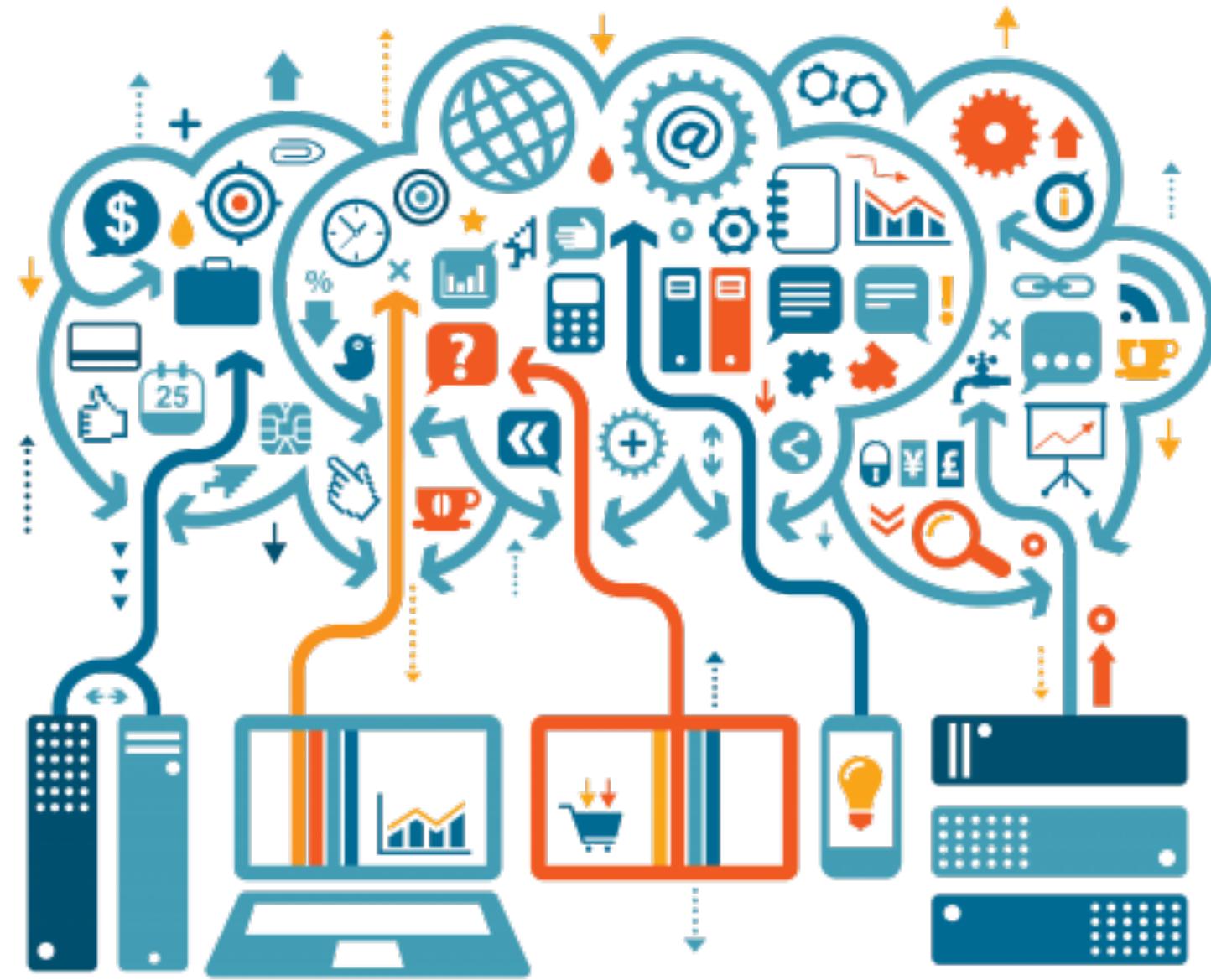


Aplicações de Inteligência Artificial

Parte I

Hitoshi Nagano, Ph.D.





POR QUE DATA SCIENCE?

Quantas variáveis conseguimos processar?

- 3?
- 4?
- 10?
- <https://www.psychologicalscience.org/pdf/>
ps/mind_variables.pdf

o que é aprendizagem de máquina?

- Através de dados reais
- a máquina (computador) entende os padrões...
- ...e ajuda a predizer um resultado
(classe ou valor numérico)
- predição é usada para tomada de uma decisão
de negócios

RELATÓRIO FORBES

Forbes
INSIGHTS

BLAZING THE TRAIL FROM DATA TO INSIGHT TO ACTION EXECUTIVE BRIEFING

The enterprises leading the way in data analytics are demonstrating an enormous capability to capture, process, scale and make available data to their organizations and across their networks of customers, partners and suppliers. But is this enough? The challenge is to develop this data into insights that can be applied to increase business value—moving from data to insight to action. Executives say there is a direct correlation between well-designed analytics programs and success in the marketplace. However, while many executives are embracing customer data analytics to guide their businesses, the infrastructures and processes they require to support and sustain such efforts still lag.

These are the findings of a new survey of 105 executives of large global organizations, conducted by Forbes Insights in partnership with SAS, which explores the depth of their embrace of data analytics. The survey finds that while half of large enterprises (with \$500 million or more in annual revenue) have tightly integrated customer data analytics into their key processes, there are many areas that are still works in progress.

KEY FINDINGS FROM THIS SURVEY INCLUDE THE FOLLOWING:

- Half of large enterprises are still in the learning stages of customer analytics, and are in the process of applying these analytics to enhance their customer experience. The results of such efforts, no

Fonte: "BLAZING THE TRAIL FROM DATA TO INSIGHT TO ACTION", Forbes 7

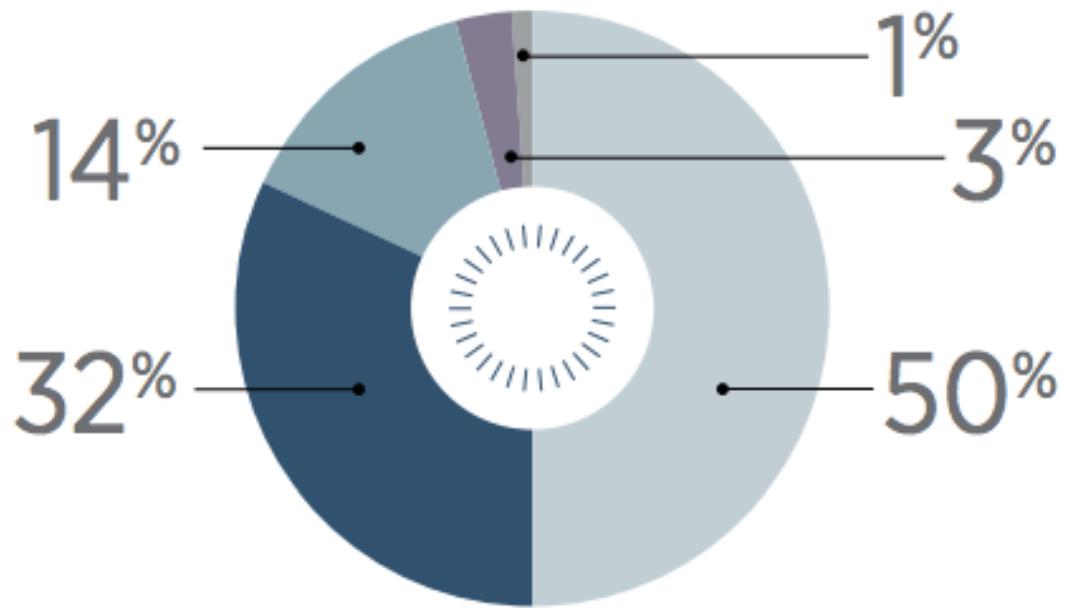
RELATÓRIO FORBES

FIGURE

1

IN YOUR EFFORTS TO BECOME A MORE CUSTOMER-CENTERED BUSINESS, WHICH OF THE FOLLOWING STATEMENTS HOLDS TRUE FOR YOUR ORGANIZATION?

- We provide a superior customer experience through a well-developed and designed enterprise data analytics effort
- We are rapidly and systematically developing data analytics capabilities to improve our customer experience
- We have data analytics capabilities in many parts of the organization, and are beginning to apply these analytics to improve the customer experience
- We are not using analytics for customer experience
- We are still working on developing data analytics and have difficulty providing consistent customer experience

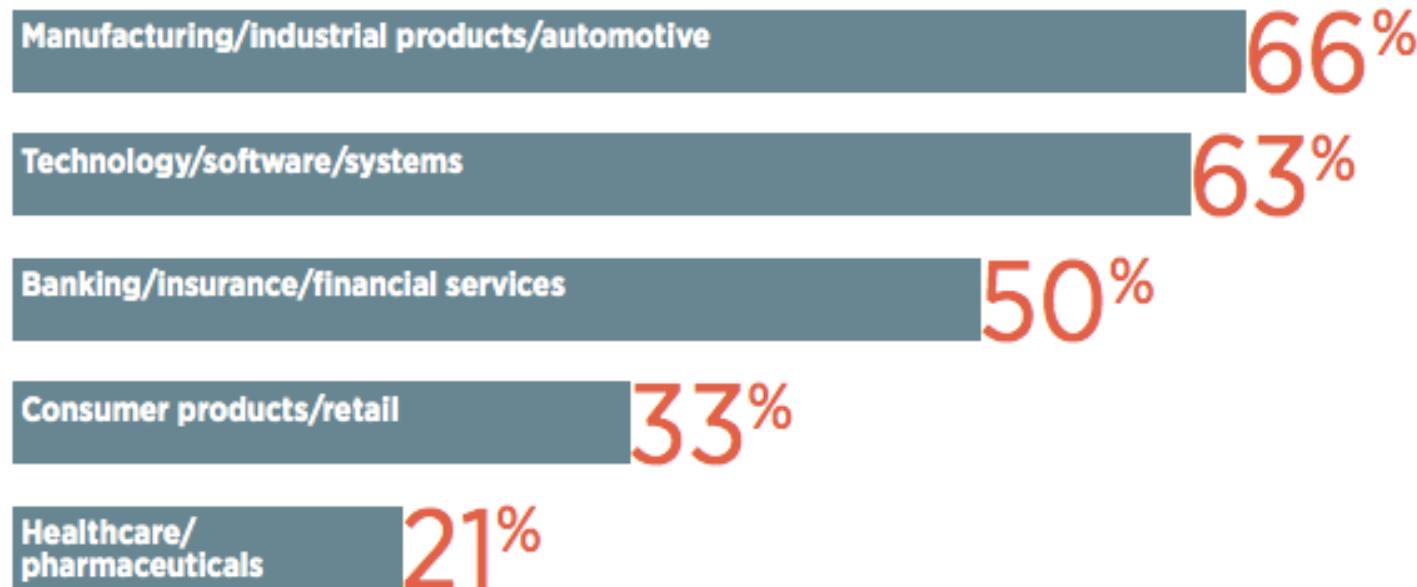


RELATÓRIO FORBES

FIGURE

2

PROVIDE SUPERIOR CUSTOMER EXPERIENCE THROUGH ANALYTICS-BY INDUSTRY GROUP



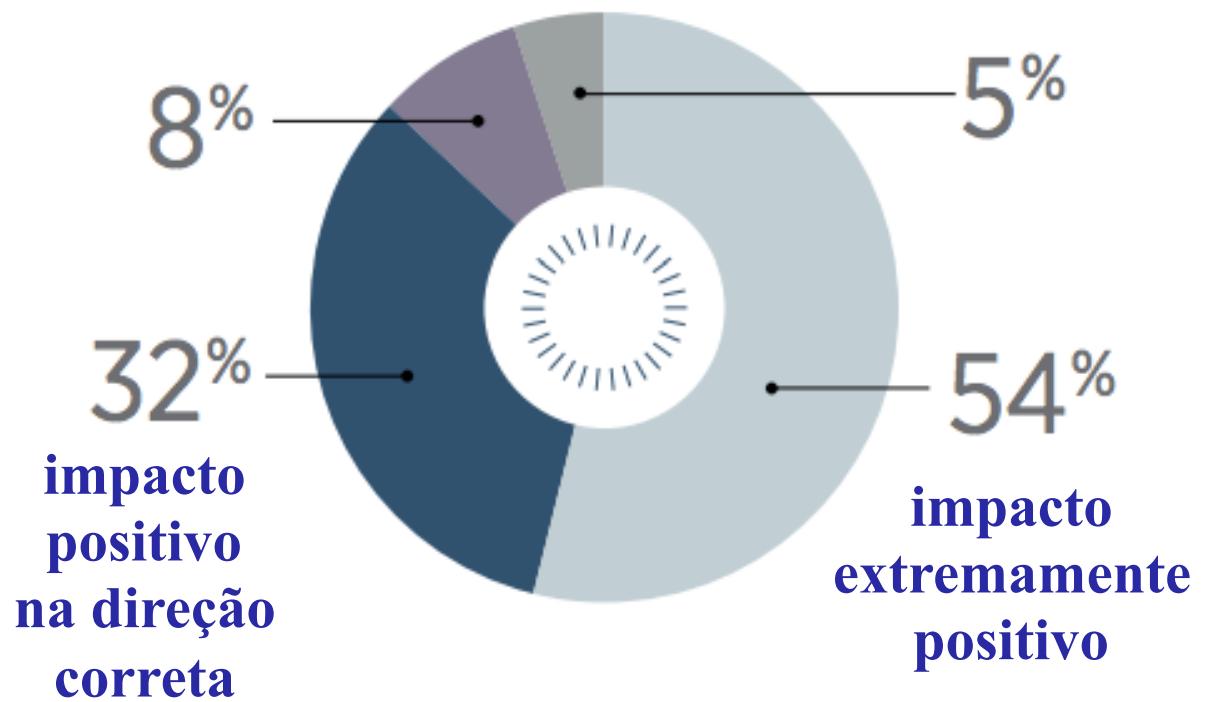
RELATÓRIO FORBES

FIGURE

3

WHAT ROLE HAS DATA ANALYTICS PLAYED IN YOUR ORGANIZATION'S ABILITY TO DELIVER A SUPERIOR CUSTOMER EXPERIENCE?

- Data analytics has had an extremely positive impact on our customer experience
- Data analytics has pushed the needle in a positive direction
- Data analytics has shown potential in areas where it has been applied
- Data analytics has not played a significant role yet

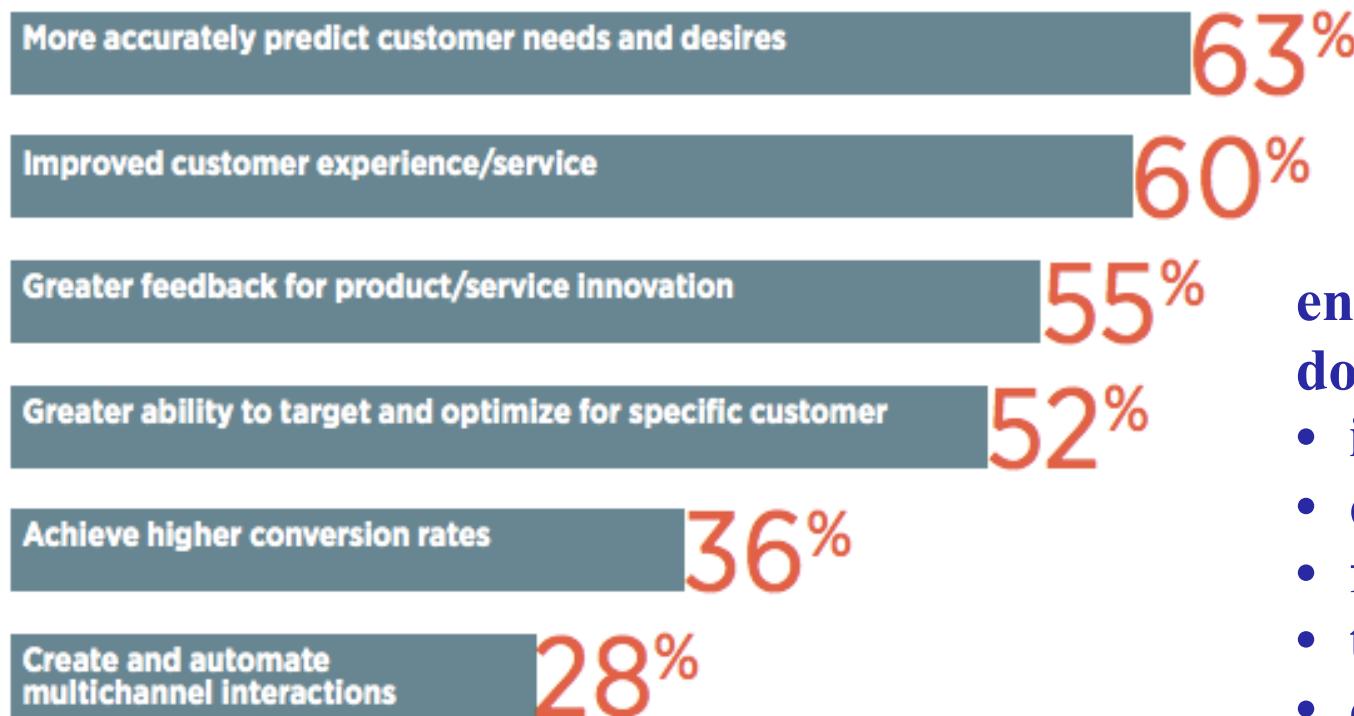


RELATÓRIO FORBES

FIGURE

9

WHAT BENEFITS CAN BE GAINED FROM ACHIEVING A MORE COMPLETE OR UNIFIED VIEW OF THE CUSTOMER?



entendimento mais apurado
do cliente:
• intenções
• experiência
• feedback
• target/personalização
• conversão

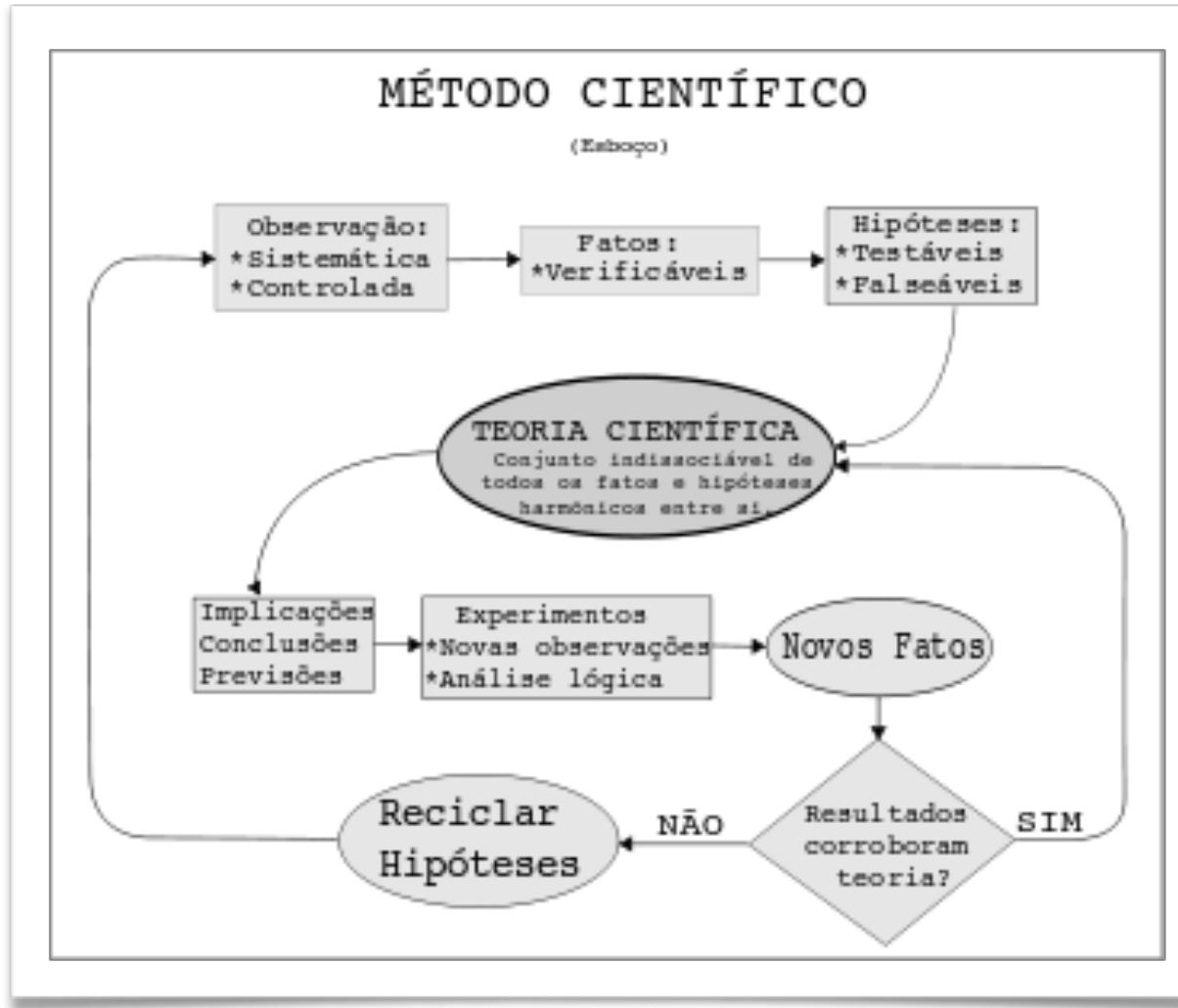
“contra fatos não há argumentos”

“números não mentem”

“If you torture the data enough, nature will always confess”

Por que ciência?

- ciência em “ciência de dados”
- método científico



Por que ciência?

- observação
- formulação
- experimentação
- validação
- e...
- ... reproduibilidade
- ... apresentação

PERFIL DO CIENTISTA DE DADOS

Cientista de Dados

- estatística + matemática
- computação + ferramentas
- perspicácia comercial + intuição
(ex: domain knowledge)
- explorador + inquisitivo
- arte e estética, story telling

Principais conhecimentos

```
def f(n):  
    if n == 1:  
        return 1  
    else:  
        return n*f(n-1)
```

$$\lim_{z \rightarrow -\infty} \frac{I}{I + e^{-z}}$$

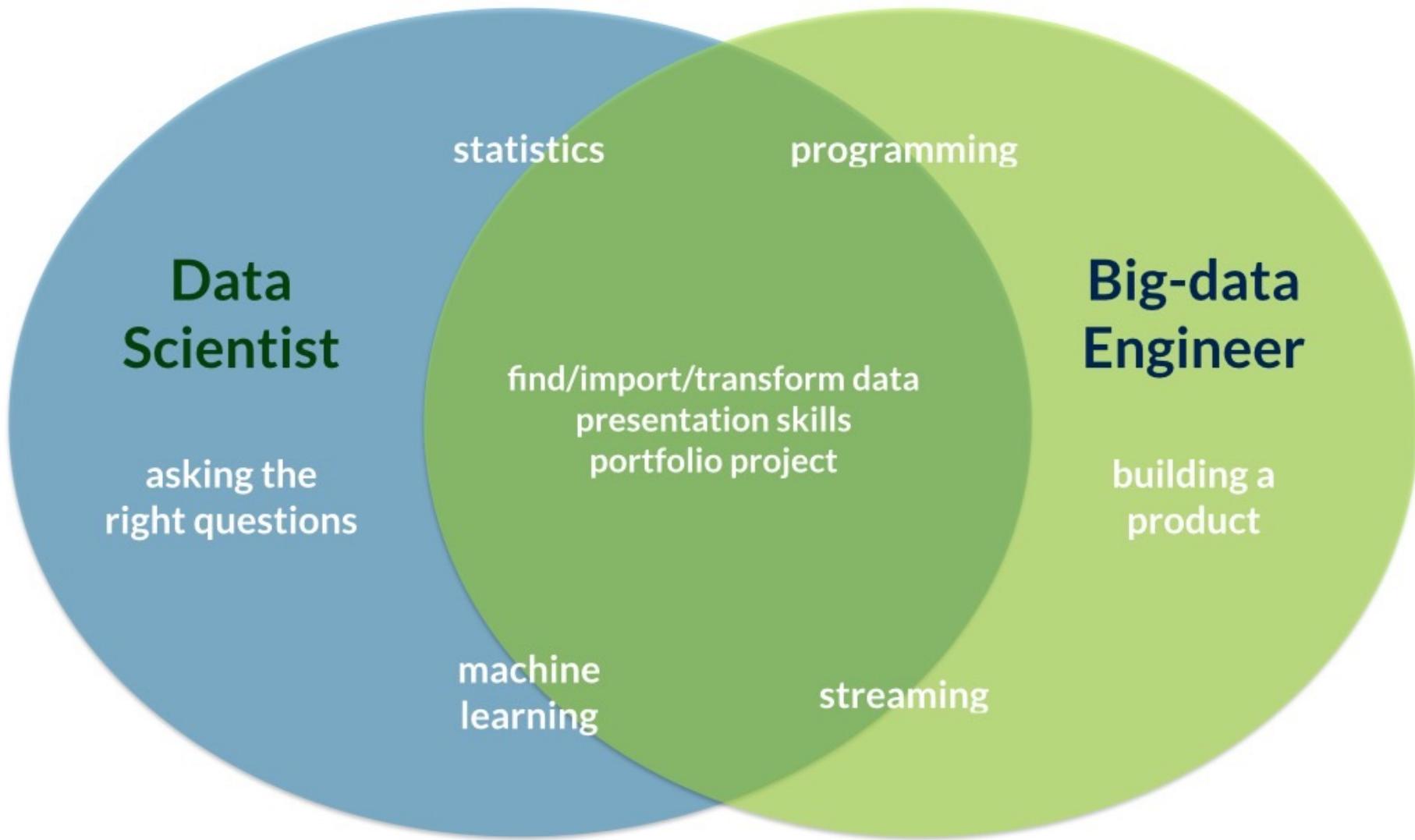
$$\lim_{z \rightarrow \infty} \frac{I}{I + e^{-z}}$$

churn, up-sell & cross-sell, lifetime? RFV? NBO?
CR, CTR, CPA, CPC?

Na entrevista: quais são os sinais?

- comportamento:
 - na atividade: inventivo, incansável, inquisitivo
 - na comunicação:
assertivo com humildade, e
articulado sem exagero
 - no relacionamento: confiável, solícito

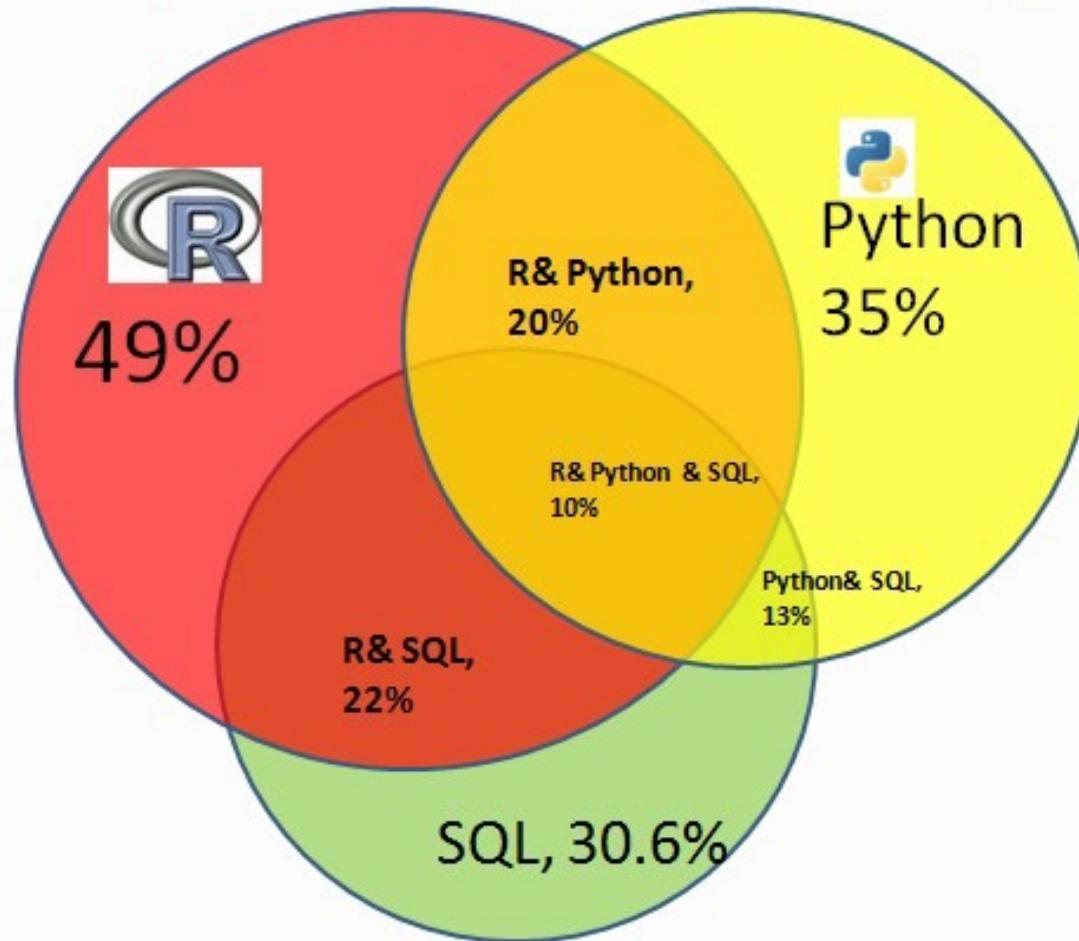
Data Science e Big Data



FERRAMENTAS

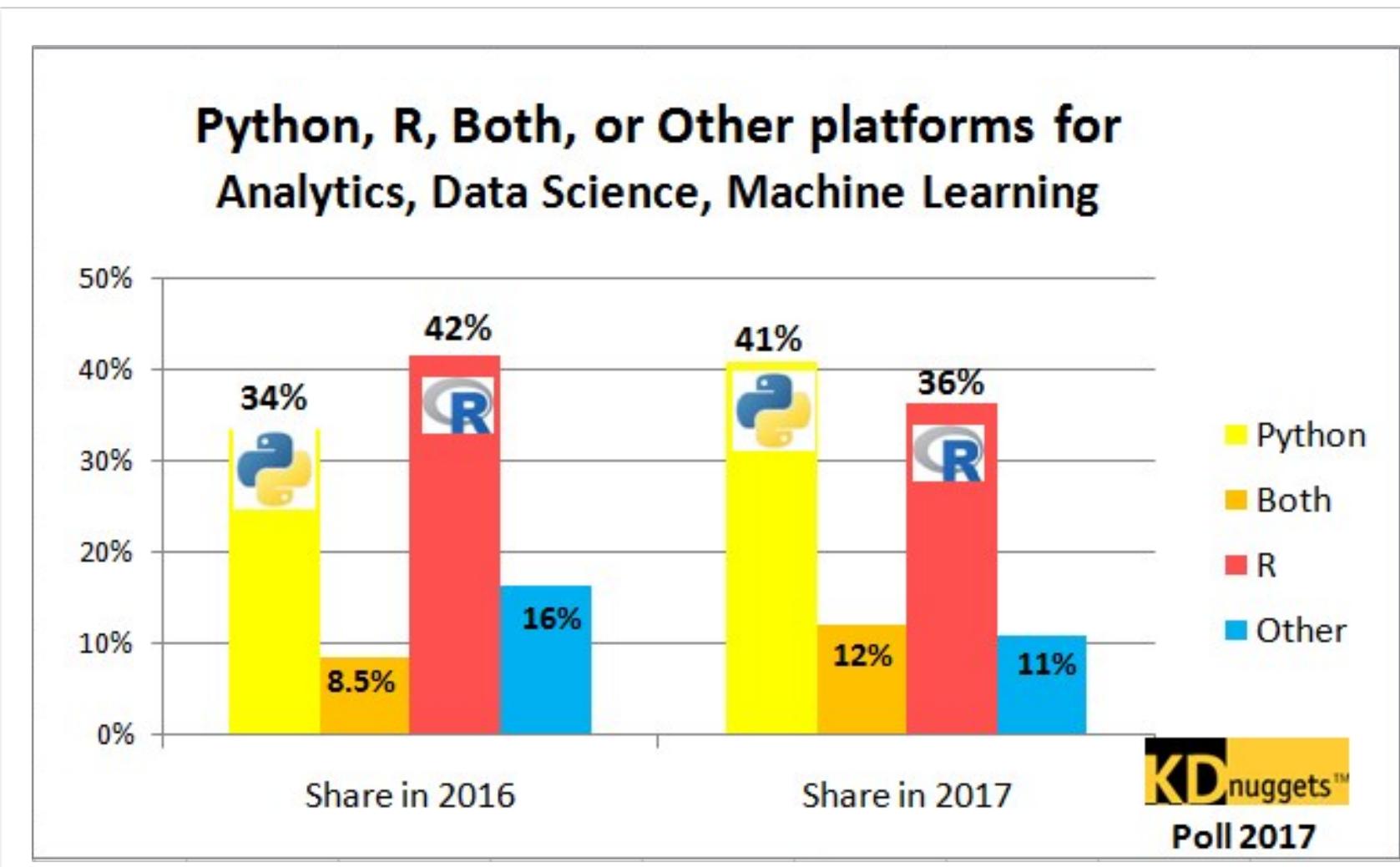
linguagens...

KDnuggets 2014 Poll: Languages used for Analytics/Data Mining



<http://www.kdnuggets.com/2014/08/four-main-languages-analytics-data-mining-data-science.html>

linguagens...



<https://www.kdnuggets.com/2017/08/python-overtakes-r-leader-analytics-data-science.html>

Por que Python? (e não R)

- vasto: cursos, documentação, suporte, etc
- DS: opção consagrada, mas amplo espectro
- simplicidade: ideia -> execução
- produção: maior disponibilidade RH

Por que R? (e não Python)

- vastíssima biblioteca e comunidade
- linguagem focada para o propósito específico
- academia & pesquisa

PROJETOS DE DATA SCIENCE

pergunte aos dados ... ou a voce mesmo...

- existe um problema de negócios?
- a empresa precisa da análise?
- tenho dados?
- consigo extrair boas features?
- existe um padrão?

exemplos de projetos

- predição de risco de churn
- clusterização de clientes
- extração de tópicos
- recomendação de produtos
- score de clientes
- modelo de inadimplência para cobrança
- recomendação de ordem de serviço
- manutenção preditiva/preventiva de falhas
- modelagem de funil de conversão
- predição de severidade de falhas em redes
- predição de convulsões epilépticas
- classificação de rotas para marketing geo-referenciado
- predição de andamentos de processos no tribunal
- otimização de cogeração em planta industrial

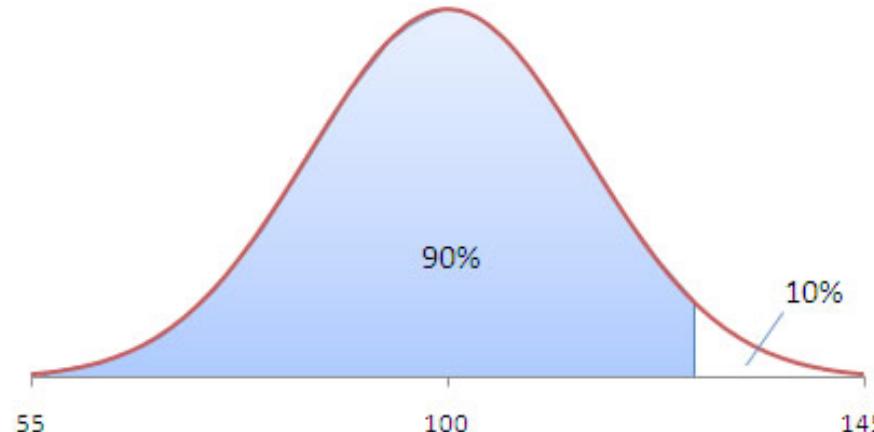
MERCADO DE TRABALHO DATA SCIENCE

Quem contrata cientista de dados?

- start-ups
- consultorias
- telecom, varejo, indústria, e-commerce, bancos, governo, farmaceuticas, ...
- <http://corporate.canaltech.com.br/noticia/vivo/vivo-cria-nucleo-de-bi-e-big-data-em-departamento-com-120-profissionais-74597/>

Quantos cientistas de dados existem no mundo?

- Forbes 2014
(<https://www.forbes.com/sites/gilpress/2015/10/21/the-number-of-data-scientists-has-doubled-over-the-last-4-years/#5027125538d4>)
Quantidade: **11430 profissionais**
- Stitchdata 2015
(<https://www.stitchdata.com/resources/reports/the-state-of-data-science/>)
Quantidade: **11400 funcionários em empresas**
- KDnuggets 2014
(<http://www.kdnuggets.com/2014/03/how-many-data-scientists-are-there.html>)
Quantidade: **150K a 250K** pessoas tecnicamente capacitadas (perfil LinkedIn)



>6-8M??? Users

https://github.com/jupyter/design/blob/master/surveys/2015-notebook-ux/analysis/report_dashboard.ipynb



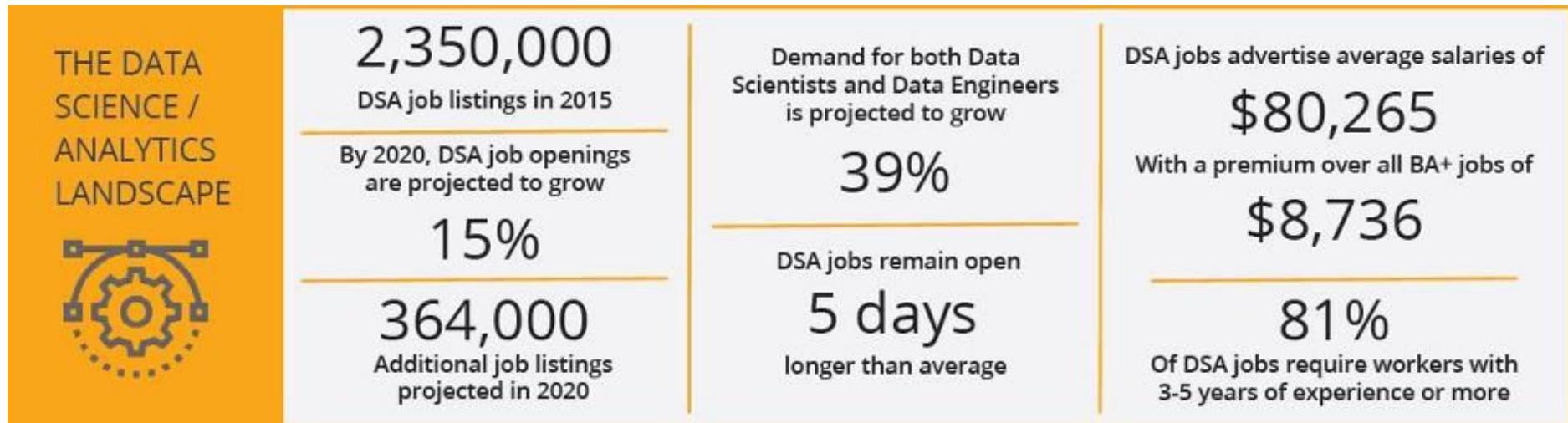
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AUGUST 22-25, 2017
NEW YORK, NY
jupytercon.com
#JupyterCon

<https://youtu.be/YKmJvHjTGAM?t=570>

Job listings



Fontes: Forbes, IBM

<https://www.forbes.com/sites/louiscolumbus/2017/05/13/ibm-predicts-demand-for-data-scientists-will-soar-28-by-2020/#2362a6037e3b>

OUTROS FATOS E PIADAS SOBRE DATA SCIENCE

Estatístico versus Cientista de Dados

- <http://priceconomics.com/whats-the-difference-between-data-science-and/>
- <https://www.analyticsvidhya.com/blog/2015/10/job-comparison-data-scientist-data-engineer-statistician/>
- <http://blog.revolutionanalytics.com/2013/05/statistics-vs-data-science-vs-bi.html>

Analysis Tool	Similar Superhero	Super Powers in Common
R 	Batman 	<ul style="list-style-type: none"> • Detective Work • Intelligence • Cunning • Usage of Tools • More Brain than Muscles
Python 	Superman 	<ul style="list-style-type: none"> • Muscle Power • Super Strength • Elegance • Wide Range • More Muscles than Brain

<http://i2.wp.com/ucanalytics.com/blogs/wp-content/uploads/2015/10/R.jpeg?resize=198%2C150>

Dificuldades ou Desculpas criadas por “vendors”



- Como vai gerenciar Schedulers ?
- Como vai gerenciar Segurança ?
- Como vai gerenciar o Cluster ?
Como ? Como ? Como?
- cron
- chmod 600
- Shell script
- Open Source



Data Scientist Nutella



Data Scientist Raiz

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Assertivo & Assertividade

- ...machine learning faz com que nossa ação seja mais assertiva
- A gestão data-driven nos leva a decisões mais assertivas
- [https://www.catho.com.br/carreira-sucesso/
columnistas/carlos-hilsdorf/o-que-e-assertividade](https://www.catho.com.br/carreira-sucesso/columnistas/carlos-hilsdorf/o-que-e-assertividade)
- <https://pt.wikipedia.org/wiki/Assertividade>

BUSCA

OK

Curtir 2,7 M

Tweetar



movimento empreenda
extreme makeover
empreendedor de sucesso
melhores franquias
+



home como começar dia a dia franquias banco de ideias startups mei | REVISTA

ASSINE



Saiba mais +



DIA A DIA > GESTÃO

TAMANHO DO TEXTO A- A+

Como tomar decisões mais assertivas na sua empresa

Quando surge aquele pepino, como conduzir a tomada de decisão? Veja algumas dicas para resolver

Da Endeavor Brasil - 02/10/2015

f Comp. (0)

p Pinar (0)

in Comp. (20)

g+ Comp.

t Tuítar

Assine já!

Nós temos o curso certo para você.

SEBRAE
SP

SUPER•
MEI
SEBRAE

INSCREVA-SE JÁ

BUSCA DE FRANQUIAS

- solicitei os dados, e vão me entregar em uma semana
- montei um data lake, gastei uma 💰💰💰 , e agora?
- hadoop para 1M de clientes

<https://cloud.google.com/products/calculator/>

<https://www.surveysystem.com/sscalc.htm>

- legal, essas são as propensões. qual ação devo tomar?

join_us.py



> **help ACE.vagas**
[1] "Mande e-mail para
cienciadedados@itau-unibanco.com.br
com o assunto sendo o resultado de:

```
sum_hex([x.Unicode\
.replace("U+","") for\
x in [Ｓ,🎲,💻,≡,✍]])
```

Atenção: sintaxe aproximadamente correta,
use apenas como motivacão.”

empresa contratando cientistas de dados

PYTHON É PARA VOCE

Python é para você... e para os CEO's também



Societe Generale CEO Frederic Oudea speaks to Bloomberg's Ed Robinson from the Web Summit in Lisbon.

Python é para você... e para os CEO's também

The screenshot shows a news article from Bloomberg Technology. At the top, there is a navigation bar with links to 'Bloomberg the Company & Its Products', 'Bloomberg Anywhere Remote Login', and 'Bloomberg Terminal Demo Request'. Below the navigation bar, there is a header with the Bloomberg logo and the word 'Technology'. To the right of the logo are links for 'Markets', 'Tech', 'Pursuits', 'Politics', 'Opinion', and 'Businessweek'. On the far right of the header are 'Sign In', 'Subscribe to Businessweek', and a search icon. The main title of the article is 'This Bank CEO Is Learning to Code', written in large, bold, black letters. Below the title, it says 'By Edward Robinson and Fabio Benedetti Valentini' and 'November 7, 2017, 2:09 PM GMT-2'.

- **Frederic Oudea** is doing everything he can to keep up with the technological changes roiling the European banking industry. The chief executive officer of Societe Generale SA has collaborated with fintech startups, backed accelerator programs to nurture innovation, and invested heavily in its French mobile-banking unit as well as in hundreds of apps.

Now **he's even taken up writing software code himself.**

"It was important for me also to **understand exactly what coding means**, so I spend a **few hours coding in Python, which is one of the two languages for data**," Oudea said in an interview at Web Summit 2017, a tech-industry conference in Lisbon.

- "We are taking the challenge seriously and understanding that there is a need to change the model and culturally embrace new technologies," said Oudea, 54.

By offering alternative methods for making payments, newcomers are trying to take customers away from traditional banks for other services, such as lending. **Societe Generale, the third-biggest French bank by market value**, will be locked in this battle for the next few years, Oudea said.

Aplicações de Python

- framework web
- computação numérica e científica
- educação
- desenvolvimento de software (testes)

- <https://www.python.org/about/apps/>
- <https://medium.mybridge.co/30-amazing-python-projects-for-the-past-year-v-2018-9c310b04cdb3>

competency framework

- OECD: https://www.oecd.org/careers/competency_framework_en.pdf
- WEF: <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>



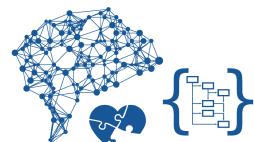
Top 10 skills

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity



Source: Future of Jobs Report, World Economic Forum