Orange Institute #18

April 24 – 27, 2017

How is Artificial Intelligence shaping the future of Tech in Silicon Valley?

orange™

Orange Institute

Orange Institute is your guide to the rapidly expanding Digital Economy, a force for positive change in the workplace, our daily life, and society. Our member companies have been collaboratively learning how to adapt and prosper, both as enterprises and as citizens, by immersing ourselves in the world's creative capitals since 2009.

The format for this learning and connecting has been evolving with each new session, typically 2-4 days long, convening inside tech hubs from Silicon Valley to Seoul, hosted by global giants and animated by entrepreneurs across a broad spectrum of disciplines and focus areas. Our topics range from neuroscience to navigation, from Big Data to e-health, from designing new consumer experiences to cutting-edge data centers.

Learning dynamically in a non-linear world is not a luxury, it is a necessity for survival and growth. As the corporate sponsor of this activity, Orange is committed to sharing and discussing new concepts and ideas - we believe that by helping others to understand, we can also see more clearly.

Our commitment is to curate insightful conversations with the entrepreneurs, disruptive companies, researchers and investors who are passionate about change. Please join us on the journey!

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Edito

“Orange Institute has a natural affinity with Silicon Valley, in fact this is the sixth time a session has been hosted there. This year, we focused on Artificial Intelligence; a theme that doesn’t just touch our lives but will fundamentally change the way we live and work.

It has also given us a lot to talk about: not only with the experts, business leaders and academics we met, but also between our members. These passionate discussions have continued until today, with many thoughts and articles being shared about the topics covered; a perfect example of the buzz our sessions create within our member community.

Our aim is to provide a consistent program from one session to the next. Our loyal Orange Institute followers will see a clear link with the tech giants we saw in China and the promising start-ups we met in Israel a year ago, who were using Big Data for the benefit of machine learning (deep learning).

The thread that connects everything is digital innovation in all its forms, whether a one-off phenomenon, or the start of a deeper, ongoing trend.

That’s why we were particularly keen to introduce pioneering companies such as Nvidia and Amazon, and visit innovation hot spots such as UC Berkeley. The speakers we met there live and breathe AI, and are in the best position to predict how the interaction between man and machine will be transformed in the months and years to come.

We spent a morning in a demo center for autonomous vehicles, where the question is not how to make them autonomous, but how autonomous to make them!

We also talked about data in space, and whether we should make all data collected by government-owned drones and satellites available to everyone (as many small companies would like to see), or filter it before making it public.

Our agricultural vision has been turned upside down. Who would have thought vertical farming was possible even 10 years ago? Centuries-old agricultural techniques are being challenged in favor of our own well-being and that of the planet.

We concluded our session with a few concrete examples where AI benefits project management, notably in matching freelancers to companies that need their skills. We also had a glimpse into the future for customers, and how they might experience shopping, loan applications, and everyday activities such as buying fuel via in-car contactless payments.

This marks the end of this journey into the world of AI. Next time, we’ll be taking up the trail in a new country and indeed a new continent where the priority for citizens is around survival, and where innovation focuses on health, smart cities, education, anti-corruption and finance.

We hope you will join us for this new session in November 2017 where we will see how innovation can help the future of humanity.”

Béatrice Mandine

Executive Vice President
of Comms and Brand

San Francisco visit

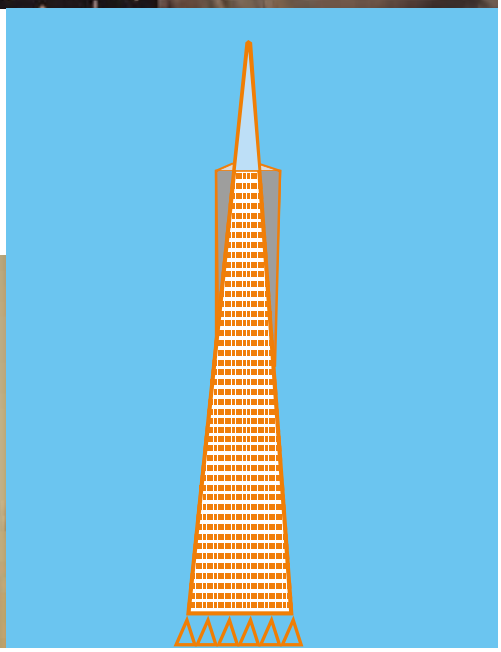
Cable car tour

Before taking a deep dive into AI and its impact on our daily lives, we started the session by discovering San Francisco on a cable car tour.

Icebreaker and Welcome dinner

48th floor of the Transamerica Pyramid

The San Francisco tour was followed by an icebreaker dinner on the 48th floor of the unique Transamerica Pyramid building, where our members had the opportunity to get to know each other and enjoy the amazing sunset views across the San Francisco Bay.



During the four-day session, Orange Institute and its members discovered how large and small companies, start-ups and VCs are reacting to Artificial Intelligence (AI), which is now present everywhere in our everyday lives. From machine learning to AgTech and FinTech, this session explored the business opportunities that AI brings to a variety of fields.

State of play: Machine Intelligence

Orange Silicon Valley

Georges Nahon introduced the opening session by briefing us on the latest Silicon Valley trends, giving us an insightful presentation of the future of Tech in the valley.

Our first meeting was with Nvidia, the leader in visual computing hardware, which supports the intensive computational loads required for deep learning. Kimberly Powell calls deep learning "an unreasonably effective" form of machine learning, and states that it is "the modern AI". She was the first of several presenters to remind us that the percentage of accuracy for image recognition – the initial massive use case for deep learning – has climbed dramatically since 2011 from 74% to 96%, thanks to ever-improving algorithms and the ability to train machines using the massive data sets on Flickr, Facebook, Netflix, etc.

> **"Amazon has thousands of engineers focused on AI."**
>
> **Joe Spisak, Product manager, Amazon AI**

These data sets live inside Amazon Web Services (AWS), where Joe Spisak works as the AWS product lead for AI frameworks and solutions, which includes Nvidia hardware. As is true of underlying cloud computing, Amazon is both a huge user of AI as well as an early and aggressive supplier of AI and machine learning tools. Joe showed us a clip of Amazon Go, a retail experience that depends heavily on sensors and computer vision to create a seamless checkout experience. Looking at the computer architecture for Go, Spisak points to Greengrass, which enables reinforcement learning at the edge, even when not connected, using Raspberry Pi processors.

As another example of Amazon's dominance, Joe carefully detailed the extensive open source ecosystem approach to machine learning being taken with ApacheMXNet, as well as supporting Google and Microsoft machine-learning frameworks. At the end of the day, it's sobering to hear him state: "Amazon has thousands of engineers focused on AI."

Peter Marx works at GE Digital, but his career arc seems like a setup for machine learning, from mobile development at Qualcomm to the latest innovations that will enhance Los Angeles' urban infrastructure. He talked about use cases in healthcare (GE makes MRI scanners), predictive elevator maintenance, and overall asset performance management.

Danny Lange left Uber after building its machine learning platform and moved to Unity, the graphics creation software environment. The power of GPUs to enhance 3D, AR, and VR content is massive, and we took advantage of Danny's decades of experience in natural language and machine learning as he presented a tour de force of deep learning examples. These start as an artificial entity – a graphic avatar of a chicken or a ballerina – trying to accomplish a task and failing, but after hours and thousands of repetitions, it masters the task, with no programming. Lange is a wizard with helpful advice: "Go for low-hanging fruit – don't start with Big Data; use the cloud, and start with supervised learning based on historical ground-truth data."

80 number of diseases that machine learning algorithms can currently identify.

96% accuracy for identifying 14 million images in the ImageNet database thanks to deep learning.

65% of Silicon Valley revenues are made outside the US.

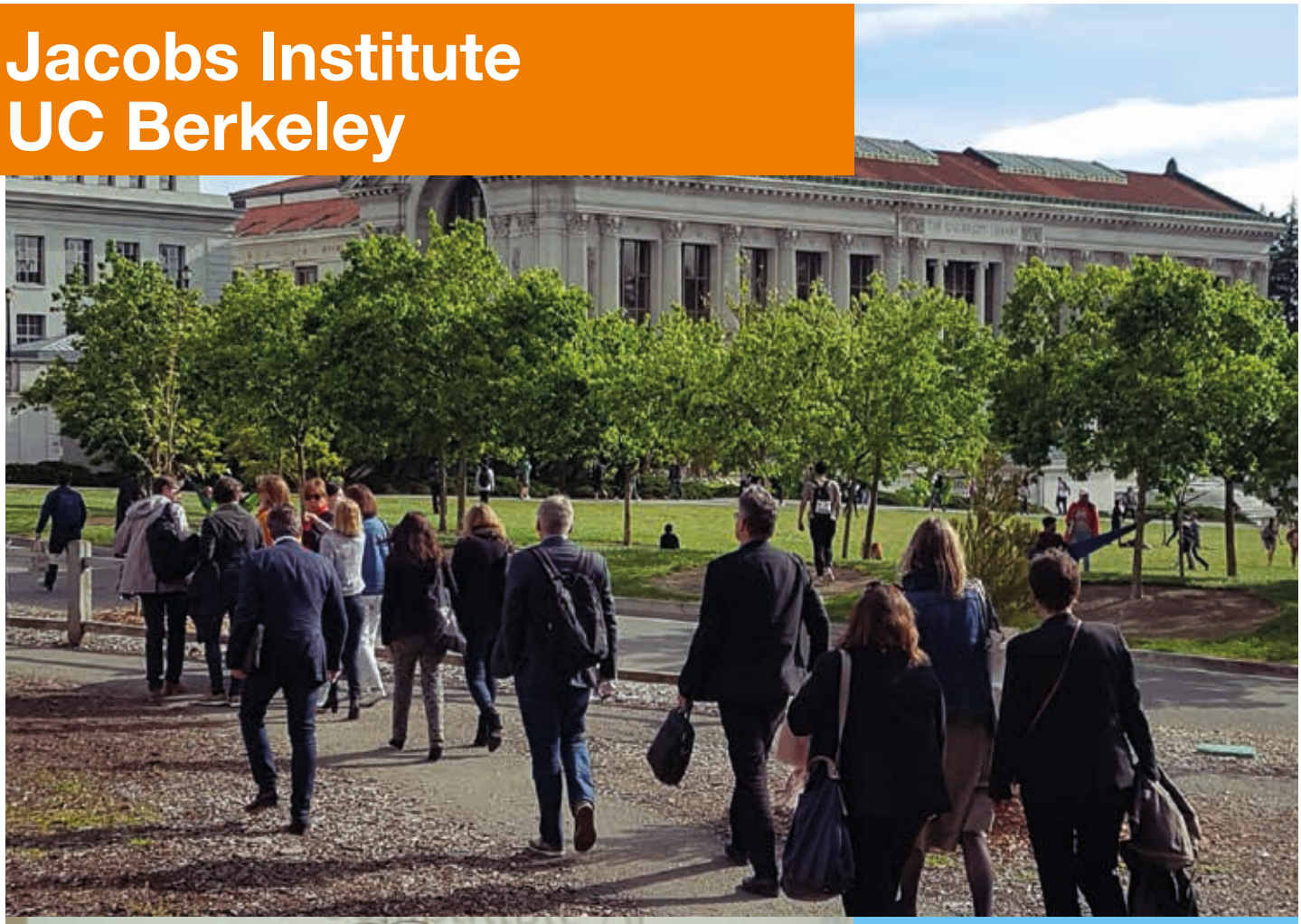
Among **180** Unicorns created in the world since 2009, almost 100 come from the US.

> "When you start to use AI it's not a one-way path, it's a loop."
>
> **Danny Lange,**
> **VP of AI and Machine Learning,**
> **Unity 3D**

> "If you are not at the table, you are on the menu."
>
> **Georges Nahon,**
> **CEO,**
> **Orange Silicon Valley**

AI code & Karma: responsible development of Machine Intelligence

Jacobs Institute
UC Berkeley



> “The human either can stop the robot, or not.”
>
> **Anca Dragan,**
> **Assistant Professor,**
> **EECS, UC Berkeley**

The afternoon moved from a technology to a design focus. Appropriately, we were in the design center of Cal (the insiders' name for UC Berkeley). Anca Dragan is a well-known robotics researcher and a member of the Center for Human-Compatible AI. She began by asking the appropriate question: "What is not compatible with humans?" It turns out that machines are very literal, so writing instruction sets – and more importantly the reward mechanisms to reinforce their behaviors – is fraught with potential misunderstanding. She cited the parable of King Midas, whose wish to have everything he touched turn to gold came true in every respect.

Dragan dug deeply into the rewards/results connection, and exposed the fact that observational data of humans greatly enhances robots' strategies for achieving rewards. That's the code part, the karmic part is whether this is a good idea: should we encourage it? Designing incentives for robots to accept human intervention is an important goal: she calls it "accepting oversight."

> **"We live at the intersection of design and technology."**
>
> **Bjorn Hartmann,**
> **Faculty Director,**
> **UC Berkeley**

Jack Clark from OpenAI continued in this vein, and underscored the unpredictability of reinforcement learning – more specifically, unintended negative outcomes. While both Anca and Jack talk about "automated intuition", it is Jack who helpfully teased out what is near-term and what should be treated with skepticism. One example: self-driving cars.

Meeting the customer with intelligence, artificial or otherwise

Jacobs Institute UC Berkeley

> "You have to be very careful about where AI stops and where humans take over."
>
> **Adam Odessky, CEO, Sense.ly**

The topic of what we know about humans, who knows it, and how it should be shared is the passion of Dan Elitzer, an IDEO designer focused on Identity. Dan directed our attention away from Big Data to something just as valuable, the Small Data about our individual lives. Turns out we're bad at keeping data secure, and that means that cybersecurity is really about identity. Dan told us what we already know: the answer to who owns our data is Google, Facebook, and Amazon. He cited Google's Federated Learning model as a way forward, which is about machine learning at the edge, and sending only anonymized summary data up the chain. He posited another model, a self-sovereign model, where the user is in control and directs the flow of identifiable personal data. Dan's background in blockchain technology makes this a well-informed design choice.

Pandorabots platform:

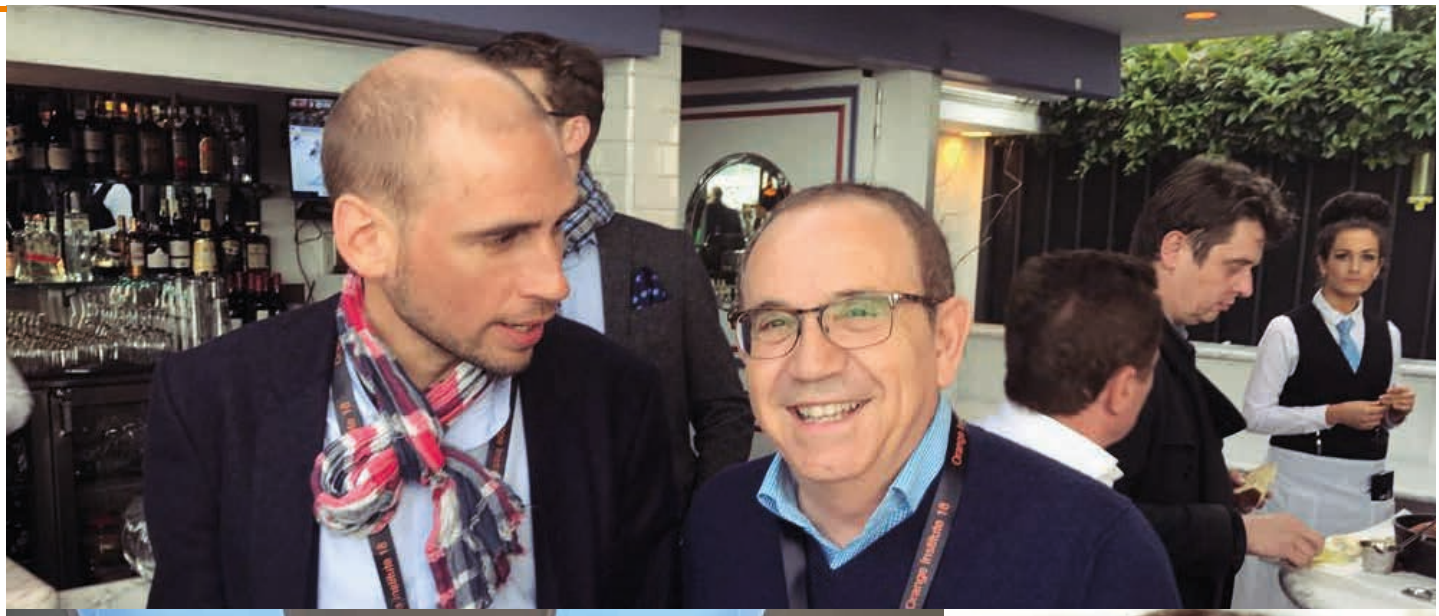
6 million
conversational interactions
& 245,000
developers.

1 million
NHS patients in the UK will connect to Sense.ly avatars.

David Martin from Orange Silicon Valley's Product Design team got under the skin of interaction design with two advanced practitioners of chatbot technology: Lauren Kunze of Pandorabots, and Adam Odessky of Sense.ly, a medical avatar for collecting the status of outpatients' health remotely. The experience of Adam working with the NHS in the UK, and Lauren's 15-year journey with messaging bots, yielded a lot of good, pragmatic advice. There is still a need for humans, and indeed 20% of the conversational interface should be with a real person… one simple but profound idea: "Don't throw bots at angry customers."

Dinner at Salito's Crab House

Sausalito




GRANCHIO ARROSTITO
SALITO'S
QUALITA SCELTA
PRODOTTO ITALIANO
ASdoMAR

AI in the driver's seat

Prospect SV

> "Cars with autonomy are going to create new social interactions."
>
> **Karen Kaushansky, Designer**

Day two began at the temple of intelligent transportation research, the ProspectSV lab, which also hosts a number of clean energy projects. Jonathan Salomon, the Connected Vehicles expert at Orange Silicon Valley, took us through the industry standard for the five levels of autonomy. He also provided a critical perspective on just how realistic the timeframe is for widespread adoption of autonomous vehicles in the US and abroad.

NIO said it will ship a level 4 autonomous vehicle in 2020. NIO is a Chinese-backed electric vehicle (EV) company with a major US HQ in San Jose. Chris Pouliot joined us – not to talk about fast cars (although he showed a video of NIO's Formula-E race car tearing up race-tracks with no driver inside), or dreamy luxury vehicles (although he showed us one of those too) – but data science. After working at Google and Netflix, Chris is now applying machine learning to create highly personalized experiences inside cars. The NIO vision has three promises: Safe, Green, and Companion, the personalized part. NIO sees this triad as the basis for Car 3.0: autonomous, electric, and personalized, even if it is shared. That's because updates and adaptations can be made over the air with software, in real time.

> **“AI conditioned on context is more powerful than AI alone.”**
>
> **Chris Pouliot,**
> **VP Data Science,**
> **NIO**

If NIO is building it, Karen Kaushansky is designing it. She identifies herself as a futurist, although her roots in the future go back to the mid-1990s, when she was designing early voice-dialing interfaces. Karen now focuses on how autonomous entities interact with humans in the messy, public real world. She has already worked out the question of intent for robots, and has now turned her attention to how robots communicate their intent to humans: think about how an autonomous car and one with a human driver would negotiate an intersection together.

This suggests new design palettes, ones that can be used for machine-to-human, as opposed to human-to-machine. She walked us through one, a spectrum starting with the literal, and ending in the transformative. Speaking of which, she is moving to Europe, good news for our members.

5 **levels of autonomy in vehicles**
1 being none and
5 being fully automated.

160 MPH
Speed record for autonomous race car set by NIO.

The built world makes room for autonomous tech

Prospect SV

Given Karen's focus on how autonomous vehicles navigate the built world, full of baby-strollers and highly distracted humans, the next panel approaches it from the other end. Will Barkis, the Smart Cities lead at Orange Silicon Valley, interviewed two people who spend a lot of time thinking about how to get around in future cities. Arup's Baumgardner explained how the US's car-centric cities are an aberration. Sven Beiker validated this, noting that public transport in Europe may be so much better because it was blown up in WWII, and post-war reconstruction was a great opportunity for infrastructure.

Looking forward, there will be more people but there will be less ownership, and therefore hopefully there will be more space. The impact of AVs on commuting, which is now a drain on not just productivity but happiness, health, even marriage, impacts urban sprawl and potentially re-vitalizes the suburbs.

Eyes on the sky: commercialization of space

RobotX Accelerator

"New Space" is where Orange Silicon Valley's expert Hugo Wagner spends his time, and we met him just a few miles from NASA to explore the growing ecosystem of VCs and entrepreneurs who are brewing a cocktail of disruptive aerospace satellite design, launch economics, and Silicon Valley data science. Bronwyn Agrios is a great exemplar: she explained how she started consulting on how to collect image data, and then backed into raising money to launch her own satellite fleet to collect more image data more often, and run more analytics on it.

13,517
commercial communications satellites expected in space.

$50 million
Capital needed by Astro Digital to put up an entire constellation of small cubesats.

> "Value moves away from owning assets and toward what you do with data."
>
> **Eric Anderson, President, And One Technologies**

She is flanked by two men with decades of perspective, who appreciate how an industry that started so slowly can now travel much more quickly. New Space VC Eric Anderson noted how as an angel, a $50-100K seed investment can have a huge impact in this category, literally putting assets into space.

Use cases proliferate when, as Bronwyn noted, we build the capability to take a picture of the Earth every 24 hours. It seems appropriate that it was Silicon Valley legend Steward Brand that convinced NASA to share the famous “blue marble” picture of Earth with us – in 1969.

> “Seed investment has a huge impact in New Space.”
>
> **Bronwyn Agrios, Head of Product, Astro Digital**

From planet to farm: seeing with computer vision

RobotX Accelerator

Our current food system was designed to manage quantity. It now has to change so that it manages sustainability while it digitizes too. Consumer behavior has quickly evolved, focusing less on price and more on health, well-being, food safety and origin. The demand for transparency has significantly increased. The development of new technologies allows producers to digitize the supply chain. Hardware and software prices are falling – the cost of the cloud has divided by 1,000 since the year 2000 – therefore, it has become easier to collect and analyze on-site data.

Agricultural yields can vary as much as 50% from one year to another. To predict them, it is necessary to count, multiply and pray; yet the precision of these predictions is up to 60%. By analyzing fruit images, AgriData was able to count them, thanks to a rolling vehicle that gives an estimation of the volume and the weight of the products. Precision is more than 90%, allowing cost adjustment, sales optimization and load by plant, resulting in a 25% increase in financial performance. Thanks to this analysis, AgriData can measure the crop's maturity and adjust the harvest date accordingly.

We also explored the disruptive manner of cultivating lettuces with Dave Vosburg from FreshBox. Leafy Green Vertical Farming Industry (CropOne) developed stacked indoor farming based on the use of LEDs in order to grow crops closer to consumers and reduce the transportation time between the production site and the point of sale.

> **"We're digitizing an industry that was never digitized before."**
>
> **Cyrille Habris,**
> **Co-Founder and CEO,**
> **Agridata**

50%
of tomatoes grown in the US are grown indoors.

1 day
Average time from harvest to table for a lettuce in the US with this new method vs 12 to 17 with a normal growth.

60 days
Shelf life of bacteria-free vertically grown produce.

In addition to consumer proximity, this implementation enables better product conditions and conservation: there are no bacteria in a vertical culture, so a lettuce lasts 60 days in the fridge, with no need to wash or pack it. A considerable amount of large-scale projects are currently deployed as Chinese people eat on average 1kg of vegetables per day, 10 times more than in the US.

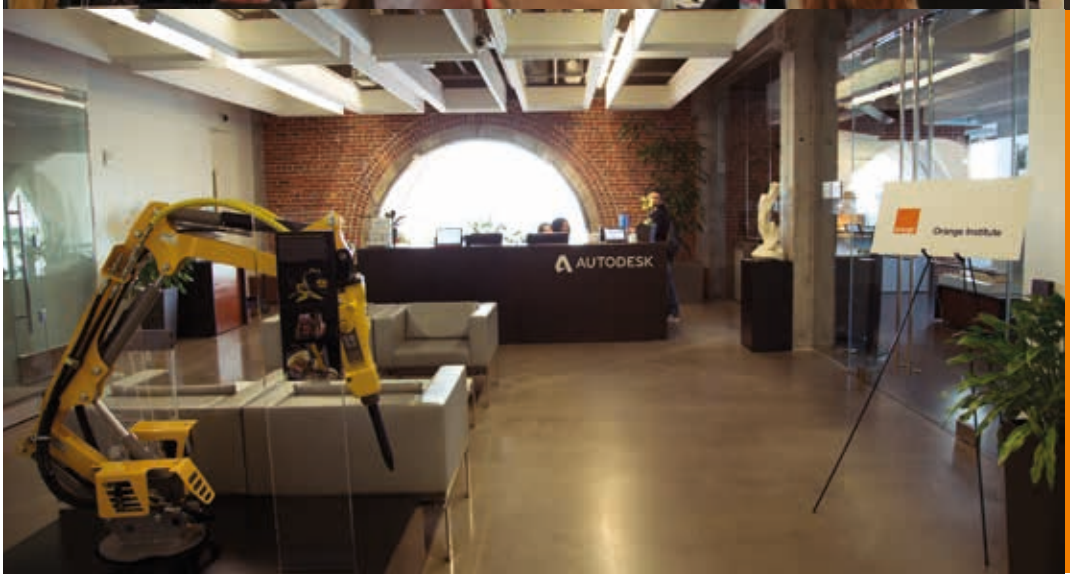
Machine Intelligence in action

Autodesk Gallery

Autodesk welcomed Orange Institute into its event space through the Autodesk Gallery, where Rama Dunayevich gave guests a tour so that they could see various design projects that the company's technology has helped to produce, including architecture, clothing, sculptures, and other artifacts. The office, which is located across the street from Orange Silicon Valley's 60 Spear St. space, offered the first of two visually impactful stops for the day that showcased some of the impressive innovation projects being pursued in the neighborhood.

Iba Masood, who founded the Orange Fab start-up Tara.ai, shared her insights on leveraging machine learning to improve the recruitment matching process between freelancers and the companies that want to hire them. Masood discussed Tara.ai's growing advantage in decision-making, which is constantly adding more data and experiences to its knowledge base.

Aden Zaman of Samba.tv showed us examples of intelligent image-identification software that his company is in the early stages of testing for monitoring TV content. Like AgriData's crop-tracking and the software used by autonomous vehicles, Samba.tv accumulates examples of objects, brands, and actors on screen that it leverages to become smarter about what it identifies in a given scene.



50%

of workforces are expected to be freelancing by 2020.

Innovation neighborhood: growing the corporate innovation network

Visa Innovation Center

Visa welcomed Orange Institute to its San Francisco innovation center, where Kellie Goodwin introduced the group to Visa's work through partnerships and special projects that will expand its capabilities in various payment spaces. Examples included a room of IoT-related payment options for Airbnb, as well as a Mini that was fitted out with smart payment technology and other user-aware features.

$ 5,000
APR of overdraft fees paid by bank customers.

138 million
of Americans struggle financially.

56%
of subprime credit scores in the US.

Ofer Mendelevitch of Lendup connected the afternoon's FinTech theme to his start-up's mission to achieve social good by increasing financial inclusion for under-banked consumers. His company uses alternative means for evaluating credit-worthiness in cases where loan applications might otherwise be declined, such as traditional track records of banking and credit-related activity.

Visa's Avin Arumugam, who previously worked with PayPal and JPMorgan Chase, introduced Visa's venture investing and IoT interests, sharing his experience with mobile payments and setting up Apply Pay at Chase. According to Arumugam, Apple has launched a monolithic platform with its iOS-based payment service, but it did knock down a barrier that made consumers warm up to non-traditional mobile payments from their personal devices.

Acknowledgment

Firstly we'd like to say a huge thank you to Georges Nahon and Mark Plakias from Orange Silicon Valley along with their super-efficient team. Their expert knowledge of the valley's digital ecosystem, and great choice of speakers and locations, made a big difference in helping us address AI and clarify the challenges ahead of us.

We could not have held such a successful session without valuable contributions from the following speakers who are working in a range of interesting and inspiring AI fields:

Kimberly Powell (Nvidia), Peter Marx (GE Digital), Danny Lange (Unity Technologies), Joseph Spisak (Amazon AI), Anca Dragan and Björn Hartmann (UC Berkeley), Dan Elitzer (Ideo Co-Lab), Lauren Kunze (Pandorabots), Karen Kaushansky (Experience Designer), Chris Pouliot (NIO), William Baumgardner (Arup), Sven Beiker (Stanford GSB), Sean Casey (Silicon Valley Space Center), Eric Anderson (And One Technologies), Brownyn Agrios (Astro Digital), Dave Vosburg (FreshBox Farms), Cyrille Habis (Agridata), Mike Haley (Autodesk), Iba Masood (Tara.ai), Aden Zaman (Samba TV), Kellie Goodwin and Avin Arumugam (Visa) – and last but not least – Ofer Mendelevitch (Lendup).

Our thanks also to Opher Kahane from Origami Logic, who shared his media marketing evolution presentation, even though he couldn't be with us as planned.

Some great moments were caught on film thanks to the video team, Aline and Thomas, who captured the busy days we spent in the valley.

This year, we had the wonderful opportunity to attract new members thanks to Sophie Duhamel from the Entreprises & Medias association. She brought the Orange Institute spirit to life across her association, resulting in 9 new members joining us for this session. This highlights the synergy and team spirit that quickly builds between our regular and new members, and we warmly thank everyone for their participation and enthusiasm to make this session memorable and productive.

Hats off to our trainee Pauline Chambon who, from our office in Paris, coordinated a seamless welcome for our members across the world in San Francisco. There's nothing artificial about her intelligence!

We'll keep you posted about our next adventure. Where are we going? Well, we're planning to travel east… Why not join us and discover (for the first time in Orange Institute history) a country that is rising to global challenges while tackling modernity and tradition, wealth and poverty.

We look forward to seeing you all there.

Best wishes,

The Orange Institute team

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