? See what happens when they turn the lights on there?

I'm really happy, honored today. I want to thank Adam, thank Ahmad for giving me this great spot. Some of you know, we've been doing this awhile together. Some of you might be new faces. My first Tech Summit was 2003 when the big innovation was that first little camera on the flip phone. So we've come into a new age.

And Eric and I were talking backstage, he says we're in the early days of a revolution. So I'm thrilled today to learn. That's why I love these events, to learn with all of you.

And I have the honor, my guest here onstage is Eric Horvitz, who is the chief scientific officer at Microsoft. Most of you know, Microsoft, of course, at the forefront of AI

innovation, and Eric is the leader at Microsoft behind that.

So please give us a round of applause for our guest this morning, Eric.

(Applause.)

Let's start, Eric, a little bit big picture, and then we'll get more granular about basketball and how AI could revolutionize the sports experience, specifically the NBA experience.

But when we were talking backstage, you were talking about how you were working on this back in the '80s, and now we are in the early days of what will be a revolution. So start at the beginning and then just your thoughts of sort of where are we today.

ERIC HORVITZ: Well, I got involved in artificial intelligence in 1985-'86 as a graduate student at Stanford. I went there pursuing my M.D. Ph.D. I thought we could sort of apply these technologies to healthcare. I also was very excited about understanding the human mind. I was really intrigued as to how nervous systems created all of this, our experience, our abilities, our intellect.

And there have been several paradigm shifts. A big one, for example, in the late '80s was going from logic-based methods, kind of like if A and B then C, to all of a sudden the world of statistics, probability theory, which is now the foundation of where we are.

But things have been challenging. It's been tough. I've been an evangelist pushing on ideas for, you know -- pushing on 40 years now.

And I'd say we hit an inflection point, a real inflection point in technology in around 2010, probably with some things that came out of Microsoft at the time that intrigued us, that were kind of early sparks that we had a new set of ideas that would probably pay off and change the way things worked. This was called deep neural network models.

About 18 to 24 months ago, we have an inflection upon an inflection with generative AI. Much of Adam's demos and prototypes this morning are demonstrating some of the

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sports

powers of that.

My view now is that we're seeing sparks of more general intelligence with the magic of what I would say, we say in research, the ability to generalize, to abstract, to specialize, and to compose, to bring several different topics together and synthesize them.

In fact, when I first saw GPT-4, which is all the rage now -- we were the first team that had access to that at Microsoft, given we oversee the safety group -- two words came to mind for me. One was phase transition from the last model, like as if water goes to ice or ice -- or water goes to steam.

And the second word that came to my mind was just polymathic. Like, I hadn't seen an AI system act like a polymath, bringing together different methods, fusing them, seeing a mathematical theorem as a poem, you know, in Shakespearean style. No problem. I'll do all that for you.

So, to summarize, we're all here together right now. It's 2024. We're riding an exponential. 18 months from now, I'd love to come back and say "I told you so" because I think we're going to be surprised again, just like many people in this room may have been shocked yesterday -- and if you haven't seen this yet, take a look -- at OpenAI's Sora that generates beautiful videos from prompts. But we shocked again, I think.

And I would say that 500 years from now, my top-level view on this, the next 25 years will be named something. I'm not sure what the name will be yet. But it's a transformational time for humanity.

JOHN KING: So transformational time, which we were talking backstage, your eyes light up with the possibilities.

ERIC HORVITZ: Yeah.

JOHN KING: But you're also a member of a safety deployment group. So there's some fear. There's some hesitation. There's some worries about, A, what the technology can do, but I think more importantly what, B, if it ends up in the wrong hands?

ERIC HORVITZ: So technologies are neutral. It's how people press these technologies into tasks, services of various kinds. And forever we've been working with the fabulous technologies and all that we can do as humanity with them. Look at the stage. We're sitting here with incredible digital technologies that we actually depend on now.

Electricity, the power grid in some ways were -- this is all --

these are all new technologies. And most have been applied for good, and I believe that will be the case with AI.

Just in the last two years, artificial intelligence has been used in the biosciences to discover whole new classes of antibiotics. Probably you've seen it, the breakthrough of the year two years ago, our ability to all of a sudden have a new lens, called a computational lens, on proteins, the machinery of biology generating millions of structures that we have never seen before and how they interact, now studying cellular processes.

But it's dual-use technology, and the power can be used by malevolent actors -- nation states, criminals -- to do new kinds of things. For example, lowering the bar on producing realistic imagery, content, videos, even persuasive text, and even personalizing that for different individuals and groups. So the deep fake situation is what I would call a crisis. We're facing a crisis.

When I just saw a face mapped onto somebody else, we all laughed and celebrated that. But how can those technologies be used to impersonate? What's the threat to democracy?

I sit on the President's Council of Advisors on Science and Technology, it's called the PCAST group -- I think we're heading back out again to the White House in a couple weeks -- where we sat with the President and we briefed him and his staff as to what this all means.

Of course, President Biden is all about -- his favorite word is "possibility." So he's very excited about the positive side of where this is going but realizes we need to sort of work through the rough edges and particular threats to democracy, which are top of mind for the President.

JOHN KING: So I was going to get to that in a little bit, but since you bring it up, I don't know if you've noticed, but our politics are a tad dysfunctional at the moment. I'm being polite.

Where are you on this idea of what's the sweet spot for regulation? And you're talking about you're on an advisory with the President. The President may want one thing. Good luck with the Congress. Never mind demo- -- you know, look at how they're fighting now in rearview mirror, fighting over social media companies, arguing things in the rearview mirror. How can we get looking out the windshield in a forward-looking way?

And you talk about you can sit with the President of the United States and his top team, but then you have to somehow integrate that, if at all possible, with some global infrastructure, right?

ERIC HORVITZ: You're bringing up all the top issues right now when it comes to the -- I'll call it the sociotechnical aspects of AI. Maybe we should call it sociopolitical aspects right now.

The fast pace of the technology and its power in many ways and how it's interleaving with so many aspects of society, whether it be education, healthcare, politics, media, entertainment, is on the minds of leaders throughout the world, both in like-minded nations and democracies as well as authoritarian regimes, where it's giving those regimes new kinds of powers to further suppress their peoples.

You know, let me start with this nation. It's not just the President, both aisles across the aisles of Congress are engaged. I've sat in closed sessions with maybe 50 senators in a room asking brilliant questions, talking to each other across political divide about what might be done, what should be done.

The President and his team wrote a beautiful -- I think it's beautiful -- executive order, really thinking about the -- mostly on the threat side, but also on the possibility side, but largely on protections of American citizens, in particular safety and rights, and tasked a number of agencies to set up task forces and to do reports and come up with strategies laid out pretty specifically with timelines and deadlines.

So it's a nice document celebrated by leaders of the world. Like, that showed that we're really thinking through on this.

When it comes to international, there have been international meetings that have been set, sometimes organized by nations. The UK had an international summit recently. We have our State Department. Believe it or not, we have a contact who I've been talking to at our State Department who is the AI link to other nations. So State Department, department diplomats are now talking about this.

And when it comes to legislation and regulation, more generally, you know, let's go back to deep fakes. We recently announced, if you follow some of the social media on this, a technology that our team is -- you know, it sourced, authored several years ago called media provenance.

The idea of media provenance -- and we came up with technology because we knew where that puck was going when it came to deep fakes, we knew that we'd be immersed someday in a world with synthetic media of various kinds, whether it be well-intentioned sports media

or malevolent attempts to impersonate and defraud and to deceive, that this would be a central thing -- how can we authenticate content, real content.

And the question I had back then was, to my team, several teams across our labs: How could I take -- have a technology that would go glass to glass, certify that every photon hitting a light-sensitive surface would be rendered on the display of the consumer? Like, you can't break it. This was the news story. Here's what happened. No one could mess with it in between. We call that digital media provenance.

And the idea is it's like a wax seal on an envelope. If you see it, you can trust it. If it's gone, you don't know what to make of things. That technology now has been -- there's been an agreement just 10 days ago, all the major tech companies -- well, most of them now -- are using that standard. So that's one technical approach. There's also watermarking.

But my point is it's going to take not just technology. There's no silver bullet here. It's going to take people working together. It's going to take networks for alerting one another, social media agreements that we stop certain things, but also regulation.

And what I said recently in a post: We need sensitive, appropriate regulatory efforts to come up with technologies and laws that work together in a way that incentivize people to do the right thing, set norms and expectations, and penalize those that mess with the system.

JOHN KING: Let's bring the conversation back to the possibility. Some of that's a little scary for me. Maybe we'll come back to some of it, especially given what I do, and we're in an election year. Fun.

So let's -- this room is full of innovators in the sports space. Adam started this morning, as you noted, by showing us some of AI's potential in the broadcast, in the fan experience. I hope you can't replace me within the next five or six years because I like coming to these things. So I want to actually be here.

But let's bring it first generally, and then I want to get more specific.

In the sports context, what do you see as the greatest possibilities for AI in the immediate and in the short term?

ERIC HORVITZ: Well, in the immediate is -- are technologies and possibilities of leveraging today's tools. So let me give you an example that comes from a different field.

I'm working with a Nobel laureate, Saul Perlmutter, who I've met on PCAST, and he is -- he got his Nobel laureate for understanding gravity waves and the fact that the universe is accelerating, which scares me, that getting further and further apart from everything else.

But he was curious as to how to use these technologies. And we showed and played with this idea, in part to demonstrate to the President, actually, we could just suck in a gigantic data set -- for them it's particle physics data sets, big, incredible, really complicated data set -- suck it in, and just ask the system: Show me the anomalies. You know, do statistics for me. I have a few general high-level interests that I want to really pursue with this data.

And the system beautifully, without statisticians -- I mean, they can be helpful to oversee, but did some beautiful visualizations and gave us new kinds of insights.

Now, sports context, we have -- and I think every major league celebrates all the data that's being connected and collected. Have we really been doing enough with that data? I think we've been scratching the surface with predictive power, with using it to optimize, with understanding peak performance when it comes to that kind of data, with understanding how teamwork occurs or fails, understanding plays, understanding your opponent.

And so I believe that data analysis and insights will be more at our fingertips, but in a much deeper way where we can squeeze more of the insights that we're looking for from that data. And that's available today.

You know, when it comes to --

JOHN KING: Let me just jump in there. So in the idea that the data -- we're leaving the age of data, I would argue, and going into the age of AI, but data has been used in terms of the health of athletes, whether it's diet, whether it's fitness, the regimen. And you now see, you know, LeBron James at 38 years old performing in a way that some of the retired players in the room probably wish, like, why didn't I have that in my day?

So what does that -- does that mean we're going to see more and more athletes playing into their 40s because you can use AI to individualize it to me versus you, our particular health challenges, our particular DNA, where we come from, how we train?

ERIC HORVITZ: That's unclear that that will be the big use of the AI. Certainly there will be medical breakthroughs. For those of you concerned about where we are in a year, there's some interesting work going on with longevity and

rejuvenation of cells with AI technologies that we've been collaborating with -- or on.

But, in general, I mean, predicting, being proactive about injury, understanding how to deal with an injury, getting to get to return to court as fast as possible, I think we'll see lots of applications in the peak performance health and vitality coming from AI technologies.

Now, there have been -- I've had colleagues at -- matter of fact, a team at MIT working with the NBA for years on understanding performance and health and vitality, vibrancy, with interesting, what I would call, traditional AI analyses. It's kind of like old school. It's interesting that we call technologies to do machine learning from just five years ago traditional AI versus today with where we are, and we're all just exploring now how to apply these methods.

But I do think in health dynamics, delivering information as to enhancing performance will be an application.

Let me just mention a couple trends. Let me start with one trend. We call this multimodal AI. You know, you saw lots of video and imagery, and people are generating videos now with prompts and so on. And then there's a language-based analyses of various kinds.

But what's one of the big trends in artificial intelligence is to bring video, imagery, language, and reasoning, health data all together into what are called foundation models.

The models then draw upon -- back to my word polymathic. They draw upon these -- in a smooth way, these different kinds of types of information to make inferences, to generate video, and so on.

It's not out of the box or out of the question right now that we'll be able to take videos of a team and go even further than we're going now to really sort of have a system, without lots of extra editing or work, really understand deeply the way an expert coach, a mentor or a fan understands basketball, understands basketball the game, and can give feedback along multiple dimensions: health, fan engagement, business strategies, team strategies, and so on, opponents, staffing.

So that's the trend we're on right now, seeing these kinds of heterogeneous, disparate data sets coming together and being reasoned about smoothly across different kinds of knowledge.

JOHN KING: And so let's now come into the fan experience. You know, what Adam was showing earlier, if you're watching at home and you want it to look like a

Spiderman movie, you can do that.

Let me start in the arena. How will it change the experience of a fan in the arena, and how will it change for individual fans in the sense that you and I could be sitting next to each other at a basketball game, I'm a season ticket holder, I'm here for almost every game. You're coming through town, it may be a business meeting, somebody wanted to bring you to the game. You're a fan, but you're not, you know, a psycho fan. How is it? Will we have a different experience? Will AI -- can you use AI to tailor a different experience for different levels of basketball fans who are in the same place at the same time?

ERIC HORVITZ: It's an interesting question as to how a real-time experience, you know, being present could be changed with these technologies.

You know, we can get really out of the box and talk about what's happening with the prospect that people would be wearing glasses of various kinds, having an augmented reality experience that would show different kinds of things.

But my first reaction was the pregame experience for somebody who's in their hotel room visiting a friend in a town that wants to find out more about what's going on with this team, the personalities, the players, how do the players and personalities and recent, let's say, close games relate to the games that he's followed or she's followed with her team somewhere in the world.

Popping up a level, in my mind I use this phrase "ultra-personalization." Ultra meaning really getting into what it is people are interested in, what would maximally engage them, whether in a live game, watching it at home, or really on the scene, understanding what that would take.

Again, it's hard to know what kind of graphics and presentation modes we'll have, what kind of earpieces people might wear someday to understand live, customized versions of the game.

But I think it's not out of the question that we'll see those technologies evolve in other places in the consumer space that would come to the real-time experience sitting at game, at game side.

JOHN KING: There's a big debate now, controversy in some quarters, about AI, you know, news media companies, for example, saying you're taking our articles or you're taking our video and you're using it to train, to teach, to feed the brain, if you will, of AI.

Does the NBA have an IP issue in the sense that, you know, if you're trying to come up with basketball coaching

videos or basketball -- you know, you're trying to create some new product to teach basketball, are you stealing? If you take all the -- you know, if you go into the NBA library and take all that footage, are you stealing?

ERIC HORVITZ: You're asking a really pressing question to society right now, and it's not just being asked by the NBA or by players or by actors and writers. It's being asked by scientists, authors of literature, movie producers.

So what does it mean when these technologies are crawling the public space, drawing upon IP, copyrighted material, transforming it? You know what lawyers will say. Oh, if you transform it, it's okay with today's laws.

But transforming it in novel ways that will bring things together sometimes will actually be very similar to what was created, certainly used to make the system smarter and more efficacious and more creative than it was without the input.

My frank feeling is we have a pressing societal conversation to have about what it is we do with these technologies when it comes to IP.

There are some short-term ideas. So there's a standard right now, for example, to put on content -- it's kind of this like this label -- "No crawl for machine learning," you can't crawl this and you can't use this, and make a statement like that.

And the question is if everyone is doing that, what's going to be -- what's going to be -- what are the agreements going to be like between the NBA and OpenAI, for example? Imagine like a big deal between OpenAI and NBA, you can crawl my content for your video production, but here's the deal, versus we just go ahead and do that.

So that's going to happen, combination of technology. Now, I just came out from a National Academies of Science meeting last week on AI and the integrity of our science, how people are using AI to review papers now, to help write papers, to do laboratory experiments and guide them. They're also taking content and helping people, right, come up with new ideas.

A core part of scientific -- the scientific endeavor is attribution: referencing, citing, citing the tower of the shoulders that you have stood on. And that disappears sometimes when AI just goes ahead and does its interesting polymathic thing, collecting millions of interesting facts and sources.

So the question came up is can the scientists of the nation, can the National Academies of Science push AI companies

to figure out how to do attribution to pass through sources all the way through with pointers back and make appropriate agreements on that.

JOHN KING: So you mentioned Sora at the beginning. If you haven't seen these videos, it's woolly mammoths running at you, a couple holding hands walking through the streets of Tokyo. Incredibly realistic. What are the possibilities -- I can think of the possibilities just for the video game environment or in basketball. Is there a risk of that too? Can you create a fake game? Can you, in the middle of a game, create a fake highlight that maybe influences sports betting?

ERIC HORVITZ: You know, we've often thought about can in the middle of a Teams call during a boardroom vote can someone come in with a fake to raise their hand and so on.

One of the big challenges we're going to have moving into the next decade, the next 10 years, I'll just say it's the authenticity problem. Is this authentic?

You know, when I saw the Spiderman demo this morning that Adam put up, I was thinking how far can you push that and still have NBA authenticity in that video? Each organization and each sector is going to have to think about how do we celebrate authenticity, how do we assure it to fans and to consumers?

My reaction is it's going to be tricky, but there will be norms and tools to do that.

For the Spiderman movie, it's a version. It's delightful. We want to celebrate and have access to these incredible new kinds of technologies and how they can shape how -- you know, entertainment, the joy of going to sporting events, the joy of watching a sporting event and reviewing sporting events and history of sporting events.

But at the same time we have to keep in mind several principles. One is going to be the authenticity of content. Another is IP and ownership. A third I would call is celebrating the primacy of human agency, human authorship, human creativity, designing tools that really support people to become better at what they do, to have more joy, to reduce drudgery, while it's them in control and it's them leading the creative efforts.

JOHN KING: So explain more. You used the term "agency." Explain more what you mean by that and how you see the balance between it's complementary, it takes the drudgery away, so you can use your creative talent, your time, your energy to focus on new creativity as opposed to I have to do all this too to get there, the AI can do that for me, versus AI essentially getting ahead of you

and replacing you.

ERIC HORVITZ: It's such a great question, John.

So thinking deeply about where things are going, there's different ways that AI could go on the planet, and I think it's going to take active shaping.

For example, creating technologies that lead to shared prosperity and new kinds of experiences for people. That's where their intellect and their decision-making is being augmented versus taken over by an AI system.

I'm sorry to geek out when I said "agency," "human agency." People in charge, people's actions and the spark of who it is they are leading the way versus being steamrolled over by powerful technologies that are providing great answers and being persuasive.

One of the areas that I've studied, per the technology, but it's also in terms of design of these systems, we call human AI collaborative technologies. Can we actually design machinery that understands when to come forward, what's the drudgery versus the creative part of a job?

You know, my daughter is a physician. She told me, You know, I'm getting tired of medicine because I have such little time with my patients -- she's a pediatric neurologist -- and I'm doing all this documentation all the time.

And when I showed her some of these tools that we developed -- just for healthcare we're looking at, like, automatic summarization, report writing just from your conversation with the patient, helping draft notes for the patient inbox that we're all getting more familiar with now talking to our physicians -- she said, Oh, I could have more time with my patients.

So she likes patient time. She likes thinking about medicine. She doesn't mind getting tips about diagnoses. But she's the doctor, right, doesn't want the system becoming like an automated doctor that's, you know -- and patients want the physician's touch, they want the human touch.

So there are definitely ways to build systems that understand the human mind, human psychology, human capabilities, and that lean in to complement them in ways where, you know -- I mean, I hate to use a brand name here, but the system is the co-pilot, the human is the pilot. And it's an important concept.

JOHN KING: So you have a room full of NBA partners here. There are owners here, there are players here, there are people who have different relationships, different

companies doing different things with the NBA.

If someone is early on the path of how do I bring AI into my world, we're going to hear later today -- Deb Cupp is going to be here, Brad Lightcap -- about the Microsoft-OpenAI collaboration.

For someone out here saying, you know, maybe they've been resistant, but I have no choice now, this is my new world, we're in the early days of the revolution, how do you get on the path and sort of what should your north star be.

ERIC HORVITZ: So my reaction on that is, number one, hold on to your seats because we're surfing a wave that's changing as we're surfing on it.

This is the fastest pace of technology, particularly with AI, that I have seen ever. And I see acceleration occurring. There are sources like the big tech companies are trying their best to educate, provide resources and tools. NGOs, non-profits are writing about the balance of concerns and good uses.

There are technical evangelists out there. I happen to follow someone named Ethan Mollick, who's a business school professor posting a lot on X and on LinkedIn. But people today, including close colleagues, let's say in healthcare, are shocked when I show you what's available -- when I show them what's available now.

And so just seeing what people are doing. And some people are posting examples. If you have a tech -- for your tech people on your team, have them do brief things with you. Have them go out and look at what people are doing. Find best practices. You typically have to look outside the field, look outside the NBA to see what's going on.

Now, I have to say that I was just getting briefed before coming here today. I'm blown away by NBA tech, NBAI, even the thinking in that north star. The app I thought was really well done. I spent time playing basketball with my fingers a couple nights ago.

So I think that the NBA seems to be leaning in right now. But each team and each, you know, team lead and tech lead for teams or tech teams on teams should be really looking at some examples, best practices. And they're out there.

And the reason you have to look is because the examples out there now point the way to where things are going on that changing wave, but they also will shock you about what's available today.

JOHN KING: So let's -- we have a couple minutes left. So

let's come back to the sports experience, then. I think part of your conversation is, you know, the fact that NBA is having these Technology Summits now for 20-plus years, part of it is forward-looking leadership that's not afraid of change, right?

So we're here at All-Star Weekend. You say hold on to your seats. When we're at the next year's All-Star Game and then the year after that, you know what's behind the curtain. You may be working out the kinks on its efficiency. You may be working out the kinks on safety or whether you can trust whether we can be trusted with it just yet.

What is the fan experience this weekend and then this weekend next year and this weekend five years from now? What is going to change in your -- you're sitting in an arena or you're watching a game at home. What can AI do to revolutionize the love of sports and the participation in sports, and particularly basketball?

ERIC HORVITZ: Well, let me start by saying that no matter what we could imagine right now -- and I'll say a few things -- people in this room, mark my words, will be shocked by what five years from now will bring to fans and bring to the sport.

There will be, no matter what I say, a surprise or a set of surprises in what the technology will enable and the way creative NBA leads will be harnessing it for new kinds of experiences.

But what comes to mind is, again, I go back to this multimodal model, and I go -- I'll mention one other trend, which watch out for this coming year, deep memory.

Right now these systems are trained once and then they have kind of like lightweight, you know, personalization. Imagine if systems had more or less something like the memory that we have of the personal, immersed experiences we've had as individuals and we actually ask them to remember like that and they're with us as companion fans working with us. Keep that in mind.

Keep the word ultra-personalization hovering over your head as I then say multimodal models will let these systems watch sporting games.

At the same time, look into deep video libraries and in real time do the kinds of clip curation that's going offline right now that we see happening.

And by the way, the NBA was a leader in using AI technologies to find clips of a game and really understand how to put that together into a summary.

But that can happen all in real time, it can be based on what your interests are, your deep interests, based on what you've been seeing and what you've been liking over time, including statistics, patterns, commentary, what could have gone better and why in a particular play and so on.

But as I try to struggle with what's possible with multimodal models, deep memory in our systems, changing the way they work with us, and technologies that can synthesize across large databases, I still think that I will be surprised with looking at a sporting event five years from now.

JOHN KING: Unfortunately, I need to call it a day there. I could go on for a few hours here. But thank you. Thank you very much.

(Applause.)

AHMAD RASHAD: Thank you, John; thank you, Eric.

All right, everyone, we're going to take another break. I mean, a really quick one, really, really quick break, and we'll see you back here in a few minutes.

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