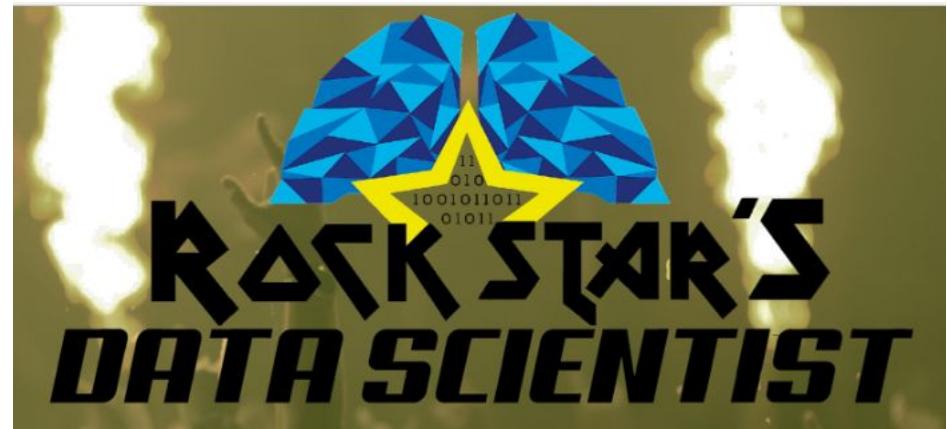


Machine Learning and data analysis:

From the globe to Colombia



Hello!

I am Camilo Vásquez



You can find me at:

Twitter: @**@jcvasquezc1**

LinkedIn: @**jcvasquezc**

Email: **jcamilo.vasquez@udea.edu.co**

<http://jcvasquezc.wixsite.com/home>

Hello!

I am Camilo Vásquez



- Lecturer and machine learning researcher at UdeA



**UNIVERSIDAD
DE ANTIOQUIA**

1 8 0 3

You can find me at:

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LinkedIn: **@jcvasquezc**

Email: **jcamilo.vasquez@udea.edu.co**

<http://jcvasquezc.wixsite.com/home>

Hello!

I am Camilo Vásquez



- PhD(c) Pattern recognition Lab.
University of Erlangen-Nuremberg.



FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG



L EHRSTUHL FÜR
M USTER-
E RKENNUNG

You can find me at:

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LinkedIn: **@jcvasquezc**

Email: **jcamilo.vasquez@udea.edu.co**

<http://jcvasquezc.wixsite.com/home>

Hello!

I am Camilo Vásquez



- Machine learning engineer and software developer at Brandon Logan



BrandonTM Logan

Inspired By data.

You can find me at:

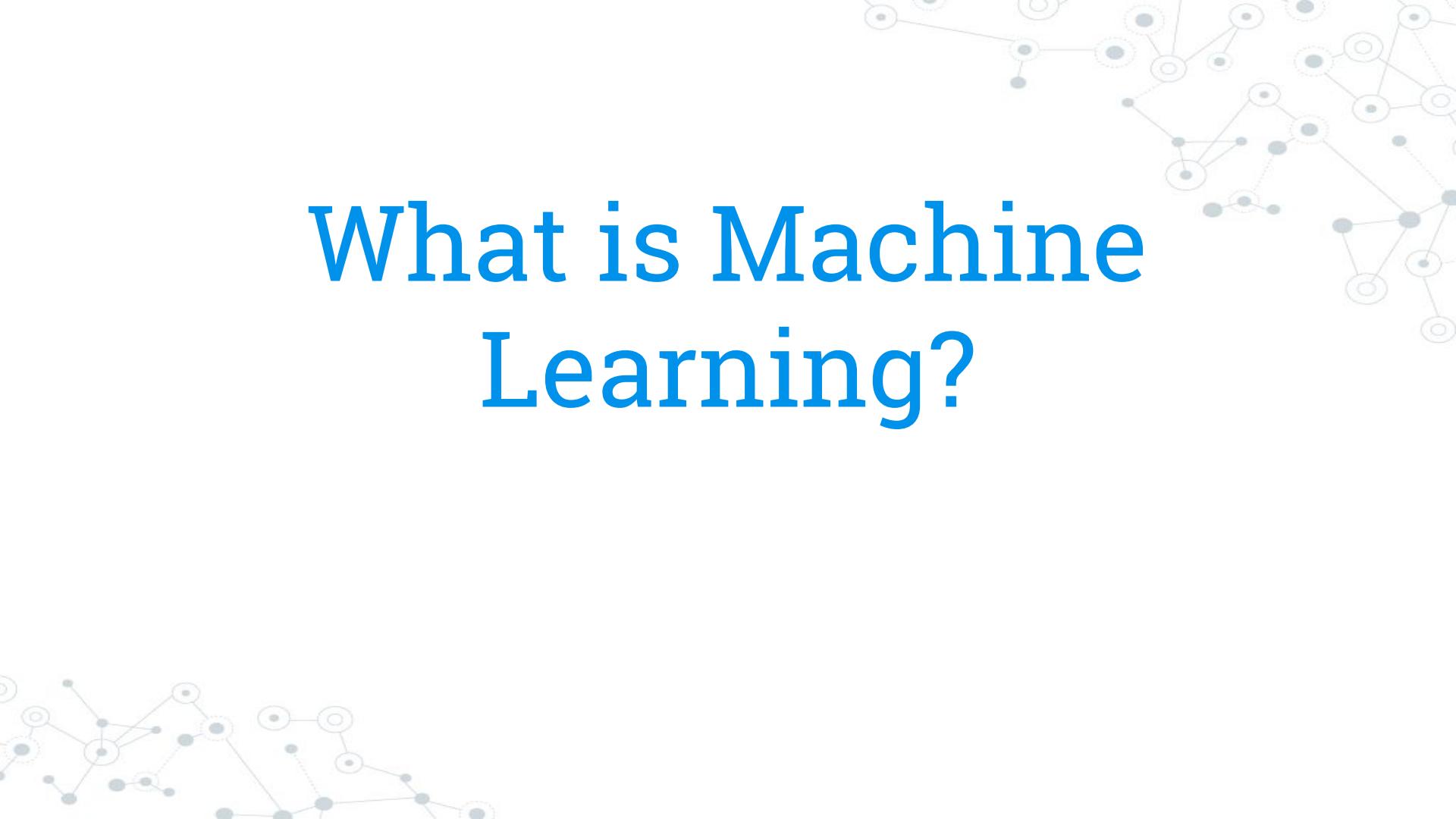
Twitter: @ [@jcvasquezc1](https://twitter.com/jcvasquezc1)

LinkedIn: [@jcvasquezc](https://www.linkedin.com/in/jcvasquezc)

Email: jcamilo.vasquez@udea.edu.co

<http://jcvasquezc.wixsite.com/home>

What is Machine Learning?





Machine Learning
is not magic,
It's engineering







Time, Money, Human Resources

Machine learning: key concept

Available
data



Predictions
for new
data



Machine learning
algorithm

Machine learning: key concept

Available
data



Predictions
for new
data



Machine learning
algorithm

Machine learning: key concept

Available
data



Predictions
for new
data



Machine learning
algorithm

Machine learning: key concept

Available
data



→

Predictions
for new
data



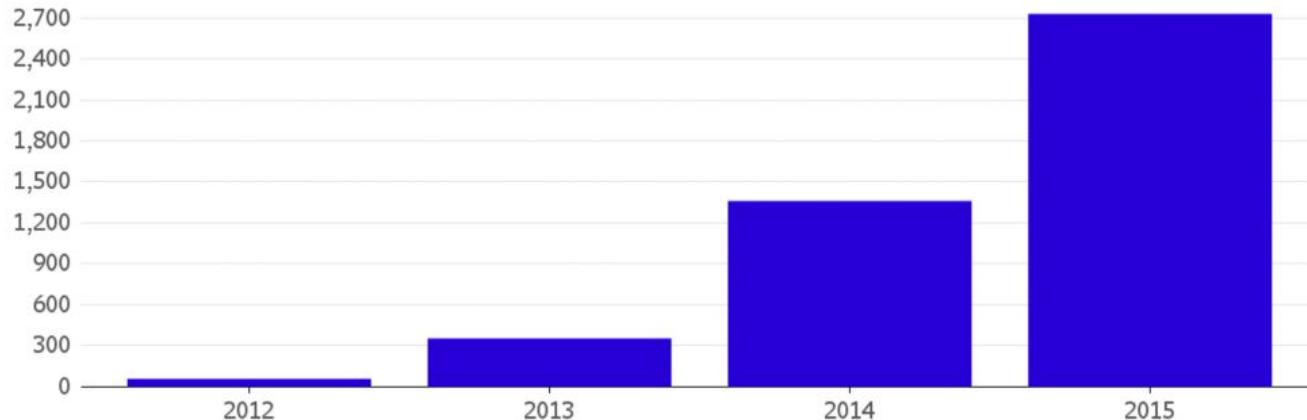
Machine learning
algorithm

Trends

Trends

Artificial Intelligence Takes Off at Google

Number of software projects within Google that uses a key AI technology, called Deep Learning.



Source: Google

Note: 2015 data does not incorporate data from Q4

Trends

- 50% of companies that implement ML solutions quantify return over inversion (ROI)

Source: Google cloud 2017:

https://cloud.google.com/blog/big-data/2017/04/survey-says-machine-learning-happening-now-and-paying-off?utm_source=newsletter&utm_medium=email&utm_campaign=2017-May-GCP-newsletter-en

Trends

- 50% of companies that implement ML solutions quantify return over inversion (ROI)
- 60% of companies around the globe have ML strategies under development.

Source: Google cloud 2017:

https://cloud.google.com/blog/big-data/2017/04/survey-says-machine-learning-happening-now-and-paying-off?utm_source=newsletter&utm_medium=email&utm_campaign=2017-May-GCP-newsletter-en

Trends

- 50% of companies that implement ML solutions quantify return over inversion (ROI)
- 60% of companies around the globe have ML strategies under development.
- ML inversion is quickly growing up (companies invest of up to 15% of budget to ML projects)

Source: Google cloud 2017:

https://cloud.google.com/blog/big-data/2017/04/survey-says-machine-learning-happening-now-and-paying-off?utm_source=newsletter&utm_medium=email&utm_campaign=2017-May-GCP-newsletter-en

Trends

- 50% of companies that implement ML solutions quantify return over inversion (ROI)
- 60% of companies around the globe have ML strategies under development.
- ML inversion is quickly growing up (companies invest of up to 15% of budget to ML projects)
- 95% of companies around globe have adopted **Big data** technology (Spark, Hadoop)

Source: Google cloud 2017:

https://cloud.google.com/blog/big-data/2017/04/survey-says-machine-learning-happening-now-and-paying-off?utm_source=newsletter&utm_medium=email&utm_campaign=2017-May-GCP-newsletter-en

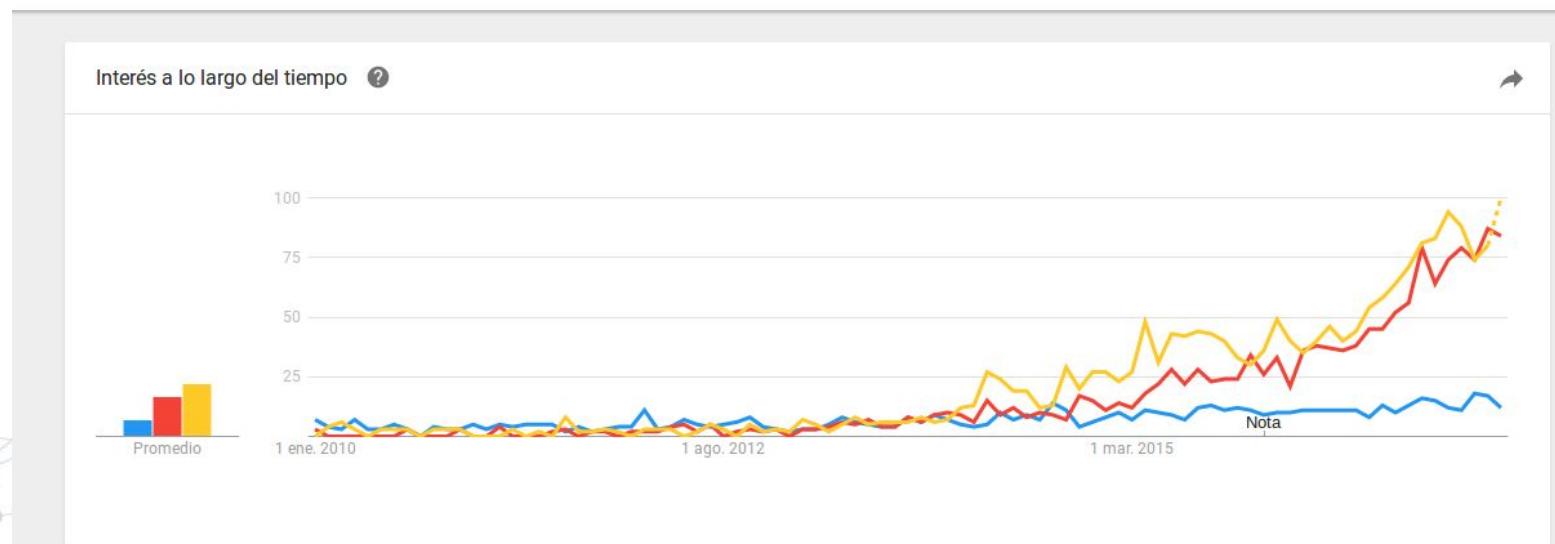
Trends

- Top companies investing in ML
 1. DeepMind
 2. Google
 3. Facebook
 4. OpenAI
 5. Baidu
 6. Microsoft
 7. Apple
 8. IBM

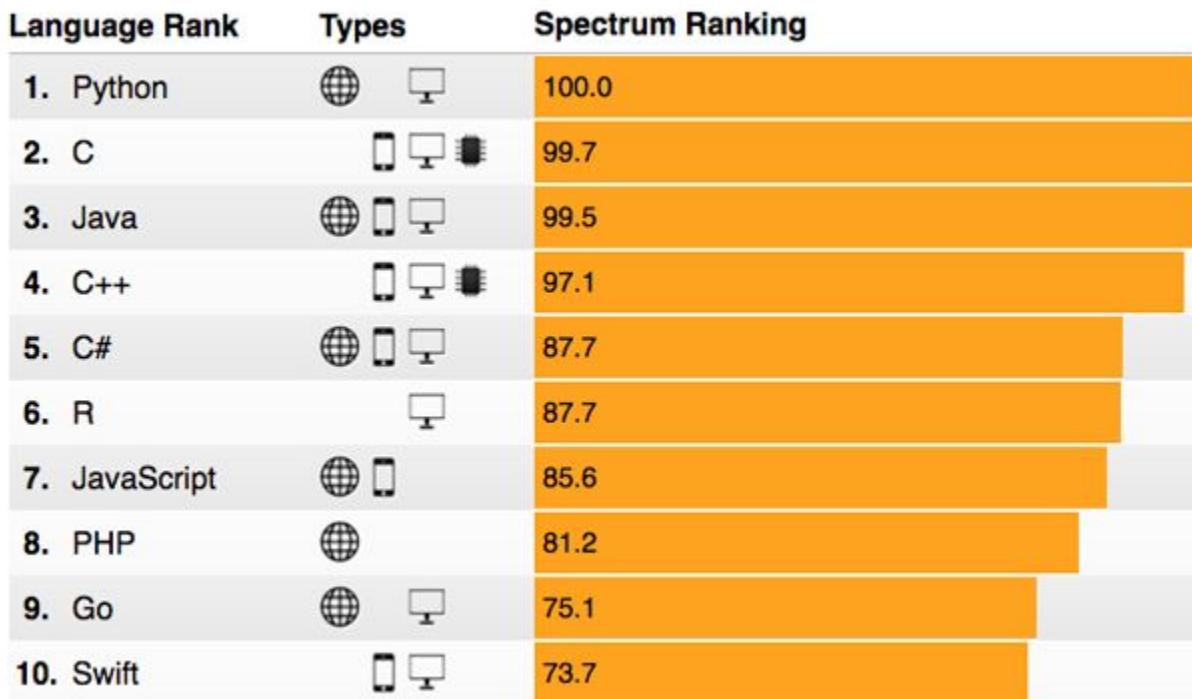
Source: Forbes 2017:

<https://www.forbes.com/sites/quora/2017/02/24/what-companies-are-winning-the-race-for-artificial-intelligence/>

Trends

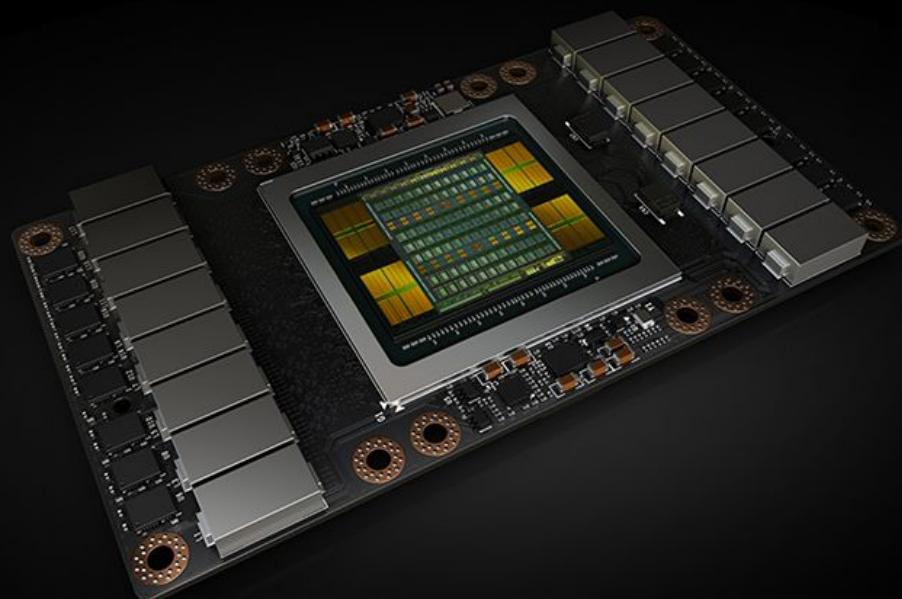


Trends



Source: IEEE Spectrum 2017:

<http://spectrum.ieee.org/computing/software/the-2017-top-programming-languages>



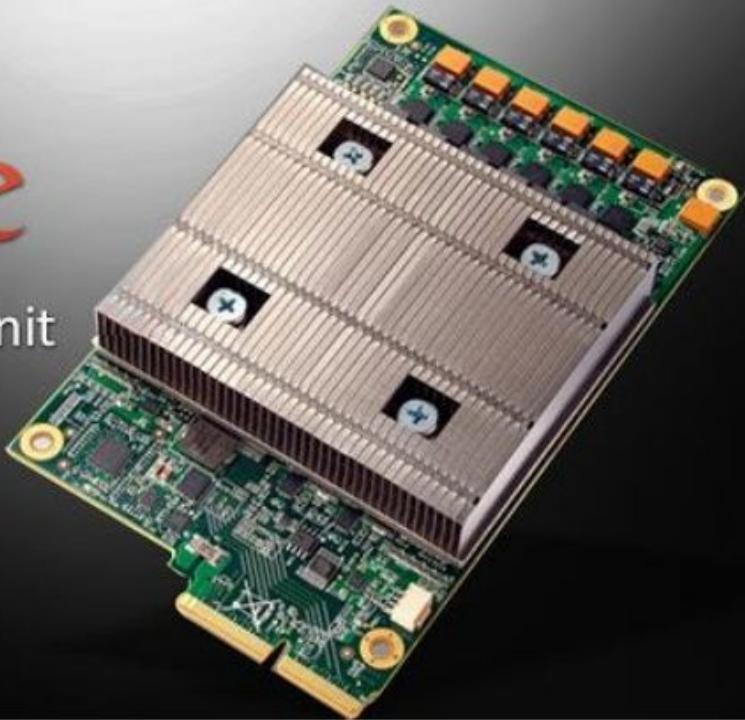
THE CORE OF AI

NVIDIA Volta is the new driving force behind artificial intelligence.

[LEARN MORE](#)

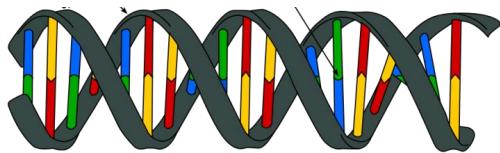
Google

Tensor Processing Unit

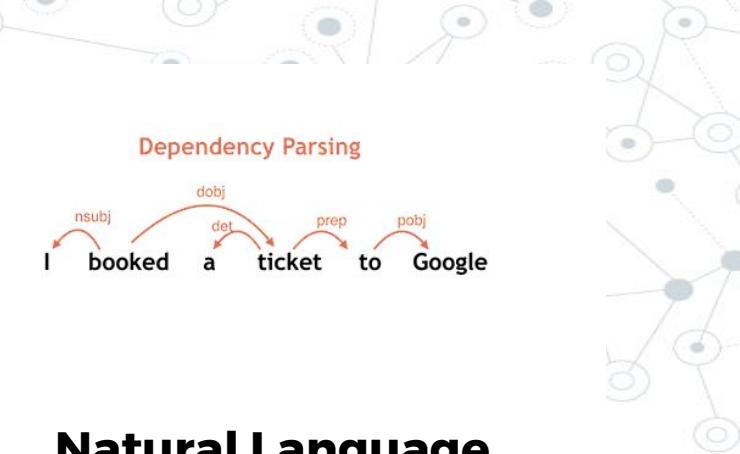


Applications

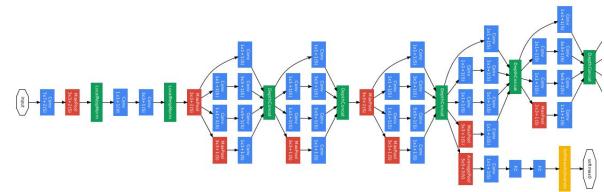
Applications



Genetics



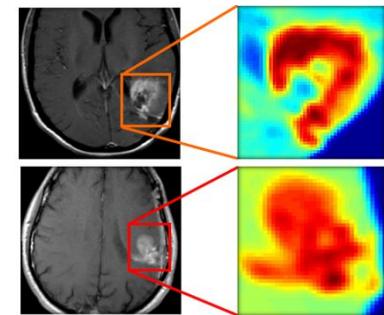
Natural Language Processing



Deep Learning



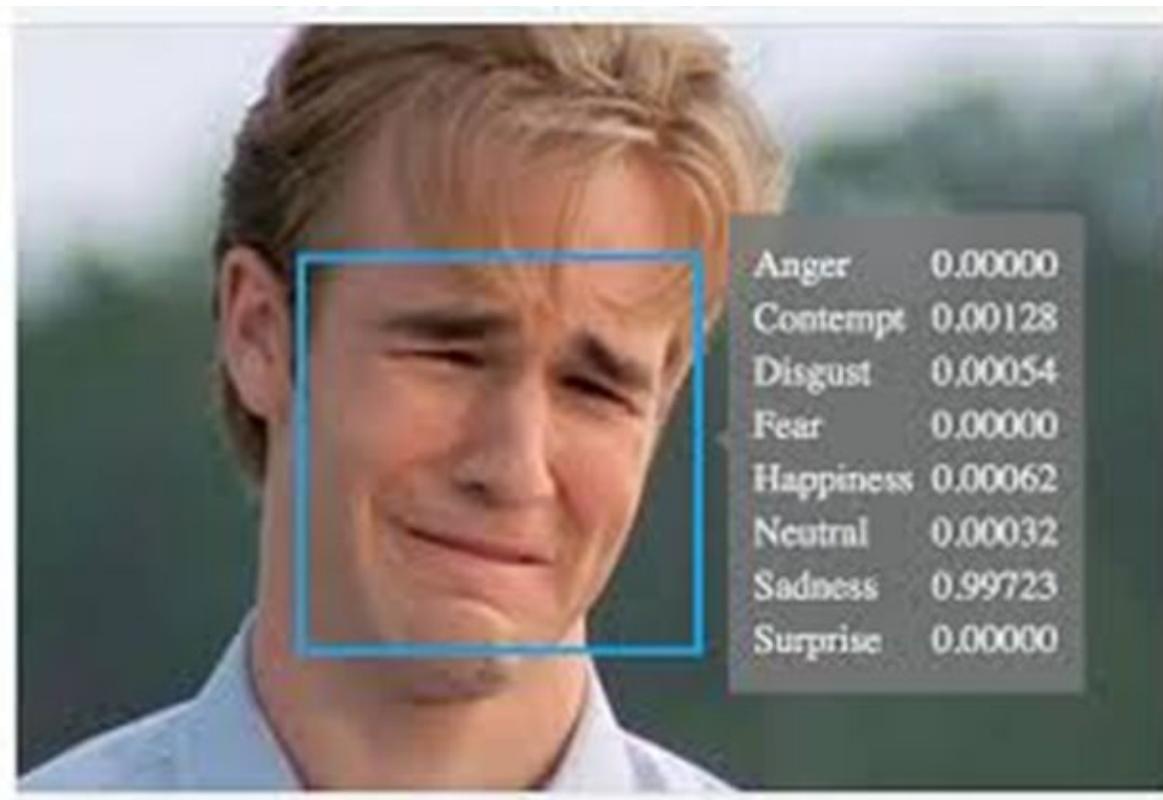
Self Driving Cars



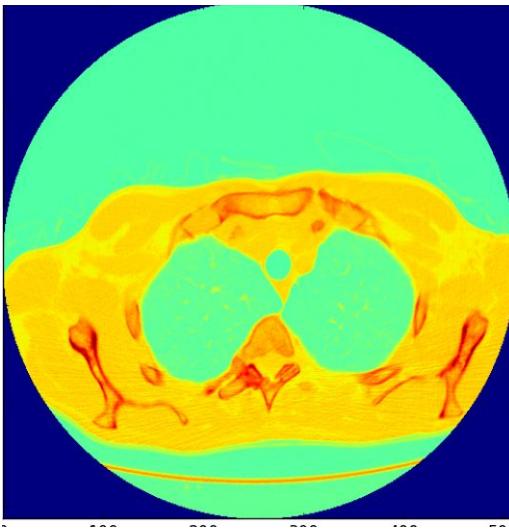
Healthcare

2017 Worldwide

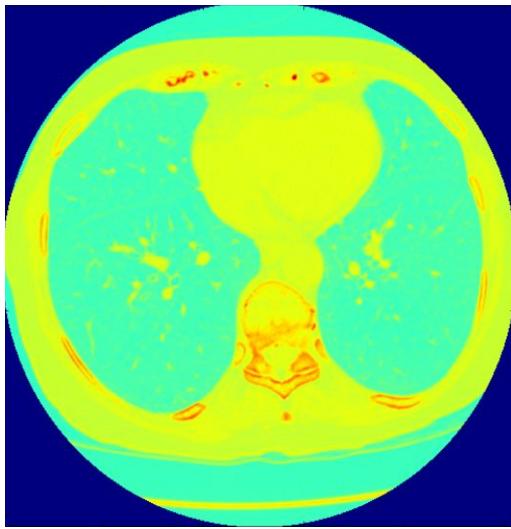
Applications: human computer interaction



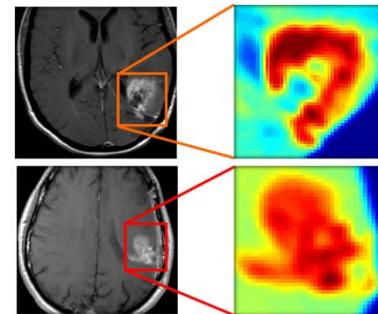
Applications: healthcare



cancer



healthy



Applications: business analytics



Grupo Bimbo Inventory Demand

Maximize sales and minimize returns of bakery goods
\$25,000 · 1,969 teams · a year ago



Santander Customer Satisfaction

Which customers are happy customers?
\$60,000 · 5,123 teams · a year ago

Applications

The screenshot shows a Kaggle dataset page. At the top, there's a navigation bar with the 'kaggle' logo, a search bar containing 'Search kaggle', and links for 'Competitions' and 'Datasets'. Below the navigation bar is a large image showing a close-up of hands holding banknotes. Overlaid on this image is the title 'Synthetic Financial Datasets For Fraud Detection' in bold white text, followed by a subtitle 'Synthetic datasets generated by the PaySim mobile money simulator'. In the bottom left corner of the image area, there's a small profile icon for 'TESTIMON @ NTNU' and the text 'last updated 3 months ago'.

kaggle Search kaggle Competitions Datasets

Synthetic Financial Datasets For Fraud Detection

Synthetic datasets generated by the PaySim mobile money simulator

TESTIMON @ NTNU • last updated 3 months ago

Applications

The screenshot shows the Kaggle website interface. At the top, there are two navigation bars. The left bar has a "kaggle" logo and a search bar labeled "Search kaggle". The right bar has links for "Competitions", "Datasets", and "Kern". Below these, there are two more search bars, one for each navigation bar. The main content area features a large red "BOSCH" logo. To its right, the title "Bosch Production Line Performance" is displayed in bold black text. Below the title, the subtitle "Reduce manufacturing failures" and the competition statistics "\$30,000 · 1,373 teams · 8 months ago" are shown. On the far left, a dark sidebar contains the word "Synthetic" and a small logo with the letters "NTNU" and the word "TESTING".

kaggle Search kaggle Competitions Datasets

kaggle Search kaggle Competitions Datasets Kern

Synthetic TESTIN

BOSCH

Bosch Production Line Performance

Reduce manufacturing failures

\$30,000 · 1,373 teams · 8 months ago

Applications

kaggle Search kaggle Competitions Datasets

kaggle Search kaggle Competitions Datasets Kern

kaggle Search kaggle Competitions Datasets Ke

Synthetic TESTI

E Human Activity Recognition with Smartphones
Recordings of 30 study participants performing activities of daily living

UCI Machine Learning • last updated 9 months ago

Highlighted projects

NETFLIX

Movie Recommendations

Enlitic



Enlitic uses deep learning to make doctors faster



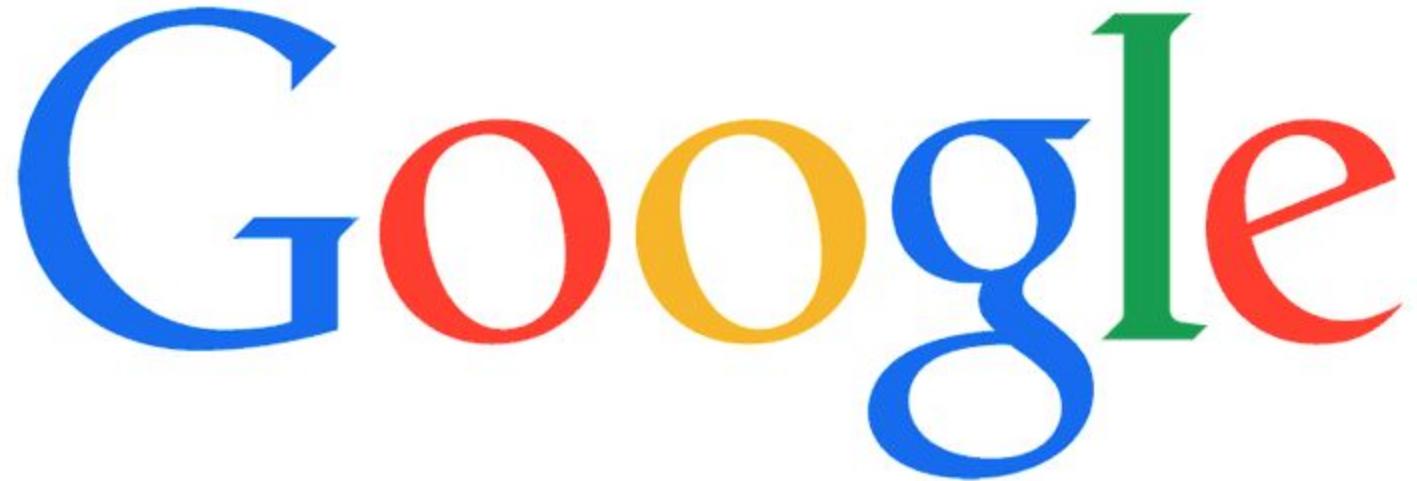
Product Recommendations

LEGAL ROBOT



Artificial Intelligence for Legal Documents

Error checking, Correction Recommendations, Risk prediction

The Google logo is displayed prominently in the center of the slide. It consists of the word "Google" in a bold, sans-serif font, where each letter is a different color: G is blue, o is red, o is yellow, g is blue, l is green, and e is red.

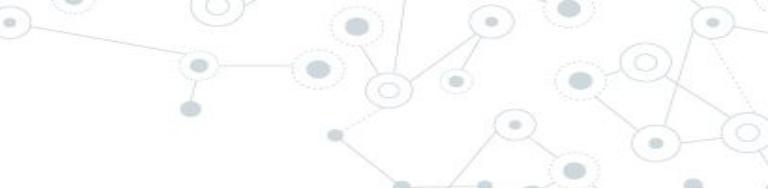
**Search, Translation, Ads, Google Now, Google Images,
Self Driving Cars,...**

HOW IT WORKS



Emotion recognition. Our technology analyzes subtle facial expressions to identify human emotions.

[LEARN MORE](#) [OUR PRODUCTS](#)



A screenshot of the AffdexMe mobile application. At the top, it shows the Affectiva logo and the app name "AffdexMe". Below that, it says "Affectiva Inc. Libraries & Demo" and "Everyone". It also notes compatibility with all devices. On the right, there are "Add to Wishlist" and "Install" buttons. The main area displays three frames of a man's face. Each frame has a different colored overlay indicating detected emotions: a yellow smiley face in the first frame, a red frowny face in the second, and a green smiley face in the third. To the right of the frames is a vertical sidebar with various options like "Show Shapes", "Set To", and "Enable Track on screen".

Emotion recognition from facial expressions and speech



In the globe: Alpha Go Zero



AlphaGo Zero: Learning from scratch

<https://deepmind.com/blog/alphago-zero-learning-scratch/>

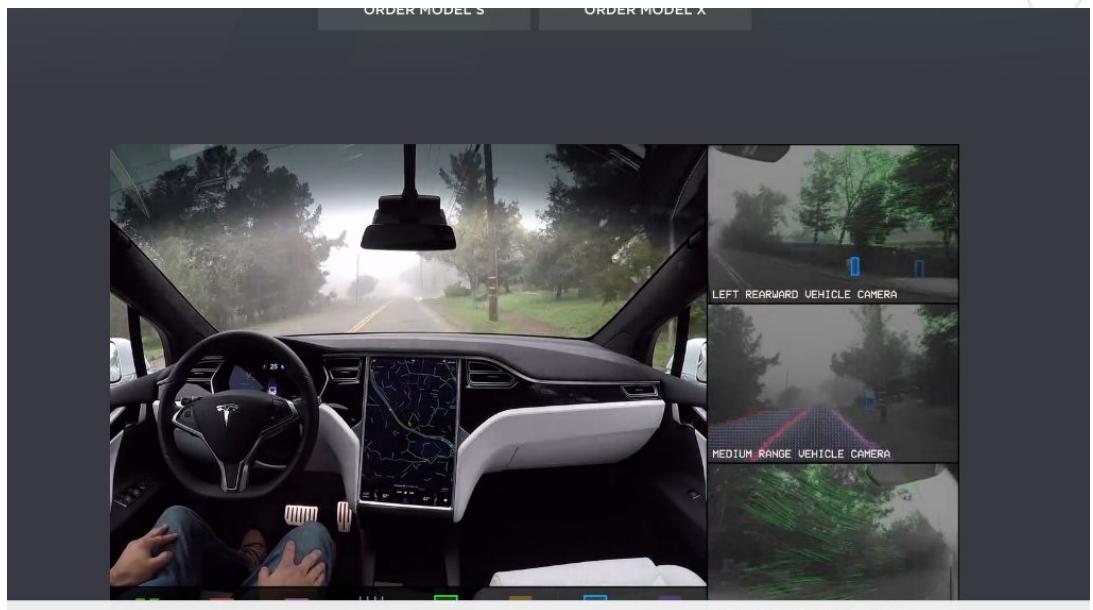
Artificial intelligence research has made rapid progress in a wide variety of domains from speech recognition and image classification to genomics and drug discovery. In many cases, these are specialist systems that leverage enormous amounts of human expertise and data.

However, for some problems this human knowledge may be too expensive, too unreliable or simply unavailable. As a result, a long-standing ambition of AI research is to bypass this step, creating algorithms that achieve superhuman performance in the most challenging domains with no human input. In our most recent [paper](#), published in the [journal Nature](#), we demonstrate a significant step towards this goal.

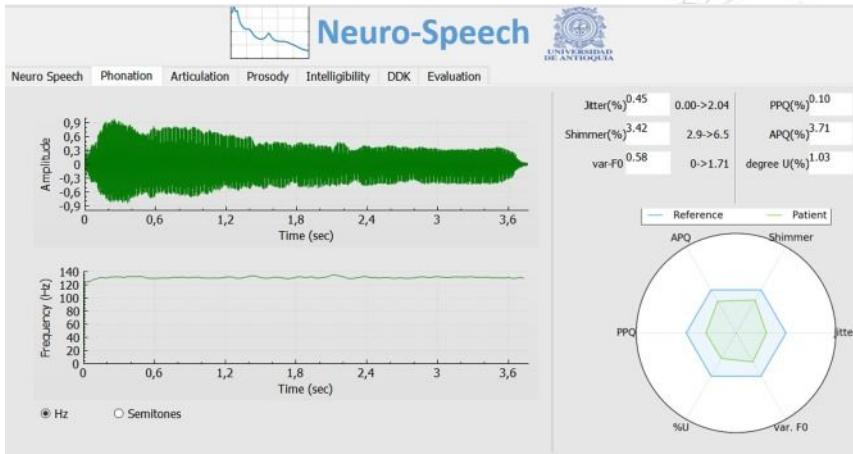


In the globe: Tesla Autopilot for self driving cars

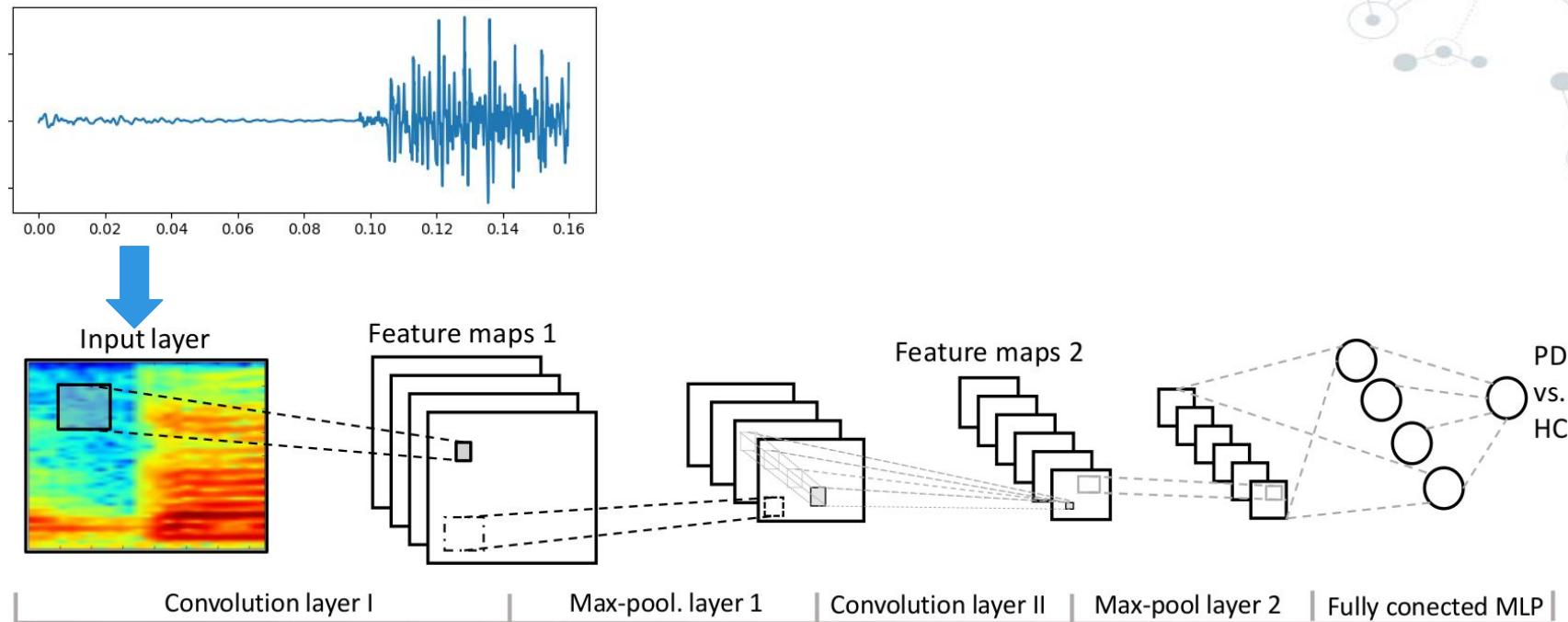
<https://www.tesla.com/autopilot>



In Colombia: Multimodal monitoring of neurodegenerative disorders



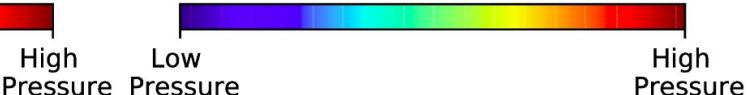
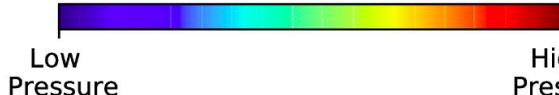
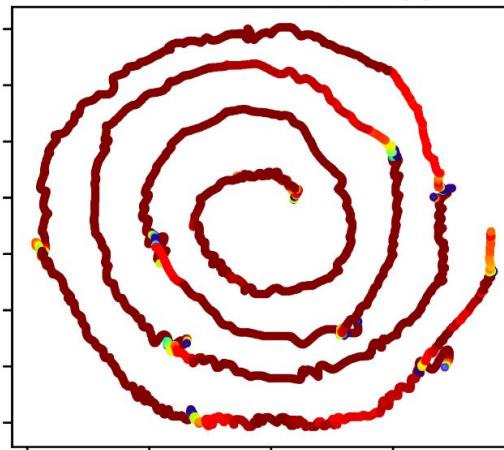
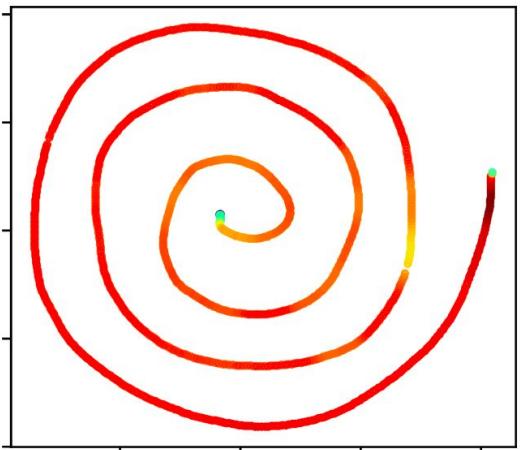
In Colombia: Multimodal monitoring of neurodegenerative disorders



J. C. Vásquez-Correa, J. R. Orozco-Arroyave, and E. Nöth. "Convolutional Neural Network to Model Articulation Impairments in Patients with Parkinson's Disease". In: 18th International Conference of the Speech and Communication Association (INTERSPEECH). Stockholm, 2017.

In Colombia: Multimodal monitoring of neurodegenerative disorders

- Online biometrics authentication
- Healthcare



In Colombia: ANMOTO (<https://anmoto.herokuapp.com/>)



Herramienta de análisis de hurto de motocicletas en Colombia

Marca

AUTECO

.inea

BOXER CT 100

Color

Select...

.a Probabilidad de que su moto sea robada es: 0.352

.a probabilidad de que su moto sea robada en ANTIOQUIA es 0.183

.a probabilidad de que su moto sea robada en MEDELLIN (CT) es: 0.139

Modelo

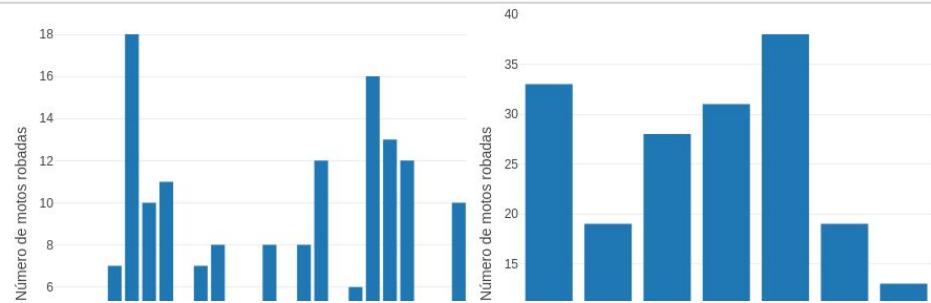
2017

Departamento donde se encuentra

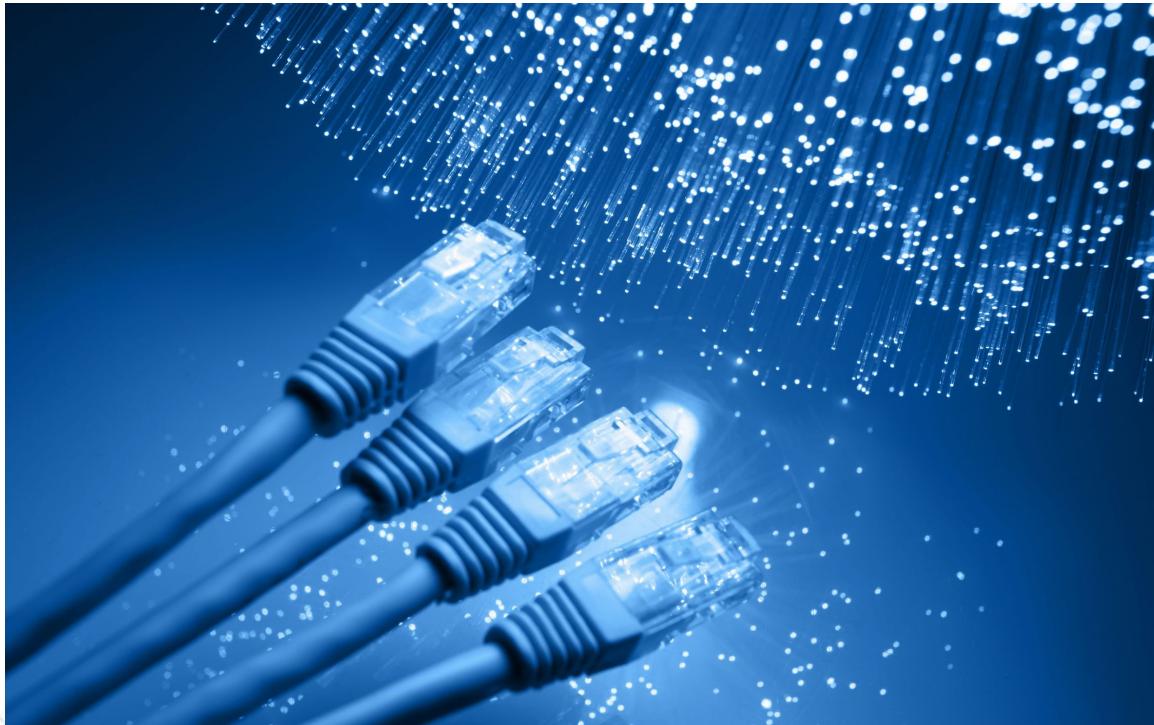
ANTIOQUIA

Ciudad donde se encuentra

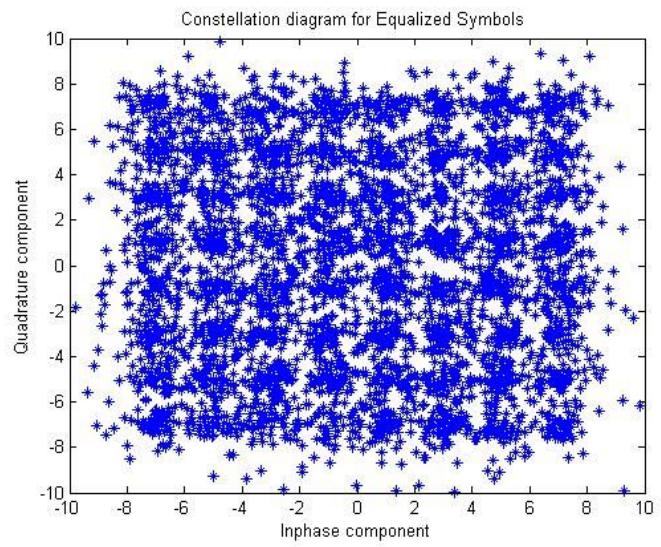
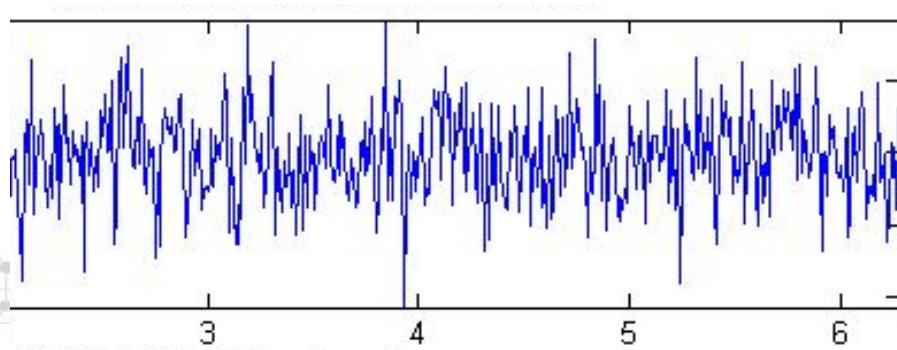
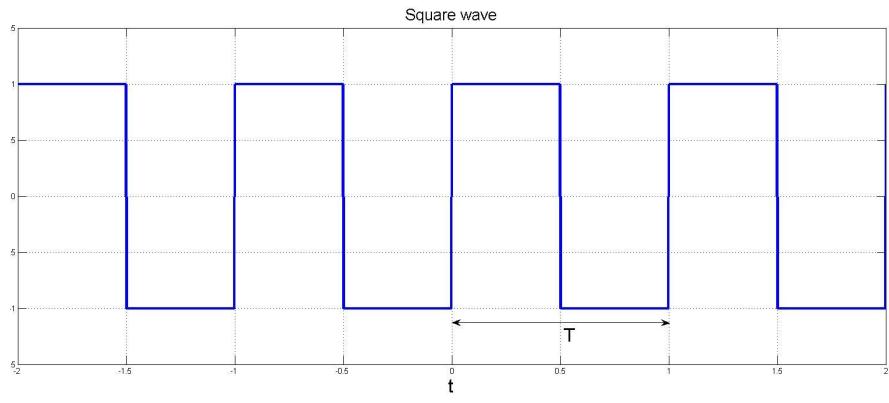
MEDELLIN (CT)



In Colombia: ML to improve capabilities in optical networks



In Colombia: ML to improve capabilities in optical networks



In Colombia: SARHA



In Colombia: SARHA



developers.googleblog.com

**Google Developers
Blog: Kaldi now
offers TensorFlow
integration**

In Colombia: SARHA



In Colombia: Datos a la U



In Colombia: Banrep



Banco de la República - Colombia

TRABAJAMOS PARA PRESERVAR EL PODER ADQUISITIVO DE LA MONEDA CON CRECIMIENTO ALTO Y SOSTENIDO



[Inicio](#) | [El Banco](#) | [Política monetaria](#) | [Junta Directiva](#) | [Publicaciones e investigación](#) | [Sistema financiero](#) | [Normatividad](#) | [Billetes y monedas](#) | [Estadísticas](#)

Usted está aquí: [Inicio](#) > [Machine Learning](#)

Machine Learning

Últimos documentos actualizados en Machine Learning

[Banks in Colombia: how homogeneous are they?](#)

- Viernes, 13 Octubre 2017 - 10:20am

[Clustering and forecasting inflation expectations using the World Economic Survey: the case of the 2014 oil price shock on inflation targeting countries](#)

- Jueves, 4 Mayo 2017 - 11:01am

[Whose Balance Sheet is this? Neural Networks for Banks' Pattern Recognition](#)

- Miércoles, 7 Septiembre 2016 - 8:45am



What makes it possible

BIG DATA

A large, bold, orange-red word 'BIG' is at the top left, above a large, bold, black word 'DATA'. To the right of 'DATA', the word 'ANALYTICS' is written vertically in a smaller, orange-red font. Below 'DATA', the word 'STORAGE' is in a large, bold, black font. To the right of 'STORAGE', the word 'TECHNOLOGIES' is in a large, bold, black font. The word cloud contains numerous other words in various sizes and colors, including:

- USE, ONE, SINCE, SOFTWARE, SAN, TOLERABLE, SIZE NEEDED, PARALLEL, PETABYTES, INTERNET, and DISTRIBUTED.
- BUSINESS, MOVING, LOGS, PROCESSING, CAPTURE, MANAGE, GROW.
- BIOMEDICAL, RADIOPHARMACEUTICALS, RADIOPHARMACEUTICALS, RADIOPHARMACEUTICALS.
- BIOMASS, MASSIVELY, WORKING, USING, TYPES.
- HUNDREDS, GARTNER, MASSIVELY, WORKING, TYPES.
- DISK, SHARED, TIME, INCLUDE, SYSTEMS.
- NETWORKS, INFORMATION, RECORDS, COST, CONTINUES, CITATION.
- ARCHIVES, RESEARCH, DATABASES, COMPLEX.
- ABILITY, SETS, EXAMPLES, APPLIED, CURRENT.
- SENSOR, RECORDING, ELAPSED, CURRENT.
- SEARCH, DEFINITION, SEARCH, APPLIED, RECORDING.
- WITHIN, PROCESS, COMPUTING, TOOLS.
- GEONAVIGATION, RECORDS.
- EMBEDDED, RECORDS.
- DATA, RECORDS.
- MANAGEMENT, SOCIAL, LARGE, EVERY, LARGER.
- STUDY, CASE, STUDIO.





Data repositories

Kaggle

www.kaggle.com

The Home of Data Science & Machine Learning

Kaggle helps you learn, work, and play

What's Kaggle?

FIND DATA

Create an account or Host a competition

DATOS ABIERTOS

www.datos.gov.co/

The screenshot shows the official website for 'DATOS ABIERTOS GOBIERNO DIGITAL COLOMBIA'. The header features a maroon bar with the logo and a search bar. Below it is a navigation menu with links to Inicio, Descubre, Pública, Visualiza, Participa, Herramientas, and Novedades, along with language and session options. The main content area has a purple background. On the left, there's a graphic for 'DATOS A LA U' featuring a large white 'U' on a network of dots. In the center, a message congratulates the winners of the competition. To the right, a circular graphic promotes a contest with phases: 'INSCRIBETE HASTA 15 SEPTIEMBRE', 'CREA 1 AL 30 SEPTIEMBRE', and 'DISEÑA HASTA 9 OCTUBRE'. At the bottom, three colored boxes provide links to 'DESCUBRE' (with a gear icon), 'PÚBLICA' (with a share icon), and 'CONOCE' (with three donut chart icons). Each box also contains descriptive text about the data and its applications.

DATOS
ABIERTOS
GOBIERNO DIGITAL COLOMBIA

Buscar

Inicio Descubre Pública Visualiza Participa Herramientas Novedades

Español ▾ Iniciar sesión

DATOS — A LA U

Felicitamos a los 20 mejores equipos del concurso Datos a la U

INSCRIBETE HASTA 15 SEPTIEMBRE

CREA 1 AL 30 SEPTIEMBRE

DISEÑA HASTA 9 OCTUBRE

DESCUBRE

PUBLICA

CONOCE

Datos del Gobierno Colombiano para investigar, desarrollar

Datos de Gobierno para que puedan ser usados en investigaciones.

Visualizaciones e investigaciones creadas a partir de datos abiertos

MEDATA

www.rutanmedellin.org/es/competencia-de-datos-medata-2017



SIATA

<https://github.com/DatosAbiertosMedellinOrg/calidadaire>



Colomb-ia

<https://github.com/colomb-ia/retos>

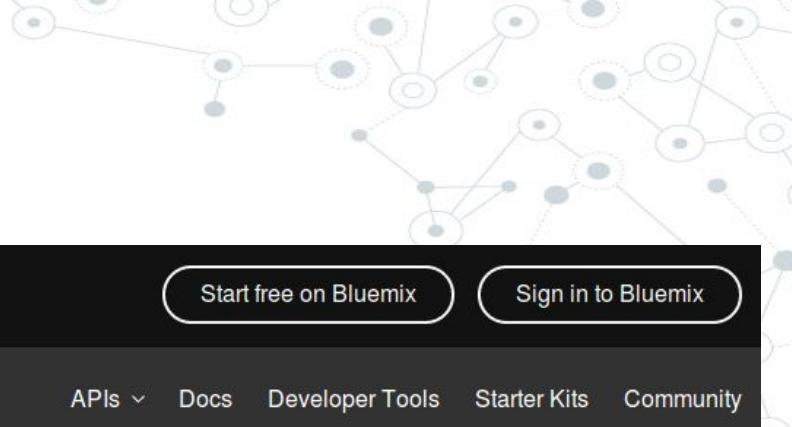
Retos colomb-ia

Supervised Learning

Básico

Dataset	Descripción	Contribuyente
Iris Dataset	Construye un clasificador de tipos de plantas	Sebastian Pineda
Population vs Profit	Construye algoritmo que prediga las ganancias de un restaurante dada la poblacion de la ciudad	Cristian Garcia
Wisconsin Diagnostic Breast Cancer	Construye un clasificador para reconocer cancer de piel segun características de lunares	Camilo Vásquez
Blobs	Construye un clasificador para este dataset artificial	Cristian Garcia
Circles	Construye un clasificador para este dataset artificial	Cristian Garcia
S-Curve	Construye un algoritmo de regression para este dataset artificial	Cristian Garcia
Gaussian Quantiles	Construye un clasificador para este dataset artificial	Cristian Garcia
Moons	Construye un clasificador para este dataset artificial	Cristian Garcia
Admission Exams	Construye un clasificador para predecir si un estudiante entra a una universidad basado en resultados de exámenes	Carlos Alvarez

Cloud machine learning tools



Watson Developer Cloud

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APIs ▾ Docs Developer Tools Starter Kits Community

Build with Watson

Enable cognitive computing features in your app using IBM Watson's Language, Vision, Speech and Data APIs.

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VENTAS 01-800-710-2238 ▾

MI CUENTA

PORTAL

BÚSQUEDA

Microsoft Azure

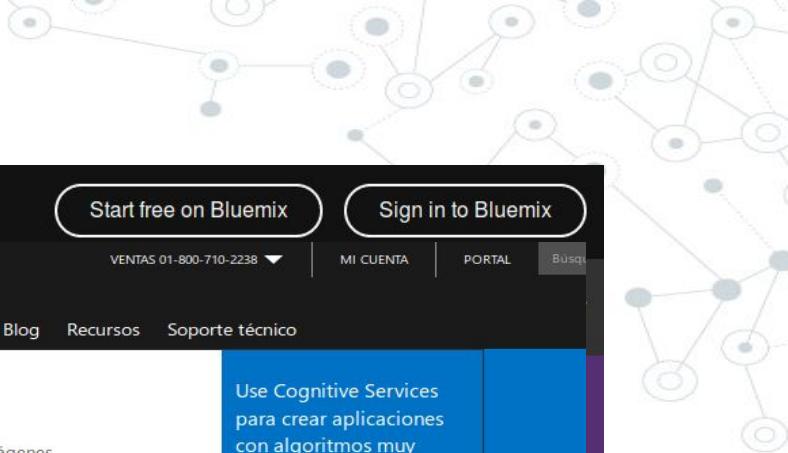
Por qué Azure Soluciones Productos Documentación Precios Formación Partners Blog Recursos Soporte técnico

- Proceso
- Redes
- Storage
- Web y móvil
- Contenedores
- Bases de datos
- Datos y análisis
- AI + Cognitive Services
- Internet de las cosas
- Integración empresarial
- Seguridad + Identidad
- Herramientas para desarrolladores
- Supervisión + Administración
- Microsoft Azure Stack
- [Ver todos los productos](#)

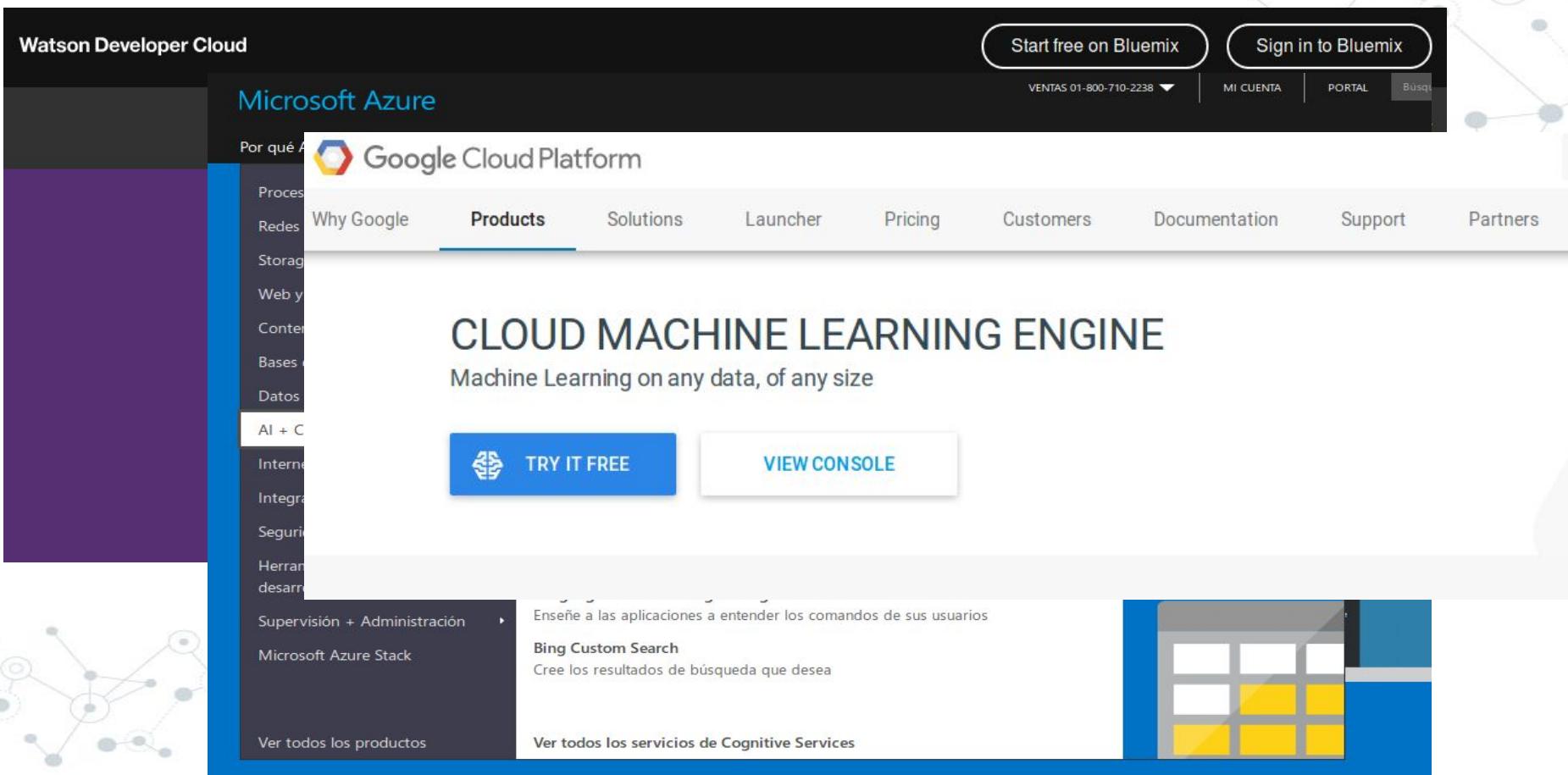
- AI + Cognitive Services
 - Computer Vision API**
Condense información de aplicación práctica a partir de imágenes
 - API de reconocimiento facial**
Detecte, identifique, analice, organice y etiquete caras en las fotos
 - Bing Web Search API**
Conecte búsqueda en la Web de gran eficacia a sus aplicaciones
 - Custom Speech Service**
Elimine las barreras del reconocimiento de voz, como el estilo de habla, el ruido de fondo y el vocabulario
- Custom Vision Service**
Un servicio web personalizable que aprende a reconocer determinado contenido en imágenes
- Video Indexer**
Haga búsquedas en sus videos, editelos, analicelos y obtenga conocimiento de ellos
- Language Understanding Intelligence Service**
Enseñe a las aplicaciones a entender los comandos de sus usuarios
- Bing Custom Search**
Cree los resultados de búsqueda que desea

Use Cognitive Services para crear aplicaciones con algoritmos muy eficaces con tan solo algunas líneas de código.

Pruebe Cognitive Services APIs gratis ►



Cloud machine learning tools

A faint, light-gray network diagram consisting of numerous small circles connected by thin lines, resembling a neural network or a complex web of connections, serves as the background for the entire slide.

Watson Developer Cloud

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MI CUENTA

PORTAL

Búsq

Microsoft Azure

Por qué A

Proces

Redes

Storage

Web y

Content

Bases

Datos

AI + C

Intelli

Integra

Seguri

Herram

desarr

Google Cloud Platform

Why Google

Products

Solutions

Launcher

Pricing

Customers

Documentation

Support

Partners

CLOUD MACHINE LEARNING ENGINE

Machine Learning on any data, of any size

TRY IT FREE

VIEW CONSOLE

Supervisión + Administración

ENSEÑE A LAS APLICACIONES A ENTENDER LOS COMANDOS DE SUS USUARIOS

Microsoft Azure Stack

Bing Custom Search

Cree los resultados de búsqueda que desea

Ver todos los productos

Ver todos los servicios de Cognitive Services

Cloud machine learning tools

The image features a central screenshot of a web-based machine learning platform. At the top, there's a navigation bar with the word "FLOYD" in blue on the left, and "FEATURES", "PRICING", and "DOCS" in white on the right. Below the navigation bar, the main content area has a light gray background. It features a large, semi-transparent graphic overlay containing various mathematical and engineering icons such as a lightbulb, a calculator, a ruler, a pencil, and a computer monitor. Overlaid on this graphic is the text "Eliminate engineering bottlenecks in Deep Learning". In the bottom left corner of the screenshot, there's a cartoon illustration of a man with glasses and a whiteboard behind him. The whiteboard has some handwritten text and equations, including "Si", "f(1)", and "1 + t". Below the screenshot, there are two calls-to-action: "Ver todos los productos" and "Ver todos los servicios de Cognitive Services". The overall background of the slide is a light purple color.

FEATURES PRICING DOCS

Eliminate engineering bottlenecks
in Deep Learning

You focus on the **science**

We'll handle the **deployment**

Ver todos los productos

Ver todos los servicios de Cognitive Services

Cloud machine learning tools

The image is a collage of screenshots from various cloud machine learning platforms. On the left, there's a stylized drawing of a person with glasses and a lightbulb, with the word 'FLOYD' written above it. Next to it is the Paperspace homepage, which features a large 'Paperspace' logo and the tagline 'A dead simple GPU cloud computing platform for individuals, startups, and enterprise.' Below the tagline is a blue button labeled 'BUILD YOUR CLOUD COMPUTER'. In the center, there's a screenshot of a laptop displaying a Jupyter notebook with Python code for deep learning, showing a neural network diagram and some data. To the right, there's a screenshot of the TensorFlow website with a 'TensorFlow' logo and a 'GET STARTED' button. Further right is a screenshot of the Icing homepage, which includes a search bar and navigation links for 'ICING', 'DOCS', and 'Partners'. The background of the collage features a network of nodes and connections.

FLOYD

P

MACHINE LEARNING API CLOUD DESKTOPS (VDI) GAMING VFX PRICING

SIGN IN SIGN UP

Paperspace

A dead simple GPU cloud computing platform for individuals, startups, and enterprise.

BUILD YOUR CLOUD COMPUTER

TensorFlow

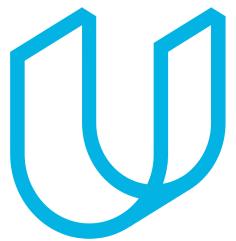
TensorFlow

GET STARTED

ICING DOCS

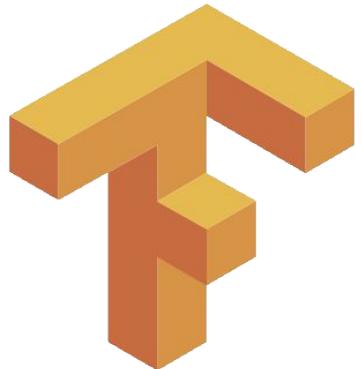
Partners

Additional resources



UDACITY





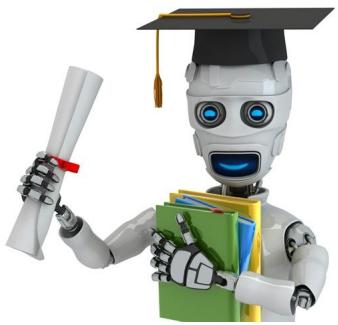
Invitations

PyCon Colombia

<https://www.pycon.co/>



Machine Learning Colombia



Facebook:
Machine Learning Colombia

In Colombia: ML meet-up Medellin

<https://www.meetup.com/es/ml-medellin/>

Machine Learning Meetup - Medellín

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Medellín, Colombia
Fundado el 2 de jun de 2016
machine learning engineers
Opiniones sobre el grupo
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28 de septiembre - 18:30
Redes neuronales recurrentes + Cómo construir mejores aplicaciones

Novedades



In Colombia: Databeers Medellín



<http://databeersmde.com/>

Modern DataScientist

The sexiest job of
the 21th century

MATH & STATISTICS

- ★ Machine learning
- ★ Statistical modeling
- ★ Experiment design
- ★ Bayesian inference
- ★ Supervised learning: decision trees, random forests, logistic regression
- ★ Unsupervised learning: clustering, dimensionality reduction
- ★ Optimization: gradient descent and variants



DOMAIN KNOWLEDGE & SOFT SKILLS

- ★ Passionate about the business
- ★ Curious about data
- ★ Influence without authority
- ★ Hacker mindset
- ★ Problem solver
- ★ Strategic, proactive, creative, innovative and collaborative

PROGRAMMING & DATABASE

- ★ Computer science fundamentals
- ★ Scripting language e.g. Python
- ★ Statistical computing package e.g. R
- ★ Databases SQL and NoSQL
- ★ Relational algebra
- ★ Parallel databases and parallel query processing
- ★ MapReduce concepts
- ★ Hadoop and Hive/Pig
- ★ Custom reducers
- ★ Experience with xaaS like AWS

COMMUNICATION & VISUALIZATION

- ★ Able to engage with senior management
- ★ Story telling skills
- ★ Translate data-driven insights into decisions and actions
- ★ Visual art design
- ★ R packages like ggplot or lattice
- ★ Knowledge of any of visualization tools e.g. Flare, D3.js, Tableau

Thanks

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Machine Learning and data analysis:

From the globe to Colombia

