

Google presents: Live from Paris

Company Participants

- Christopher Phillips, Vice President & General Manager, Geo at Google
- Elizabeth Reid, Vice President of Search
- Marzia Niccolai, Senior Product Manager
- Prabhakar Raghavan, Senior Vice President of Google
- Unidentified Speaker

Presentation

Prabhakar Raghavan {BIO 3368123 <GO>}

Hello, everyone. Bonjour. Welcome. Before we start, I'd like to join Matt in acknowledging the tragic loss of life and the widespread destruction from the earthquakes in Türkiye and Syria. Our hearts are with the people there.

Now, we're here in France, the birthplace of several giants of science and mathematics Blaise Pascal, Pierre de Fermat, Joseph Fourier, to name just a few, on whose shoulders computer scientists stand today. And for those on the livestream, we're coming to you from Google Paris, home of one of our premier AI research centers, and less than 5 kilometers from the final resting place of Pascal, my favorite mathematician. What a fitting setting to talk about the next frontier for our information products and how AI is powering the future.

Our very first founders' letter said that our goal at Google is to significantly improve the lives of as many people as possible. That's why our products have a singular focus, to be helpful to you in moments big and small. Think about Google Search, which will celebrate its 25th birthday today -- this year. Search was built on breakthroughs in language understanding. That's why we can take a complex conversational query like "delicious looking flaky French pastry in the shape of a heart" and help you identify exactly what you're looking for.

But we didn't stop there. Through our ongoing investments in AI, we can now understand information in its many forms, from language to images and videos, even the real world. With this deeper understanding, we are moving beyond the traditional notion of Search to help you make sense of information in new ways. So now, you can simply take a picture with Lens to instantly learn that heart-shaped pastry is a palmier cookie.

Our advancements in AI are also why if you need to fix your bike chain, you can get directed to the exact point in a video that's relevant to you, like when they're showing you how to put the chain back on. If you're shopping for a new accent chair,

you can see it from all angles, right on Search, in 3D, and place it in your living room with AR, augmented reality, to see how it looks. Or if you pop out of the metro in an unfamiliar city, you can find arrows overlaid in Google Maps on the real world, pointing you to walk in the right direction.

All these examples are a far cry from the early days of Search, but as we always say, Search will never be a solved problem. Although we are almost 25 years in, Search is still our biggest moonshot. The thing is, that moon -- that moon keeps moving. The perfect Search remains elusive, because two things are constantly changing: first, how people expect to engage with information naturally and intuitively; and second, how technology can empower that experience. And so we are creating new Search experience that work more like our minds, that reflect how we, as people, naturally make sense of the world.

As we enter this new era of Search, you'll be able to understand information, no matter what language it originated in, search anyway and anywhere, be it on your screen or to explore the real world, and express yourself and unlock your creativity in new ways.

Let's start with understanding information. We've seen time and time again that access to information empowers people. But for centuries, information was largely confined to the language it was created or spoken in and only accessible to people who understand that language. With Google Translate, we can break down language barriers and unlock information, regardless of the language of its origin. Over a billion people around the world today use Translate across 133 languages to understand conversations, online information and the real world.

For example, Translate has been a lifeline to help those displaced from Ukraine adjust to daily life in new countries. In the war's early days, Ukrainian Google Translate queries grew in Polish, German and other European languages, as Ukrainians seeking refuge turned to it for critical information in their language.

We recently added 33 new languages to Translate's offline mode, including Corsican, Latin and Yiddish to name just a few. So even if you are somewhere without access to the internet, you'll get the translation help you need. And soon, we'll bring you a richer, more intuitive way to translate words that have multiple meanings and translations. So whether you're trying to buy a new novel or celebrate a novel idea, you'll have the context you need to use the right turn of phrase.

We'll begin rolling this out in several languages in the coming weeks, but there's still more we can do to bridge language divide. To bring the power of Translate to even more languages, we use zero-shot machine translation, an advanced AI technique that learns to translate into another language without ever seeing translation pairs. Thanks to zero-shot machine translation, we've added two dozen new languages to Translate this past year. In total, over 300 million people speak these newly-added languages. That's roughly the equivalent of bringing Translation to the entire United States.

While language is at the heart of how we communicate as people, another important way we make sense of information is visually. As we are fond of saying, your camera is the next keyboard. That's why back in 2017, we redefined what it means to search by introducing Lens, so you can search what you see with your camera or photos. We've since brought Lens directly to the Search bar, and we've continued to bring new -- bring you new capabilities like shopping within an image and step-by-step homework help.

I'm excited to announce that we've just reached a major new milestone. People now use Lens more than 10 billion times a month. This signals that visual search has moved from a novelty to reality, and as we predicted, the age of visual search is here.

In the context of translation, understanding isn't just about the languages we use. It's also about the visuals we see. Often, it's the words with context, like background images, that create meaning. And so in Lens, our new advancement helps you translate the whole picture, not just the text in it.

Before, when translating text in an image, we'd block part of the background. Now, instead of covering the text, we erase it, recreate the pixels underneath with an AI-generated background, and then overlay the translated text back on top of the image, all as if it was part of the original picture. I'm pleased to share that this is now rolling out globally on Android mobile, so you can use Lens to start translating text into context.

As you can see, with Lens, we want to connect you to the world's information one visual at a time. We're continuing to build upon these capabilities, so I'll now turn to Liz to share more. Liz?

Elizabeth Reid {BIO 1702228 <GO>}

Thanks, Prabhakar. You can already use Lens to search from your camera or photos, right from the Search bar. But we're introducing a major update to help you search what's on your mobile screen. In the coming months, you'll be able to use Lens to search what you see in photos or videos across the websites and apps you know and love on Android.

For example, let's say you get a message from your friend who sent a video exploring Paris. You'd like to learn what the landmark is that you see in the video. So you long press the power button on your phone, bring up Google Assistant and tap Search Screen. Assistant connects you to Lens, which identifies it as Luxembourg Palace and you can tap to learn more. Pretty awesome, huh? Think about it like this. With Lens, if you can see it, you can search it.

As Prabhakar touched upon sometimes, it's the combination of words and images that communicate meaning. That's why last year we introduced Multisearch in Lens. With Multisearch, you can search with a picture and a text together, opening up entirely new ways to express yourself. Say, you see a stylish chair, but you want it in a more muted color to match your style. You can use Multisearch to find it in beige or

another color of yours. Or you spot a floral-patterned shirt, but you want it in bleu et rouge instead, you can use Multisearch for that too.

Let's see how that works with a live demo. Oops, we are missing the -- we're missing the phone. We will have to -- we have no -- okay, we're going to move on, we can't find the phone. Sorry, we'll do it one later in the special Q&A.

Okay. So what you can do is you can spot a cool pattern on the notebook, but then you can swipe up to see the text and be able to search on the Search box, letting you find something like a rug, if you just type in Tepih [ph], or you can find wallpaper, similar, okay?

This unique ability allows us to mix modalities like images and text, and it opens up a whole world of possibilities and you can imagine a future where even more modalities are at play. I'm excited to share that Multisearch is now officially live globally on mobile. And that means Multisearch is now available in over 70 languages that Lens is in around the world.

We've taken Multisearch a step further, by adding the ability to search locally on mobile in the U.S. You can take a picture or screenshot of a food dish or item and add Near Me, to find where to get it nearby from the millions of businesses on Google. In the next few months, we'll bring Multisearch Near Me to all the languages and countries for which Lens is available too. So you'll be able to use Near Me if you want to support a neighborhood business or if you just need to pick something up right away.

There are also times when you're already searching and you find something that just catches your eye and it inspires you. So in the next few months, you'll be able to use Multisearch globally for any image you see on the Search results page on mobile. Once you start using Multisearch, it's striking how natural it feels to be able to use multiple senses to search. I hope you give it a try.

And with that, back to Prabhakar.

Prabhakar Raghavan {BIO 3368123 <GO>}

Thanks, Liz, and we'll have to figure out who stole your phone. So far today, we've talked about how AI is helping us more deeply understand the world's information so we can help you access it more naturally. But we've only scratched the surface of what's possible with AI. We've long been pioneers in the space, not just in our research, but also in how we bring those breakthroughs to the world and our products in a responsible way.

We've made significant contributions to the scientific community, like developing the Transformer, which set the stage for much of the generative AI activity we see today. And we're continuing -- committed to continuing to bring these technologies to the world in a responsible way that benefits everyone. This is a journey we've been on

with large language models, which can make engaging with technology more natural and conversational.

Back at I/O in 2021, we unveiled our LaMDA AI model, a breakthrough in conversational technology. Next, we're bringing LaMDA to an experimental conversational AI service, which we fondly call Bard. You'll be able to interact with Bard to explore complex topics, collaborate in real-time and get creative new ideas.

For example, let's say you're in the market for a new car, one that's a good fit for your family. Bard can help you think through different angles to consider, from budget to safety and more, and simplify and make sense of them. Bard's suggestion to consider fuel type might spark your curiosity, so you can ask it to explain the pros and cons of buying an electric car, and get helpful insights.

And we all know that once you buy a new car, you'll have to plan a road trip. Bard can help you plan your road trip, so you can take your new car out for a spin. You might ask Bard to help you find scenic routes, interesting places to stop along the way, and fun things to do when you and your family get to your destination. Bard seeks to combine the breadth of the world's knowledge with the power, intelligence and creativity of our large language models. It draws on information from the web to provide fresh, high-quality responses.

We're releasing Bard initially with our lightweight model version of LaMDA. This much smaller model needs significantly less computing power, which means we'll be able to scale it to more users and get more feedback. We just took our next big step by opening Bard up to trusted testers this week. We'll continue to use feedback from internal and external testing to make sure it meets the high bar -- our high bar for quality, safety and groundedness, before we launch it more broadly.

Human curiosity is endless and for many years, we've helped remove roadblocks to information so you can follow your curiosity wherever it takes you, from learning more about a topic to understanding a variety of viewpoints. People often turn to Google for quick factual answers like, what is a constellation? Already today, we give you fast answers for straightforward queries like these.

But for many questions, there's no one right answer, what we call NORA queries. Questions like, what are the best constellations to look for when stargazing? For questions like those, you probably want to explore a diverse range of opinions or perspectives and be connected to the expansive wisdom of the web. That's why we're bringing the magic of generative AI directly to your search results.

So soon, if you ask, what are the best constellations to look for when stargazing, new generative AI features will help us organize complex information and multiple viewpoints right in search results. With this, you'll be able to quickly understand the big picture and then go on to explore different angles. So say, this new information on constellations piques your interest, you can dig deeper, for instance, to learn what time of year is best to see them and explore further on the web.

Open access to information is core to our mission, and we know people seek authentic voices and diverse perspectives. As we scale these new generative AI features like this in our search results, we'll continue to prioritize approaches that will allow us to send valuable traffic to a wide range of creators and support a healthy open web. In fact, we've sent more traffic to the web every year, each year, than the year prior.

The potential for generative AI goes far beyond language and text. As we've mentioned earlier, one of the most natural ways people engage with information is visually. With generative AI, we can already automate 360-degree spins of sneakers from just a handful of still photos, something that would have previously required merchants to use hundreds of product photos and costly technology.

As we look ahead, you could imagine how generative AI might enable people to interact with visual information in entirely new ways. They might help a local baker collaborate on a cake design with a client, or a toy maker dream up a new creation. They might help someone envision what their kitchen looks like but with green cabinets instead of wood, or describe and find the perfect complementary pocket square to match a new blazer.

In our quest to make search more natural and intuitive, we've gone from enabling you to search with text, to voice, to images, to a combination of modalities, like you saw with Multisearch today, that Liz talked about. As we continue to bring generative AI technologies into our products, the only limit to search will be your imagination.

Beyond our own products, it's important to make it easy, safe and scalable for others to benefit from these advances. Next month, we'll start onboarding developers, creators and enterprises so they can try our generative language API, initially powered with LaMDA, with a range of models to follow. Over time, we'll create a suite of tools and APIs to make it easy for others to build applications with AI.

From Bard to the new AI-powered features in Search to image generation APIs and beyond, when it comes to AI, it's critical that we bring these experiences rooted in the models to the word, responsibility. That's why we've been focusing on responsible AI since the very beginning.

We were one of the first companies to articulate AI principles. We are also embracing the opportunity to work with creative communities and partners to develop these tools. AI will be the most profound way to expand access to high-quality information and improve the lives of people around the world. We're committing to -- committed to setting the high standard on how to bring it to people in a way that's both bold and responsible.

So far, you've seen how we are applying state-of-the-art AI technologies to help you understand the world's information across languages and modalities. AI is also making it far more natural to make sense of and explore the real world, like with Google Maps.

Over to Chris to share more. Come on up, Chris.

Christopher Phillips {BIO 20103064 <GO>}

Thanks, Prabhakar. For 18 years, Google Maps has transformed how people make sense of the world. It's a valuable tool for over 1 billion people, helping them avoid traffic jams on the way to work, find restaurants in a new city and so much more. And the latest in advancements in AI and computer vision are powering the next generation of Google Maps, making it more immersive and sustainable than ever before.

Let me show you what I mean. Before Google Maps, getting directions meant physically printing them out on a piece of paper. But Google Maps re-imagined what a map could be, bringing live traffic and helpful information about places right to your phone. Now, we're transforming Google Maps once again, evolving our 2D map into a multi-dimensional view of the real world that comes alive, starting with Immersive View. Immersive View is a brand new way to explore, that's far more natural and intuitive. It uses AI to fuse billions of street view and aerial images to create a rich digital model of the world, letting you truly experience a place before you step inside.

Let's take a look at the Rijksmuseum in Amsterdam. If you consider a -- if you're considering a visit, you can virtually soar over the building, finding the entrances and get a sense of what's in the area. With the time slider, you can see what it looks like at different times of the day and what the weather will be, so you know when you visit. To help you avoid crowds, we want to point out areas that tend to be busy. So you have all the information you need to confidently make a decision about where to go.

If you're hungry, you can explore different restaurants in the neighborhood. You can even glide down the street, peek inside and understand the vibe before you book a reservation. This stunning photorealistic indoor view is powered by neural radiance fields. It's an advanced AI technique that uses 2D images to generate a highly-accurate 3D representation that recreates the entire context of a place, including its lighting, the texture of materials and what's in the background. You can also see if a restaurant's lighting is good for a date night, or if the outdoor view at a cafe is the right place for lunch with friends.

Immersive View represents a completely new way to interact with the map, using all the detailed information in Google Maps today and visualizing it in a more intuitive way. We're excited that Immersive View starts rolling out today in London, Los Angeles, New York, San Francisco and Tokyo, and we're bringing it to more European cities like Amsterdam, Dublin, Florence and Venice in the coming months.

Immersive View is just one example of how artificial intelligence is powering a more visual and intuitive map. It also helps us reimagine how you find places when you're on the go. You heard Prabhakar talk about how your camera is the new keyboard, and that's also true for the map. Search with Live View uses AI paired with

augmented reality to help you visually find things nearby, like ATMs, restaurants and transit hubs, just by lifting up your phone. We've recently launched Search with Live View in several cities, including here in Paris. In the coming months, we'll start -- expand it to more places like Barcelona, Dublin and Madrid.

Let's head outside to where Rachel will show us how it works. Over to you, Rachel.

Unidentified Speaker

Thanks, Chris. I'm out here scoping out the neighborhood. Whenever I come to a new city, I'm always on the hunt for great coffee. So let's see what I can find. Tapping on the camera icon in the search bar, I'm able to see coffee shops as well as other categories of places, like restaurants, bars and stores. I can even see places that are out of my field of view. So I'm really able to get a sense of what this neighborhood has to offer at a glance. But let's look at coffee shop specifically, because I really need some caffeine.

All right, so it looks like we have a few good coffee options right around here. I'm able to see if these places are open, if they're busy right now and if they're highly-rated. This one looks pretty good, so I'm going to tap on it to learn more. All right. Okay, this looks pretty good. It has a lot -- it has the high star rating. This looks really tasty and cute. All right, it's not too busy right now, so I'm going to head over there and grab an espresso.

Back to you, Chris.

Christopher Phillips {BIO 20103064 <GO>}

Wow. Thanks, Rachel. As you can see, pairing our AI with AR is transforming how we interact with the world. Augmented reality can be especially helpful when navigating tricky places indoors, like airports, train stations and shopping centers. We launched Indoor Live View in select cities to help you do just that. It uses AR arrows to help you find things like nearest elevators, baggage claim, and food courts.

Today, we're excited to announce that we're embarking on the largest expansion of Indoor Live View to date. We're bringing it to 1,000 new venues and cities like Berlin, London, New York, Tokyo, and right here in Paris in the coming months. Today, you've seen how the future of maps is becoming more visual and immersive, but we're also making it more sustainable. It's all about helping people make the sustainable choice, the easy choice.

We recently launched eco-friendly routing in Europe, to help you choose the most fuel-efficient, energy-efficient route to your destination, whether you drive a petrol, diesel, electric or hybrid vehicle. And as we're seeing more drivers embrace electric vehicles, we're launching new Maps features for EVs with Google built-in, to make sure you have enough charge, no matter where you're headed.

First, to help alleviate range anxiety, we'll use AI to suggest the best charging stop, whether you're taking a road trip or just running errands nearby, we'll factor in traffic, charge level and the energy consumption of your trip. If you're in a rush, we'll help you find stations where you can charge your car quickly with our new very fast charging filter. For many cars, this can give you enough power to fill up and get back on the road in less than 40 minutes.

Lastly, we're making it easier to see when places like supermarkets have charging stations on site with a new EV icon. So if you're on your way to pick up groceries, you can choose a store that also lets you charge your car. Look out for these Maps features in the coming months for cars with Google built-in wherever EV charging is available. To help drivers make the shift to electric vehicles, we're focused on creating great EV experiences across all of our products. For instance, in ways, we'll soon be making easy for drivers to specify their EV plug types so they can find the right charging station along their route.

But we're not just focused on driving. In many places, people are choosing more sustainable options like walking, biking, or taking transit. On Google Maps, we're making it even simpler to get around with new glanceable directions. For example, when you're walking, you can track your journey right from your route overview. It's perfect for those times when you need to see your path. We'll give you easy access to updated ETAs and show you where to make the next turn; information that was previously only available by using our comprehensive navigation mode. Glanceable directions start rolling out globally on Android, and iOS in the coming months.

Making the global impact requires everyone to come together, including cities, people and businesses. That's why we've worked with cities for years to provide key insights through Environmental Insights Explorer, or EIE, a free platform designed to help cities measure emissions. The Dublin City Council has been using EIE to analyze bicycle usage across the city and implement smart transportation policies. And in Copenhagen, we're using Street View Cars to measure hyperlocal air quality with Project Air View. With this data, the city is designing low-emission zones and exploring ways to build schools and playgrounds away from high-pollution areas.

These are just a few ways that AI is helping us reimagine the future of Google Maps, making it more immersive and sustainable for both, people and cities around the world.

And now, I'll turn it over to Marzia to talk about the work we're doing in Europe with Google Arts & Culture.

Marzia Niccolai

Thank you, Chris. It's exciting to see how Google Maps keeps getting more helpful. For the past decade, our daily work at Google Arts & Culture has also been about finding new pathways, specifically those at the intersection of technology and culture. Together with our 3,000 partners from over 80 countries, we brought dinosaurs to life in virtual reality, digitized and preserved the famed Timbuktu

Manuscripts, re-crafted a destroyed Mayan limestone staircase, and found a way for us humans to find our four-legged friends' doppelganger and famous artworks. As for the latter, at least one of Chris' dogs apparently spent previous life in Renaissance Venice.

Perhaps, you might also have heard of our work through our popular Art Selfie feature, which helped over 200 million people find their doppelganger and famous artworks. But what you probably didn't know is that Art Selfie was actually the first on-device AI application from Google, and we have applied AI to cultural pursuits in our Google Arts & Culture Lab in Paris for over five years.

So today, I'd like to show you what artificial intelligence in the hands of creatives and cultural experts can achieve. For our first example, I would like to welcome the blobs to the digital stage.

Thank you, blobs. Now, some of you might recognize the hallmarks of good opera right away: base, tenor, mezzo-soprano, and soprano. And if you aren't familiar with the world of opera singing, this experiment created in collaboration with artist, David Li, is for you, and will be your gateway to learn more. For Blob Opera, we teamed up with four professional opera singers, whose voice is trained in neural network, essentially teaching the AI algorithm how to sing and harmonize. So when you conduct the blobs to create your very own opera, what you hear aren't the voices of the opera singers, but instead the neural networks interpretation of what opera singing sounds like.

Give it a try and join the many people from around the world who have spent over 80 million minutes in this playful AI experiment to learn about opera.

As you've seen and heard, AI can create new and even playful ways for people to engage with culture, but it can also be applied to preserve intangible heritage. As Prabhakar shared earlier, access to language and translation tools is a powerful way to make the world's information more accessible to everyone. But I was surprised to learn that out of the 7,000 languages spoken on Earth, more than 3,000 are currently under threat of disappearing, amongst them, Yuri, Louisiana Creole, Sanskrit and Calabrian Greek.

To support these communities and preserving and sharing their languages, we created an easily usable language preservation tool called Woolaroo, which, by the way is the word for photo in the aboriginal language of Yugambeh. So how does it work? Once you open Woolaroo in your mobile phone's browser, select one of the 17 languages currently featured and just take a photo of your surroundings. Woolaroo with the help of AI-powered object recognition will then try to identify what is in the frame and match it against its growing library of words.

For me this tool is special because it shows how AI can help to make it tangible, different for communities and real people, like the one shown here, and their struggle to preserve their unique heritage.

Now, let's have a look at AI in the service of cultural institutions and how it can help uncover what has been lost or overlooked. Women on the forefront of science have often not received proper credit or acknowledgement for their essential work. To take another step to rectify this, we teamed up with researchers at the Smithsonian American Women's History Initiative and developed an experimental AI driven research tool that, first, compares archival records across history by connecting different nodes in the metadata. Secondly, it's able to identify women scientists on variations in their name because sometimes they have to do things like use their husband's name in a publication. And third, it's capable of analyzing image records to cluster and recover female contributors. The initial results have been extremely promising and we can't wait to apply this technology to uncover even more accomplishments of women in science.

Preserving cultural heritage online is core to our mission. We work hard to ensure that the knowledge and treasures provided by our cultural partners show up where it's of most benefit when people are searching online. Say, you search for Artemisia Gentileschi, the most successful yet often overlooked female painter of the Baroque period. You'll be able to explore her -- many of her artworks, including self portrait of Saint Catherine that have been provided by our partner, The National Gallery of London, in high resolution. When you click on it, you'll be able to zoom into the brush stroke level to see all the rich detail of the work. You'll never be able to get that close in the museum.

What's more? You are actually able to bring this and many other artworks right into your home. Just click on the view and augmented reality button on your mobile phone to teleport Artemisia's masterpiece in its original size right in front of you. But culture doesn't stop at classical art. So keep your eyes open for a variety of 3D and augmented reality assets provided by cultural institutions.

One of my favorite, besides the James Webb Space Telescope is one of the most popular queries for students, the periodic table, for which I'm happy to announce, we will triple the number of available languages to include French, Spanish, German and more in the coming weeks. 3D and AR models in Google Search really unlock people's curiosity. And in the past year alone, we've seen an 8x increase in people engaging with AR models contributed by Google Arts & Culture partners to explore and learn.

Those are just some of the examples of what awaits at the intersection of artificial intelligence and culture, and how we work with our partners to make more culture available online. I invite you to discover all of that and much more in the Google Arts & Culture app.

Thank you, and back to Prabhakar.

Prabhakar Raghavan {BIO 3368123 <GO>}

Thanks Marzia. Today, you saw how we are applying state-of-the-art AI technologies to make our information products more helpful for you, to create experiences that

are as multi-dimensional as the people who rely on them. We call this making search more natural and intuitive. But for you, we hope that it means that when you next seek information, you won't be confined by the language it originated in. You won't be constrained to typing words in a search box, and you won't be beholden to a single way of searching.

Although we are 25 years into search, I dare say, that our story has just begun. We have even more exciting AI-enabled innovations of the works, that will change the way people search, work and play. We're reinventing what it means to search and the best is yet to come. Thank you all. Merci.

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