

Zerando o jogo



Como a Data Science Pode Ajudar a Bola Entrar No Gol



CIFUT

Luiz Fernando da Silva - @folksilva



Parabéns!



CIFUT

Centro de Inteligência do Futebol



GOOOOOOL!!!

O MOMENTO
MAIS ESPERADO
DO JOGO



GOOOOOOL!!!

A close-up, slightly blurred photograph of a white soccer ball hitting the back of a light-colored goal net. The ball is positioned in the upper right quadrant, with its textured surface and the mesh of the net visible. The background is a soft, out-of-focus green.

O MOMENTO
MAIS ESPERADO
DO JOGO

EXTREMAMENTE RARO

GOOOOOOL!!!

A black and white photograph of a man in a dark suit and tie walking away from the viewer. He is carrying a briefcase in his left hand. The background shows a city street with several cars parked along the side of the road.

50%

HABILIDADE

A black and white photograph of a man in a dark shirt and pants playing soccer in a parking lot. He is in the foreground, facing away from the camera, with his right leg extended towards a soccer ball on the ground. In the background, several cars are parked.

50%

HABILIDADE

A black and white photograph of a soccer player in a light-colored uniform performing a bicycle kick. The player is in mid-air, with their body arched and legs kicked high. A soccer ball is visible above them. The background consists of a hexagonal mesh, likely a goal or fence.

50%

ACASO



#30 Cristiano Ronaldo

[+ Follow](#) (321)[2014 Celebrity 100 Earnings](#)**\$80 Million****Athlete, Soccer**

Age	30
-----	----

Source Of Wealth	Soccer
------------------	--------

Salary/Winnings	\$52 M
-----------------	--------

Endorsements	\$28 M
--------------	--------

Residence	Madrid, Spain
-----------	---------------

Citizenship	Portugal
-------------	----------

Marital Status	Single
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Children	1
----------	---

Agent	Luis Correia
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Agency	Gestifute International
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**Next #31 >**

Windows Phone

Cristiano Ronaldo on Forbes Lists

#30 Celebrity 100 (2014)

#14 in Money

#2 in Press

<http://j.mp/zerando-jogo-01>



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Windows Phone

**\$ MILHÕES
EM HABILIDADE**

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<http://j.mp/zerando-jogo-01>

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**PRECISAMOS
ENTENDER
O JOGO**

TEORIA DOS JOGOS



“

O estudo de modelos matemáticos de conflito e cooperação entre tomadores de decisão com inteligência racional.

Myerson, Roger B. (1991). Game Theory: Analysis of Conflict, Harvard University Press, p. 1. Chapter-preview links, pp. vii–xi.

EXEMPLO NO FUTEBOL



A wide-angle shot of a soccer stadium during a match. In the foreground, a player in a white jersey is taking a penalty kick from the spot. Other players in white jerseys are positioned around him. A referee in a black and white striped shirt stands near the goal. The stadium's green grass field has white boundary lines. In the background, there are blue and white advertising boards for brands like 'PERDIGÃO', 'BRASILEIRÃO', 'NOVA BRAHMA DOS TIMES', 'Bivik JEANS', 'Itau', 'VIVO SEMPRE', and 'GIGANTON'.

EXEMPLO NO FUTEBOL

O JOGO DO
PÊNALTI

GOLEIRO

BATEDOR	ESQUERDA	CENTRO	DIREITA
ESQUERDA			
CENTRO			
DIREITA			

GOLEIRO

BATEDOR	ESQUERDA	CENTRO	DIREITA
ESQUERDA		GOL	GOL
CENTRO	GOL		GOL
DIREITA	GOL	GOL	

GOLEIRO

BATEDOR	ESQUERDA	CENTRO	DIREITA
ESQUERDA	DEFESA	GOL	GOL
CENTRO	GOL	DEFESA	GOL
DIREITA	GOL	GOL	DEFESA



DECISÃO
ESTRATÉGICA



NA VIDA REAL
NÃO É TÃO
SIMPLES

RESPOSTAS COM TEORIA DOS JOGOS

RESPOSTAS COM TEORIA DOS JOGOS

**MELHOR
OPÇÃO**

Maior Probabilidade

RESPOSTAS COM TEORIA DOS JOGOS

**MELHOR
OPÇÃO**

Maior Probabilidade

**PIOR
OPÇÃO**

Menor Probabilidade

RESPOSTAS COM TEORIA DOS JOGOS

**MELHOR
OPÇÃO**

Maior Probabilidade

**OPÇÃO
EQUILIBRADA**

Equilíbrio de Nash

**PIOR
OPÇÃO**

Menor Probabilidade

**PARA ENTENDER O JOGO
PRECISAMOS DE**

**MUITA
INFORMAÇÃO**



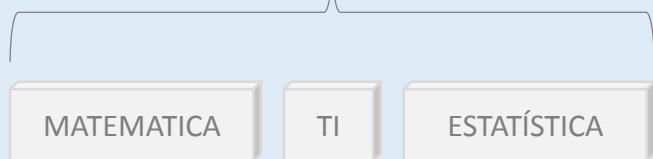
INFORMAÇÃO



DATA SCIENCE



CONHECIMENTO



O Ciclo da Data Science



Obter informações do mundo real



Encontrar perguntas para responder



Testar as respostas das perguntas

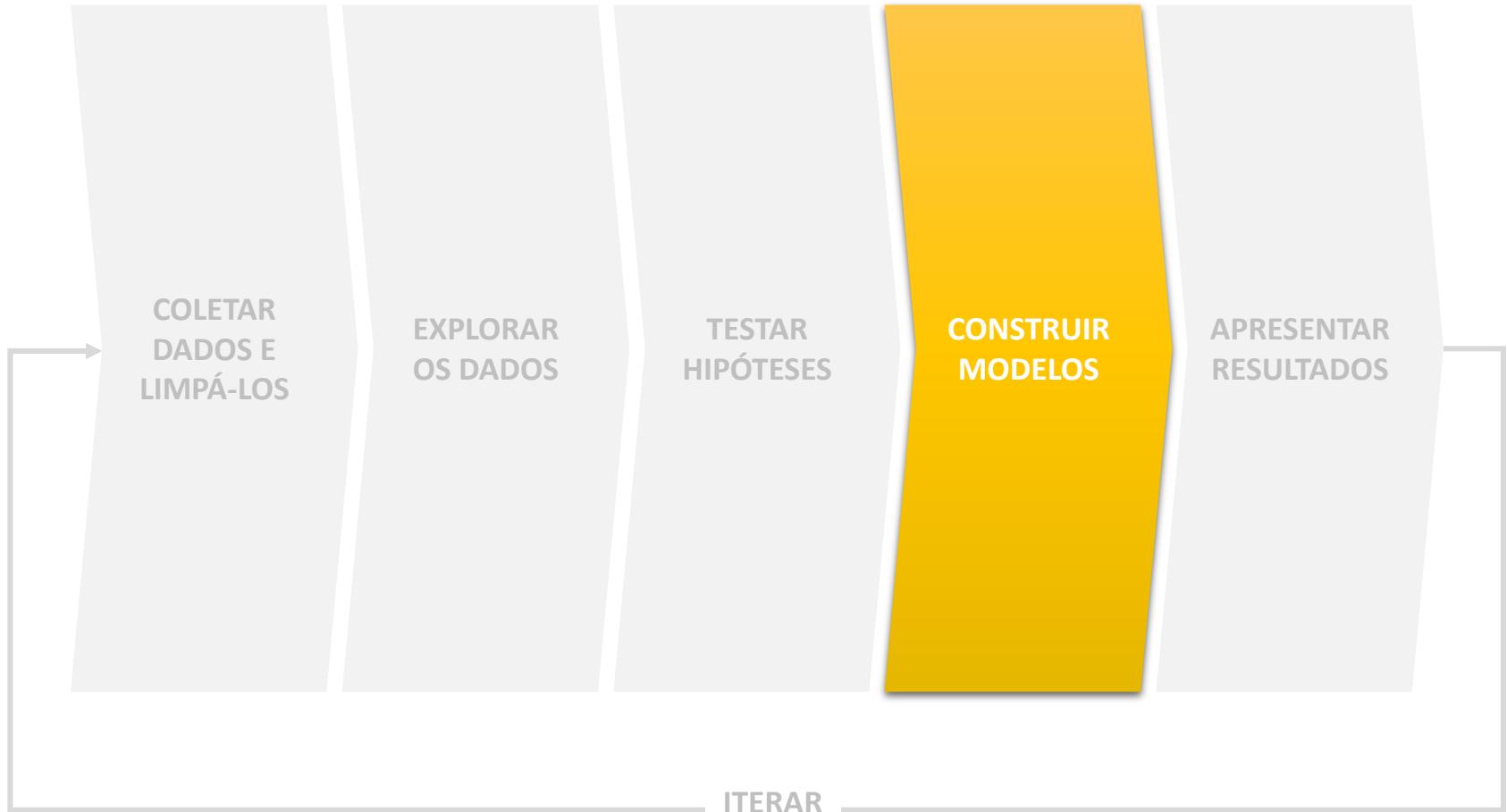


Testar as respostas das perguntas

A computação e a internet permitem trabalhar com mais informações



Preparar para reprodução



Criar produtos de dados



Criar produtos de dados

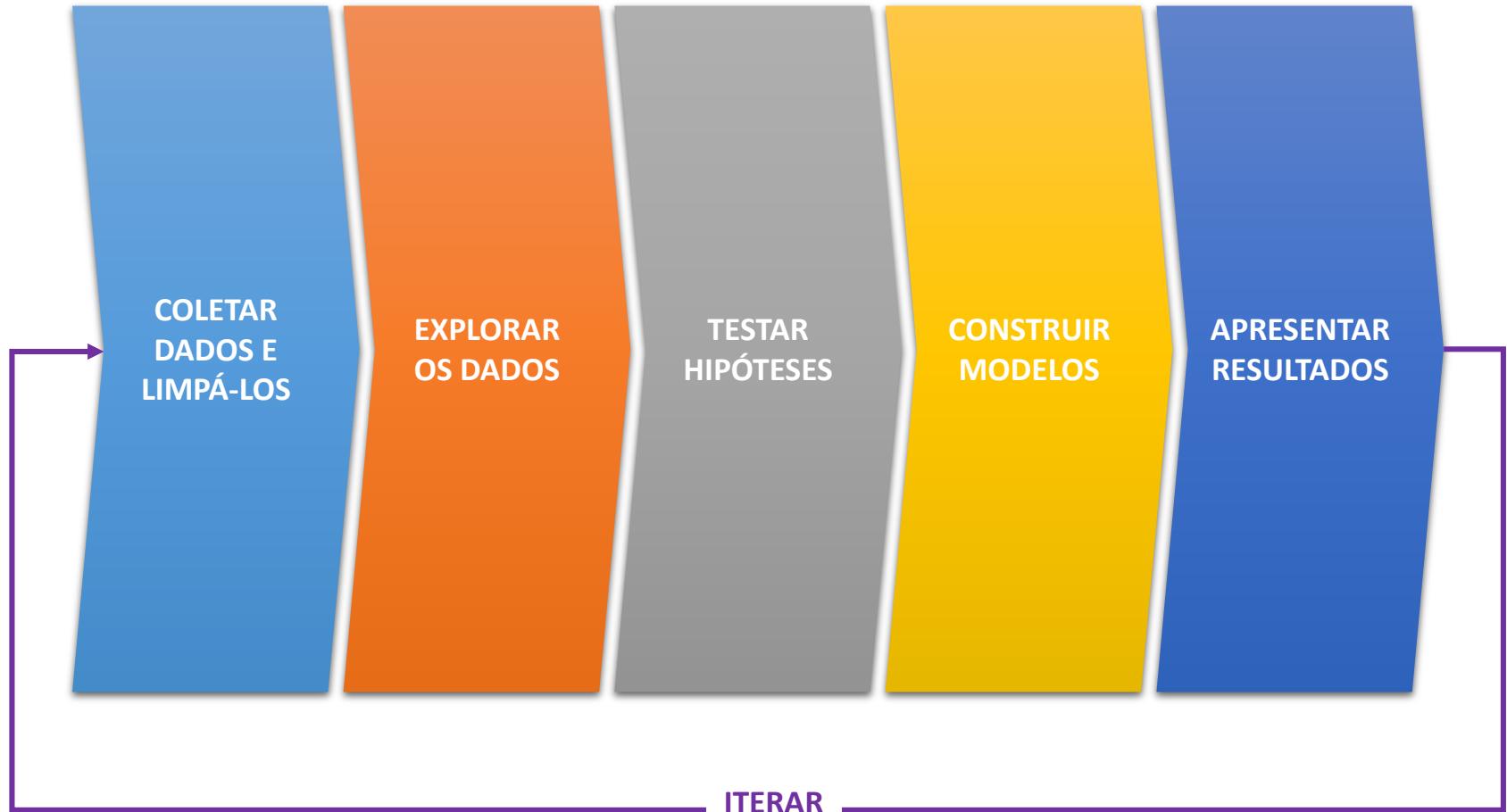
Transmitir o conhecimento de forma correta



Evoluir com o mundo real



O Ciclo da Data Science





Data Science no Corinthians

TIME DO PÓVOA

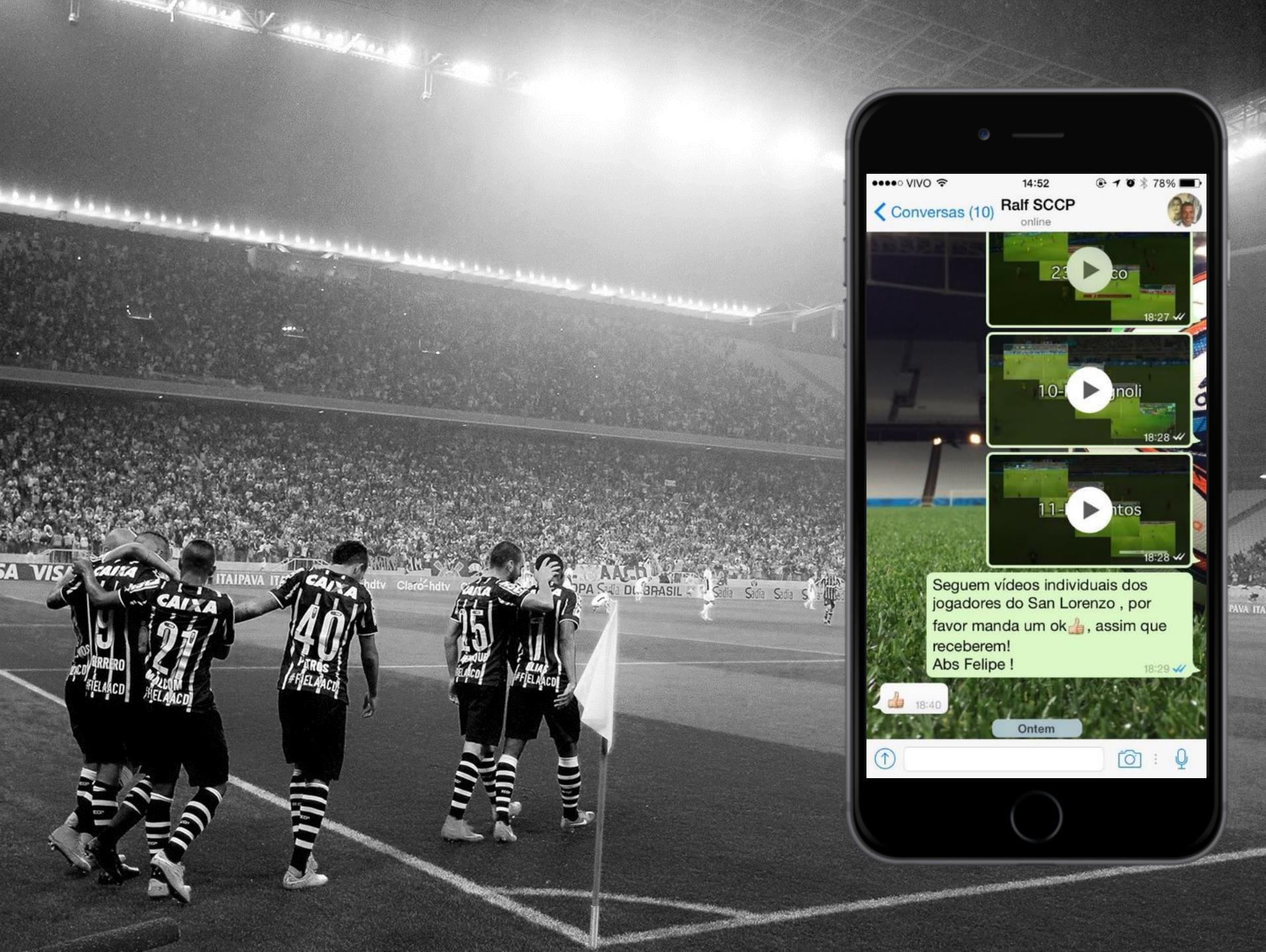
JOGAI POR NOS

O jogo é muito mais que 90 minutos



Captura de Dados Pré Jogo





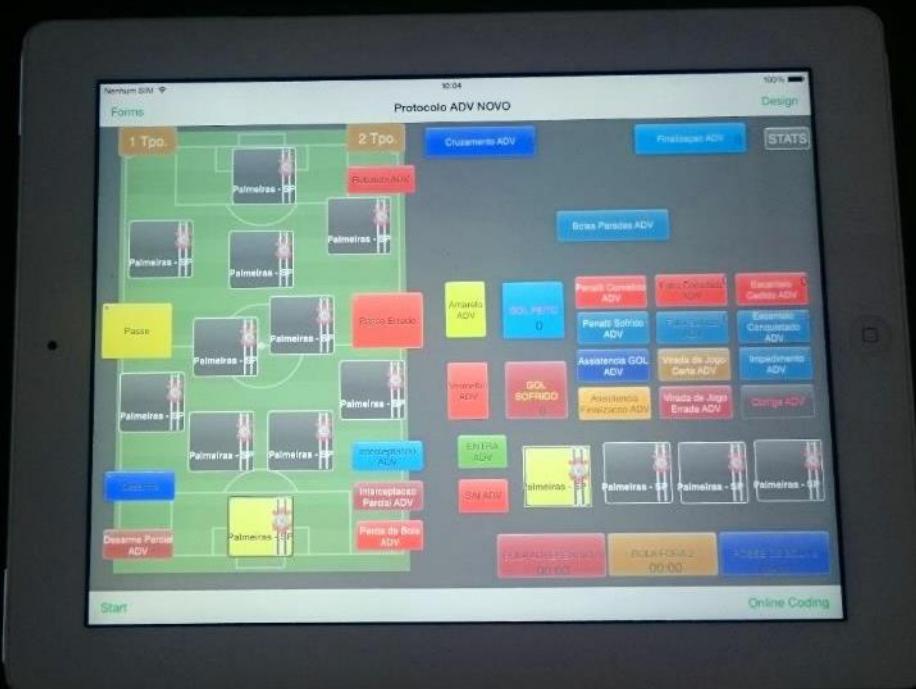
Seguem vídeos individuais dos jogadores do San Lorenzo , por favor manda um ok👍, assim que receberem!
Abs Felipe !



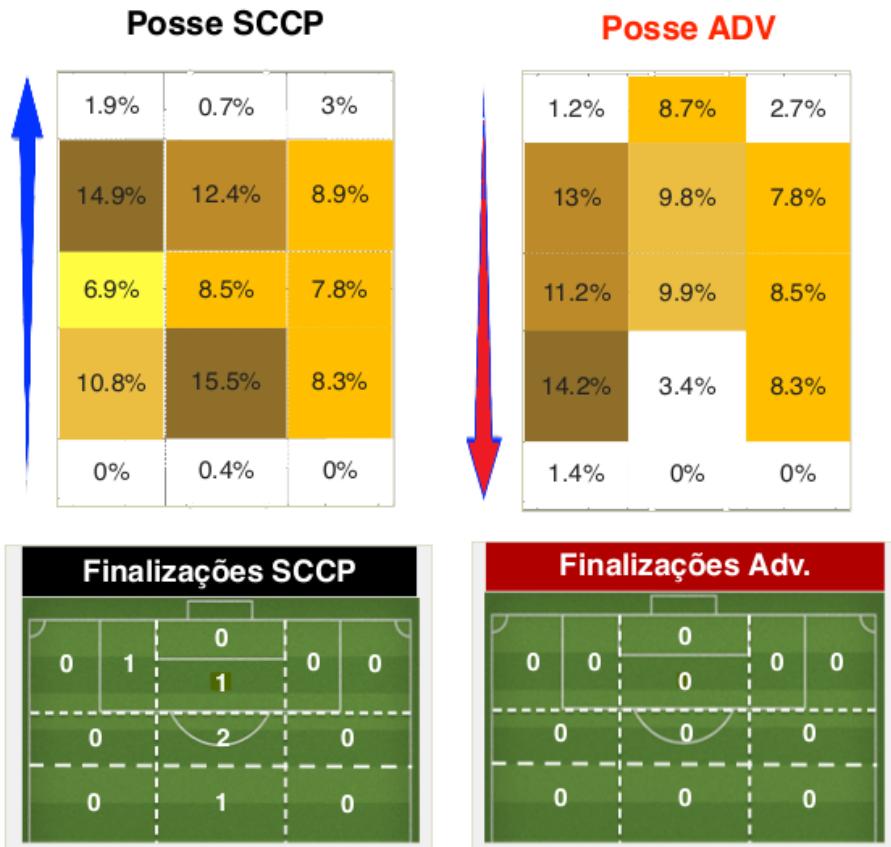
18:40

Ontem

Captura de Dados Durante o Jogo



Apresentação: Durante o Jogo





Captura de Dados Pós Jogo

Apresentação: Antes e após o Jogo

Apresentação: Antes e após o Jogo



Apresentação: Antes e depois o Jogo



Apresentação: Antes e depois o Jogo

PRO Básico Futebol Administração Análises Buscar

Local de Foco Local da Assistência Local do Chute

Corinthians - SP 0 x 0 San Lorenzo

5ª rodada. Fase de Grupos do Copa Libertadores
16/04/15 22:00 (90 min) -
Jogo sem descrição

Corinthians - SP

Numero	Posição	Jogador
12	GOL	Cássio
13	LATE	Uendel
23	LATD	Fagner
4	ZAG	Gil
22	ZAG	Felipe
5	VOL	Ralf
7	VOL	Elias
8	MEI	Renato Augusto
10	MEI	Jádson
29	ATA	Vágner Love
11	ATA	Emerson Sheik
20	MEI	Danilo
15	ATA	Stiven Mendoza
1	GOL	Walter
2	LATD	Edilson
17	ZAG	Edu Dracena
25	VOL	Bruno Henrique
16	VOL	Cristian

San Lorenzo

Numero	Posição	Jogador
17	GOL	Sebastián Torrico
21	LATE	Emanuel Más
7	LATD	Buffarini
3	ZAG	Yepes
6	ZAG	Matías Caruzzo
29	VOL	Néstor Ortigoza
10	MEI	Romagnoli
23	MEI	Sebastián Blanco
5	MEI	Juan Ignacio Mercier
15	ATA	Villalba
26	ATA	Mauro Matos
22	MEI	Alan Ruiz
11	MEI	Pablo Barrientos
28	MEI	Franco Mussis
1	GOL	Leo Franco
27	LATD	Matías Catalán
4	MEI	Facundo Quignon
9	ATA	Cauteruccio

PRO Básico Futebol Administração Análises Buscar

Local

Período do Jogo

Origem do gol

Tabela de gols

Competição	Jogo	Data/Hora
1º Gols de Peixão, Copa do Mundo PTF	#1087 - Alemanha 2 x 1 Argentina	
2º Gols de Peixão, Copa do Mundo PTF	#1087 - Alemanha 2 x 1 Argentina	
3º Gols de Peixão, Copa do Mundo PTF	#1088 - Brasil 1 x 1 Chile	
4º Gols de Peixão, Copa do Mundo PTF	#1088 - Brasil 1 x 1 Chile	
5º Gols de Peixão, Copa do Mundo PTF	#1088 - Alemanha 2 x 1 Argentina	
6º Gols de Peixão, Copa do Mundo PTF	#1088 - Alemanha 2 x 1 Argentina	

Ranking de atletas (Top 10)

Nome	Equipe	Posição
James Rodríguez (Colômbia)	Colômbia	
Neymar (Brasil - Brasil)	Brasil	
Messi (Argentina - Argentina)	Argentina	
Thomas Müller (Alemanha - Alemanha)	Alemanha	
Van Persie (Holanda - Holanda)	Holanda	
Robben (Holanda - Holanda)	Holanda	
Emre Volcan (Turquia - Turquia)	Turquia	
Benzema (França - França)	França	
Sneijder (Italia - Itália)	Itália	
Musk (Argentina - Argentina)	Argentina	

Opções

Mapa de campo

Diagrama de direção

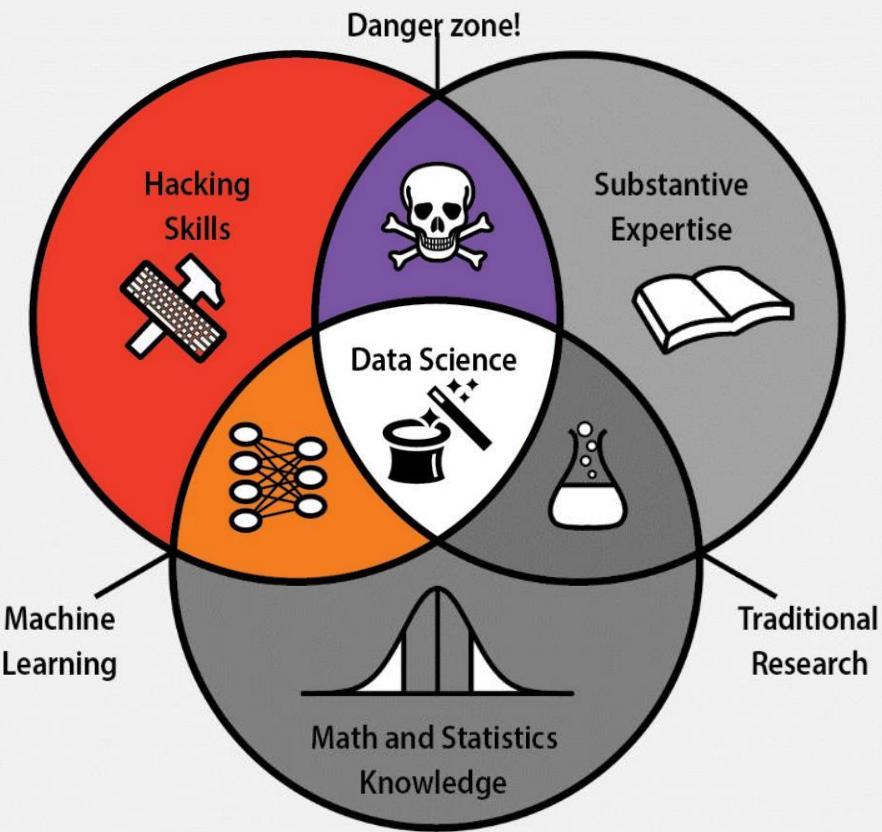
Gráficos

Relatório



**Como formar uma equipe de
Data Science?**

DATA SCIENCE SKILLSET



Data science, due to its interdisciplinary nature, requires an intersection of abilities: **hacking skills, math and statistics knowledge**, and **substantive expertise** in a field of science.



Hacking skills are necessary for working with massive amounts of electronic data that must be acquired, cleaned, and manipulated.



Math and statistics knowledge allows a data scientist to choose appropriate methods and tools in order to extract insight from data.



Substantive expertise in a scientific field is crucial for generating motivating questions and hypotheses and interpreting results.



Traditional research lies at the intersection of knowledge of math and statistics with substantive expertise in a scientific field.

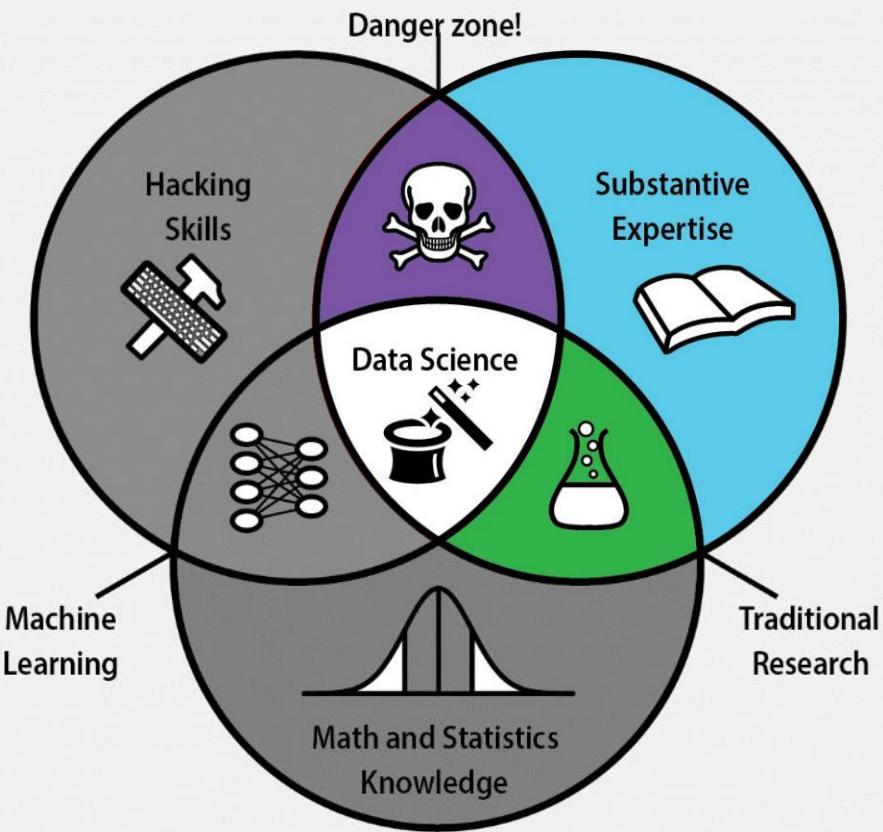


Machine learning stems from combining hacking skills with math and statistics knowledge, but does not require scientific motivation.



Danger zone! Hacking skills combined with substantive scientific expertise without rigorous methods can beget incorrect analyses.

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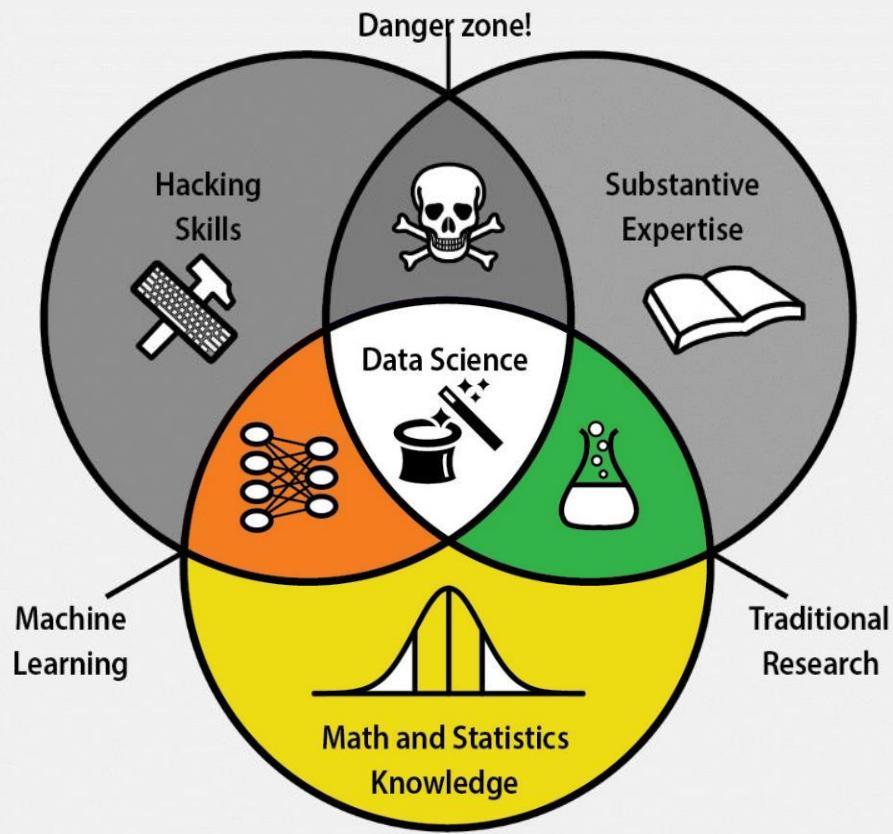


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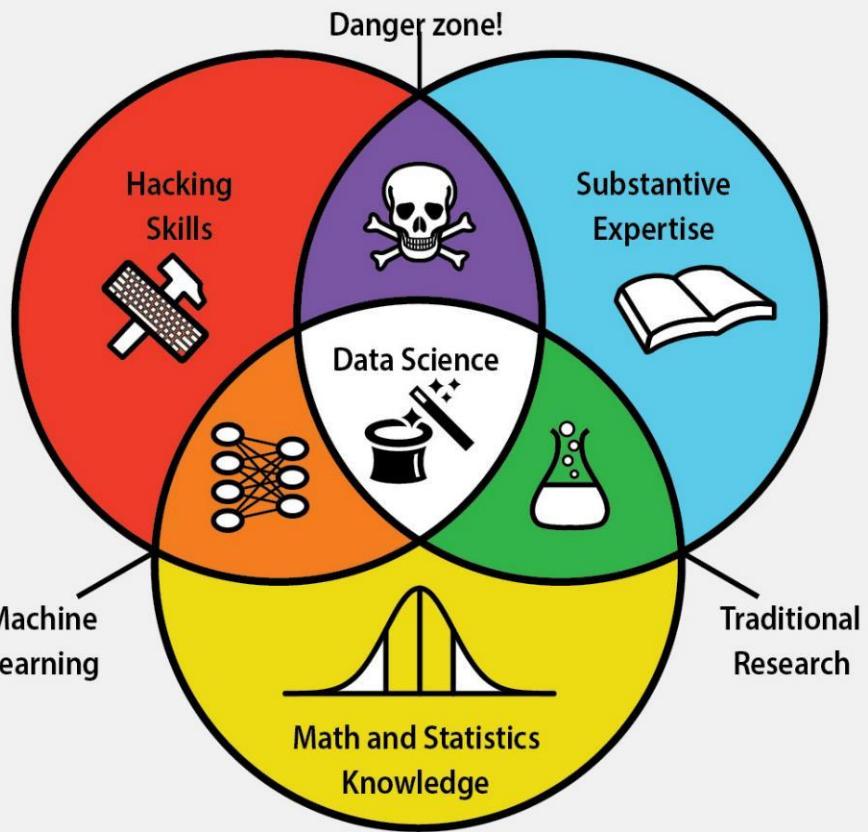
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A photograph of a grand library aisle. The ceiling is high and vaulted, supported by large wooden beams. Both sides of the aisle are filled with tall, dark wood bookshelves packed with books. Small busts of historical figures are placed on pedestals along the floor. A small cart or trolley is visible in the distance. The lighting is warm and focused on the center of the aisle.

Como aprender mais?

Estatística

Estatística

O'REILLY®

2nd Edition

Think Stats

EXPLORATORY
DATA ANALYSIS



Allen B. Downey

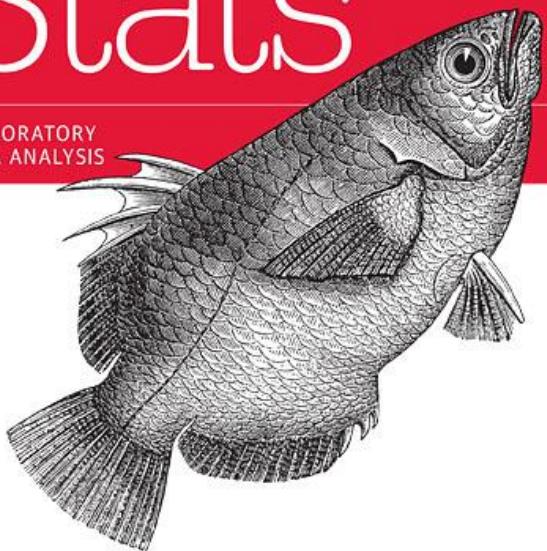
Estatística

O'REILLY

2nd Edition

Think Stats

EXPLORATORY
DATA ANALYSIS



Allen B. Downey



Statistics, Making sense of Data

<http://j.mp/zerando-jogo-06>

Estatística

O'REILLY

2nd Edition

Think Stats

EXPLORATORY
DATA ANALYSIS



Allen B. Downey

<http://j.mp/zerando-jogo-05>



Statistics, Making sense of Data

<http://j.mp/zerando-jogo-06>



<http://j.mp/zerando-jogo-07>

Machine Learning

Machine Learning

A Programmer's Guide to
Data Mining



The Ancient Art of the Numerati

Ron Zacharski

Machine Learning

A Programmer's Guide to
Data Mining



The Ancient Art of the Numerati

Ron Zacharski



Machine Learning

<http://j.mp/zerando-jogo-09>

Machine Learning

A Programmer's Guide to
Data Mining



The Ancient Art of the Numerati

Ron Zacharski

<http://j.mp/zerando-jogo-08>



Machine Learning

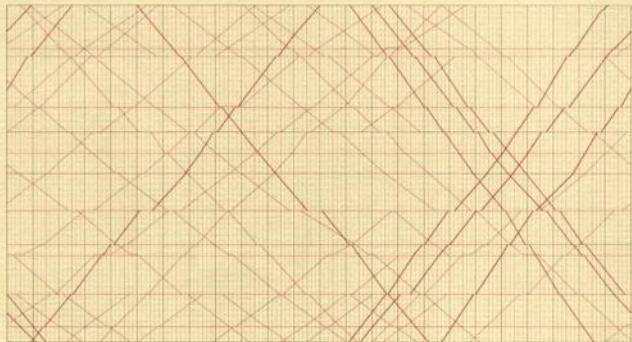
<http://j.mp/zerando-jogo-09>



<http://j.mp/zerando-jogo-10>

Visualização

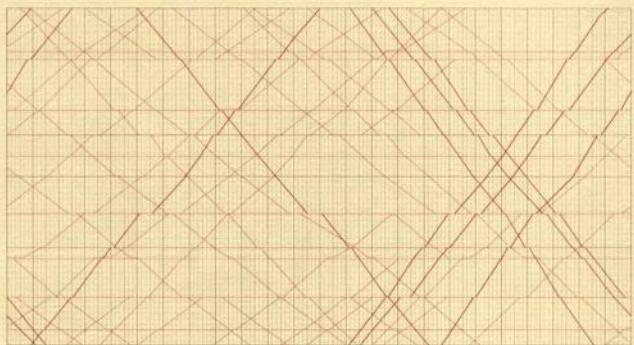
Visualização



The Visual Display
of Quantitative Information

EDWARD R. TUFTE

Visualização



The Visual Display
of Quantitative Information

EDWARD R. TUFTE



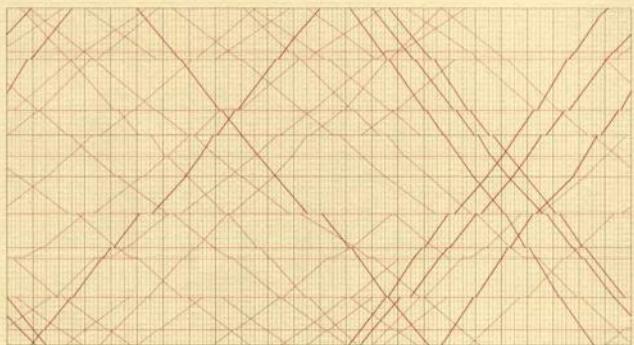
RICE®

Data Visualization (stat645)

<http://j.mp/zerando-jogo-12>

<http://j.mp/zerando-jogo-11>

Visualização



The Visual Display
of Quantitative Information

EDWARD R. TUFTE

<http://j.mp/zerando-jogo-11>



Data Visualization (stat645)

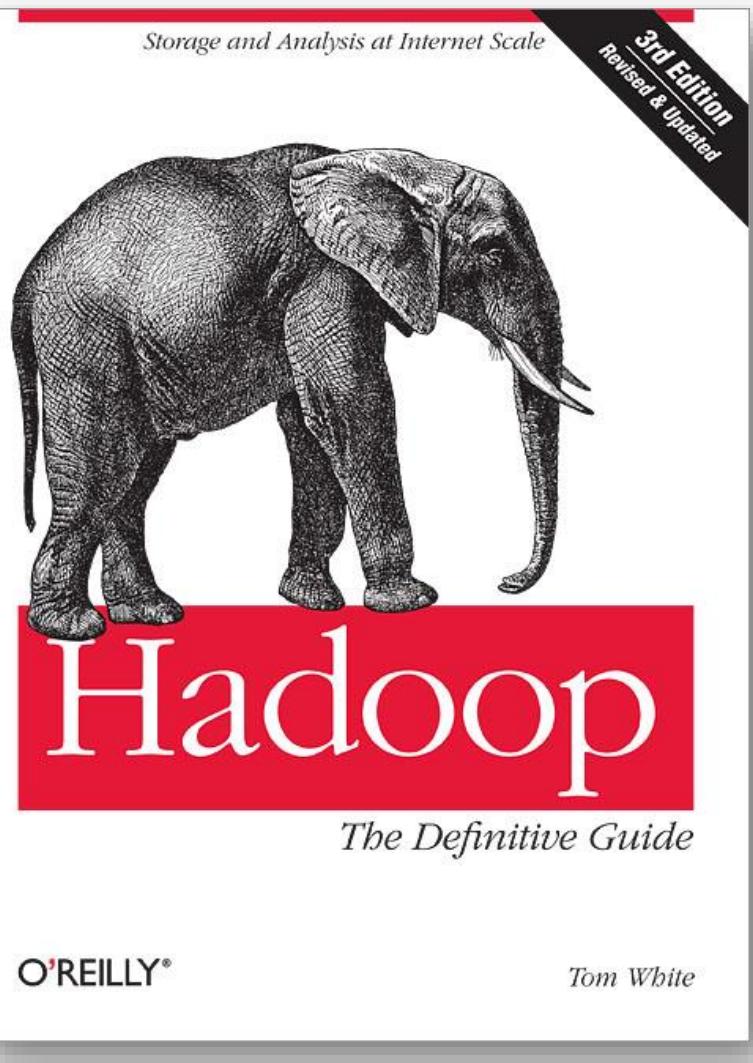
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<http://j.mp/zerando-jogo-13>

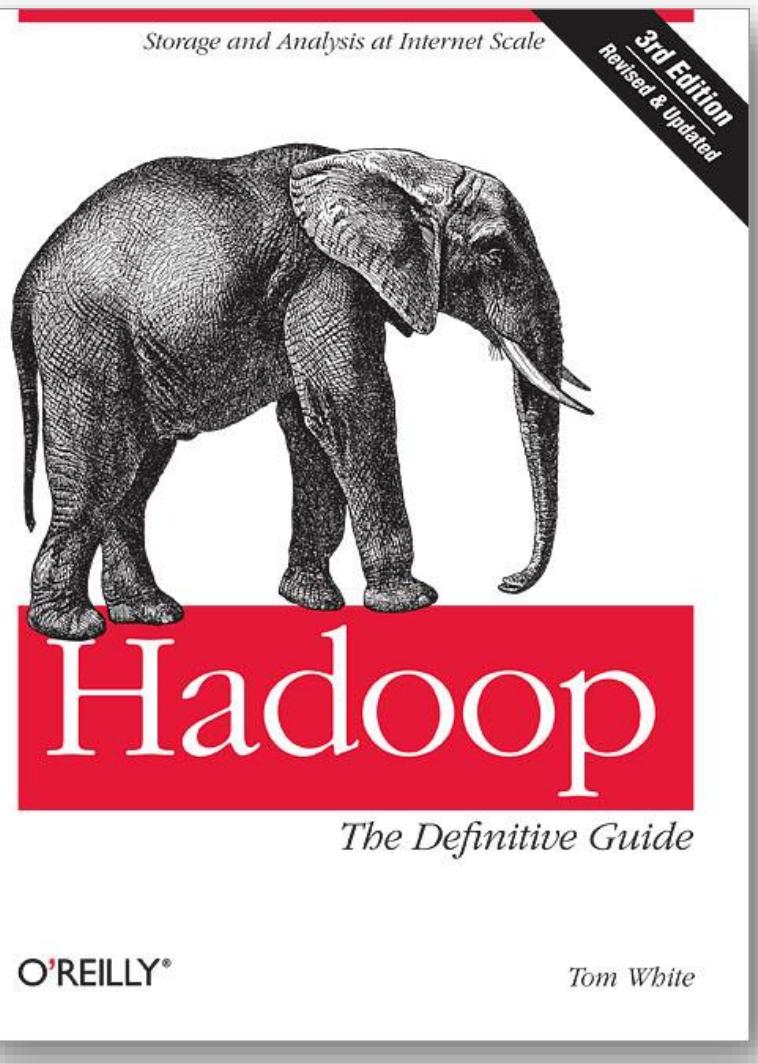
Computação em Escala

Computação em Escala



<http://j.mp/zerando-jogo-14>

Computação em Escala

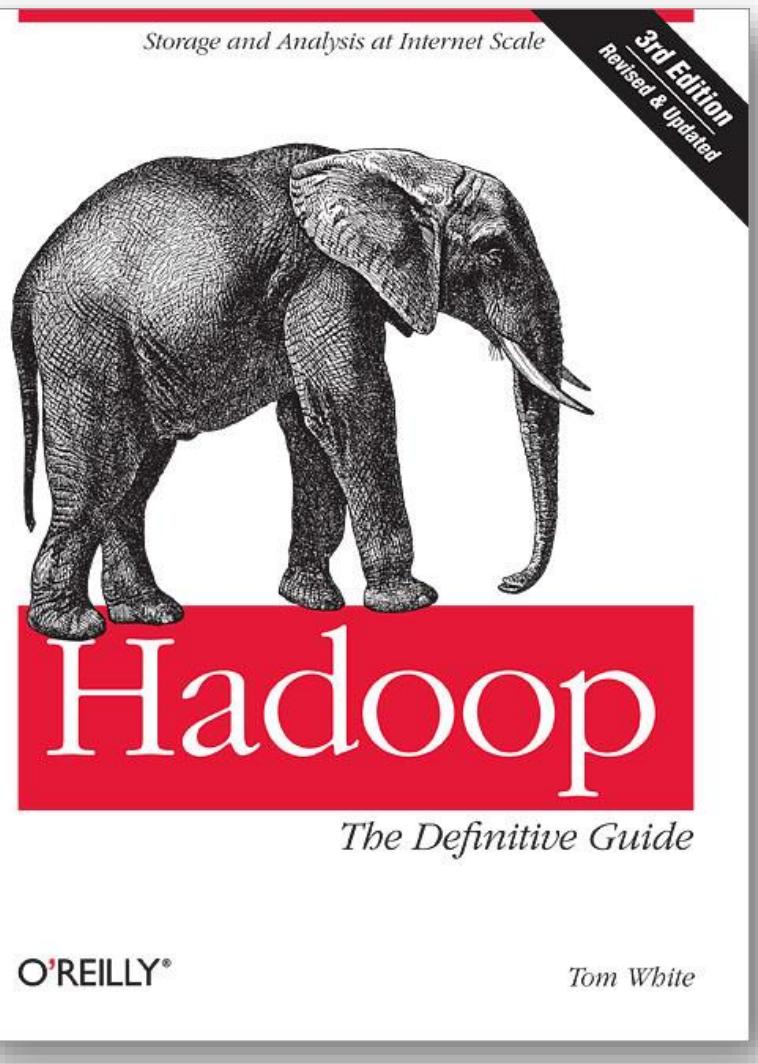


Web Intelligence and Big Data

<http://j.mp/zerando-jogo-15>

<http://j.mp/zerando-jogo-14>

Computação em Escala



<http://j.mp/zerando-jogo-14>



Web Intelligence and Big Data

<http://j.mp/zerando-jogo-15>



<http://j.mp/zerando-jogo-16>

É possível zerar o jogo?

adidas

AUSTRÁLIA 31 X 0 SAMOA AMERICANA

11/04/2001

É possível zerar o jogo?

SIM!

AUSTRÁLIA 31 X 0 SAMOA AMERICANA

11/04/2001

Obstáculos para zerar o jogo

Obstáculos para zerar o jogo

**Como saber se temos dados
suficientes?**

Obstáculos para zerar o jogo

**Como saber se a pergunta
feita vai dar a resposta que
precisamos?**

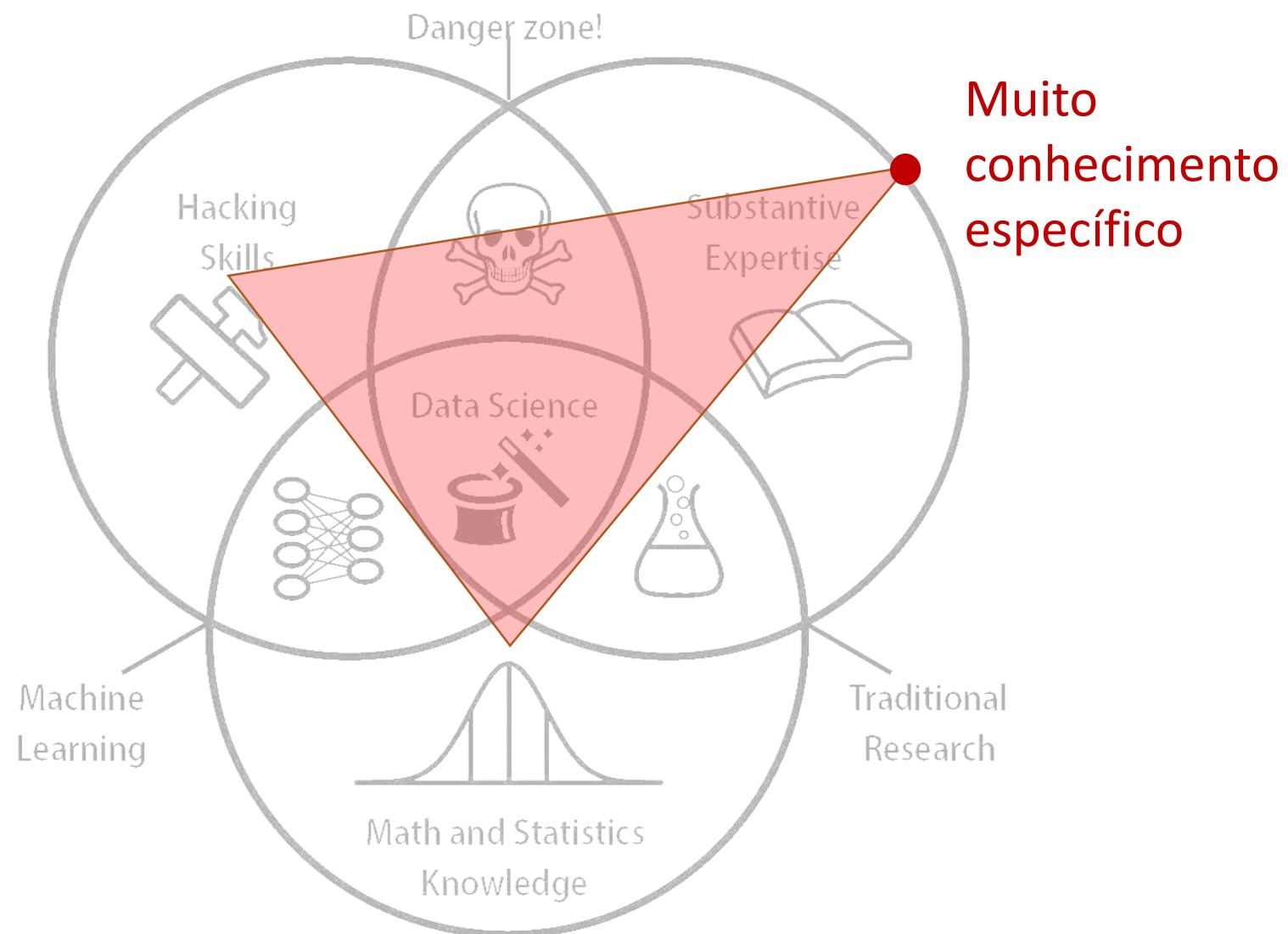
Complexidade do Futebol



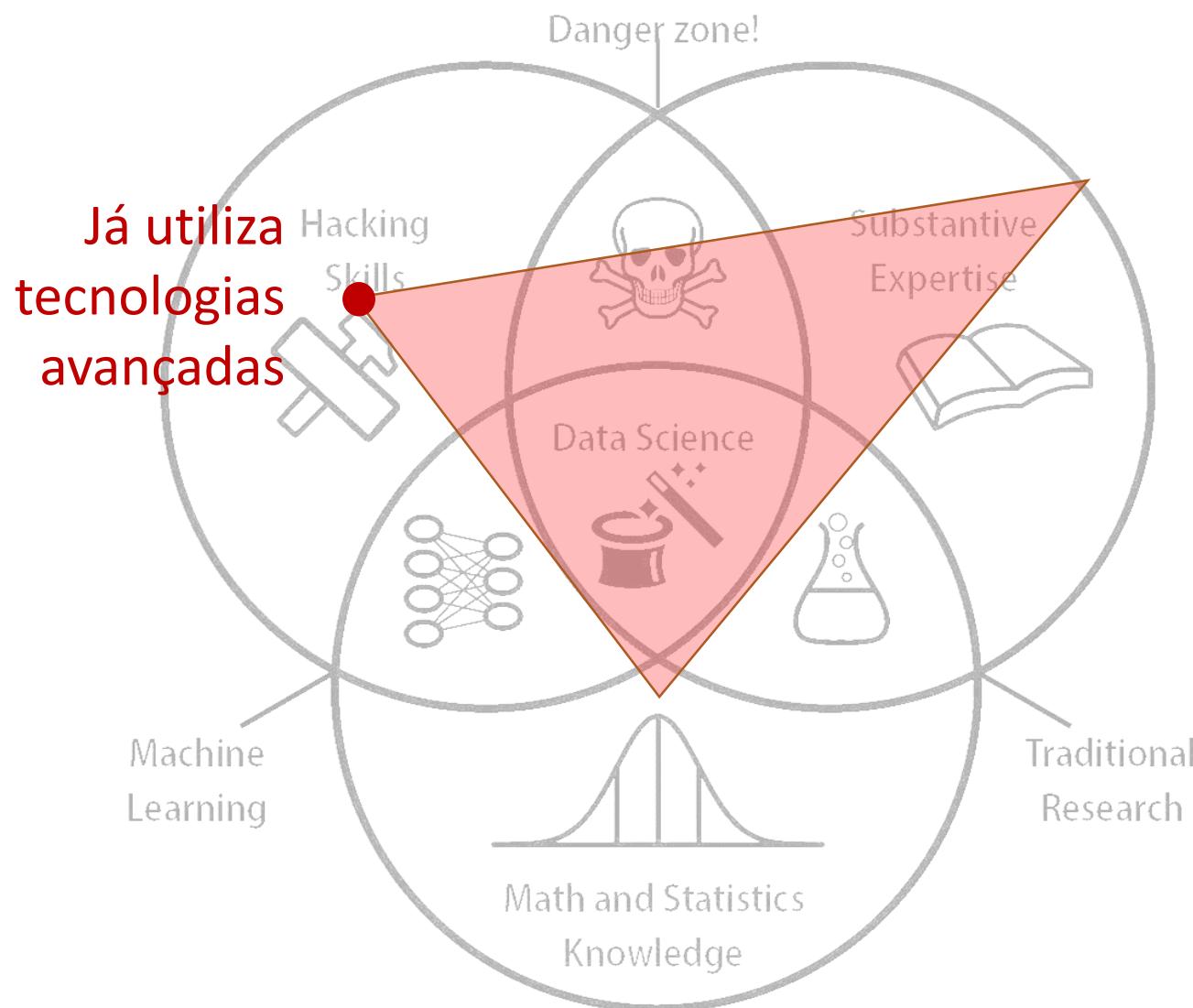
Não sei o que aconteceu ou se aconteceu não tô sabendo.

Mas futebol é isso que aconteceu, porque eu não sei o que aconteceu.

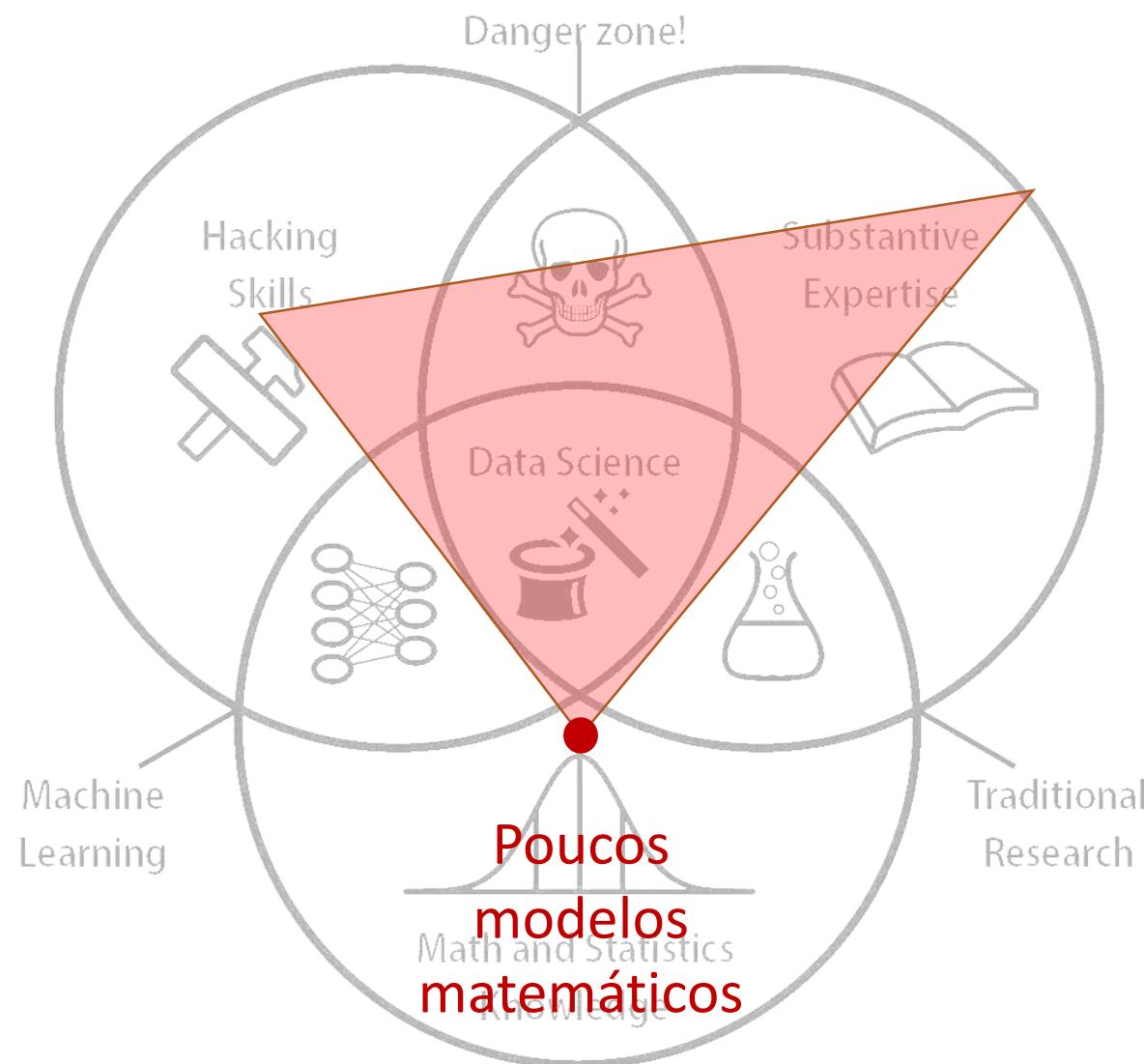
Data Science no Futebol Hoje



Data Science no Futebol Hoje



Data Science no Futebol Hoje



Solução:



Solução:
**Usar a tecnologia para
produzir novos modelos
matemáticos e testá-los.**





Perguntas?

twitter.com/folksilva

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folksilva@gmail.com

folksilva.github.io



Perguntas?

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folksilva@gmail.com

folksilva.github.io

Sobre a apresentação

