

Zerando o Jogo

Como a Data Science Pode Ajudar a Bola Entrar No Gol



CIFUT

Luiz Fernando da Silva - @folksilva

A black and white photograph capturing a moment of intense celebration. A group of football players, wearing white jerseys with 'IVECO' and 'MARRAZ' branding, are gathered together. One player in the center holds a large, ornate trophy aloft. The scene is filled with a shower of confetti, and the players' expressions are of pure joy and triumph. The word 'Parabéns!' is overlaid in large white letters across the middle of the image.

Parabéns!



CIFUT

Centro de Inteligência do Futebol



GOOOOOOL!!!

O MOMENTO
MAIS ESPERADO
DO JOGO



GOOOOOOL!!!

A grayscale image of a soccer ball hitting a goal net, serving as the background for the text.

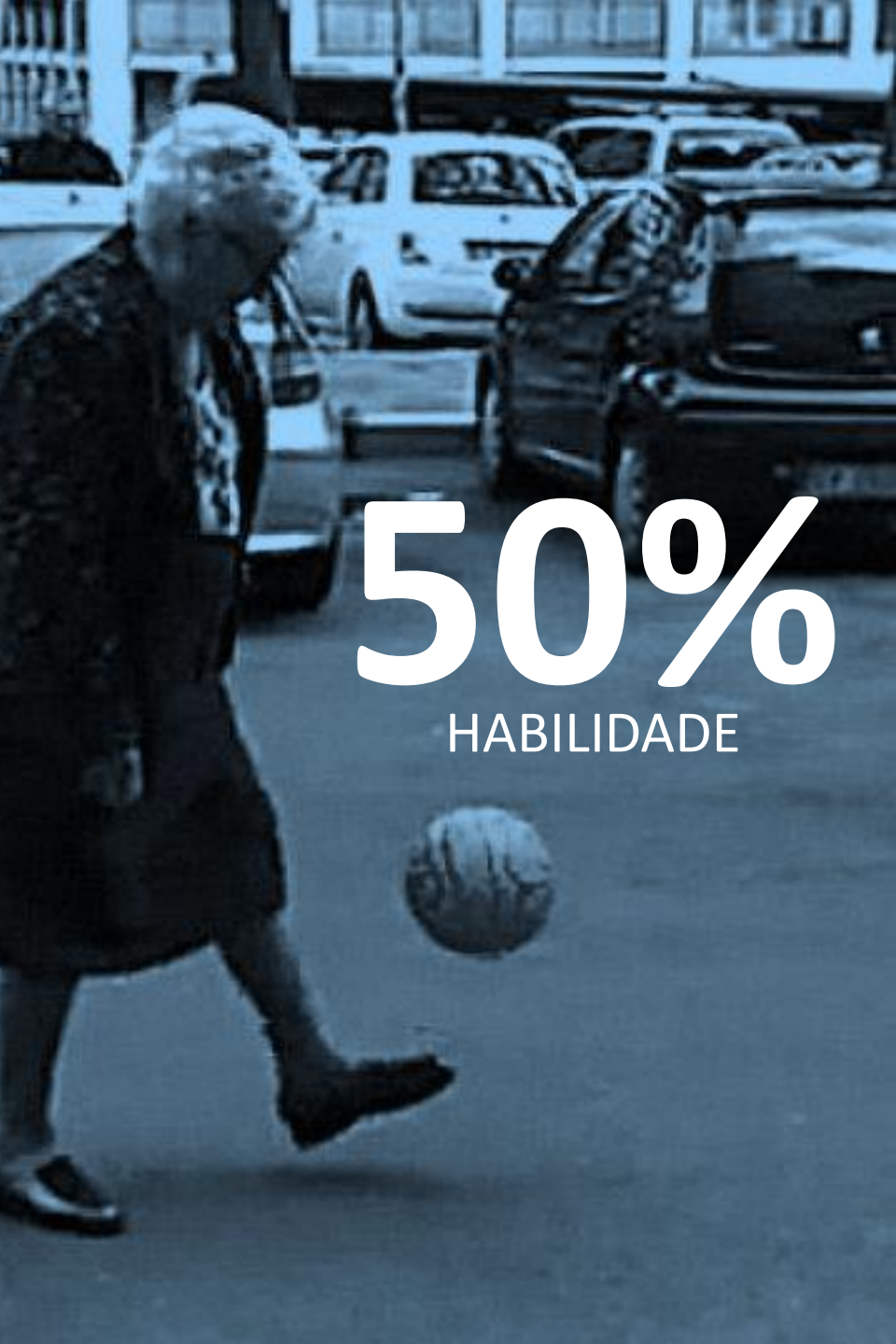
O MOMENTO

MAIS ESPERADO

DO JOGO

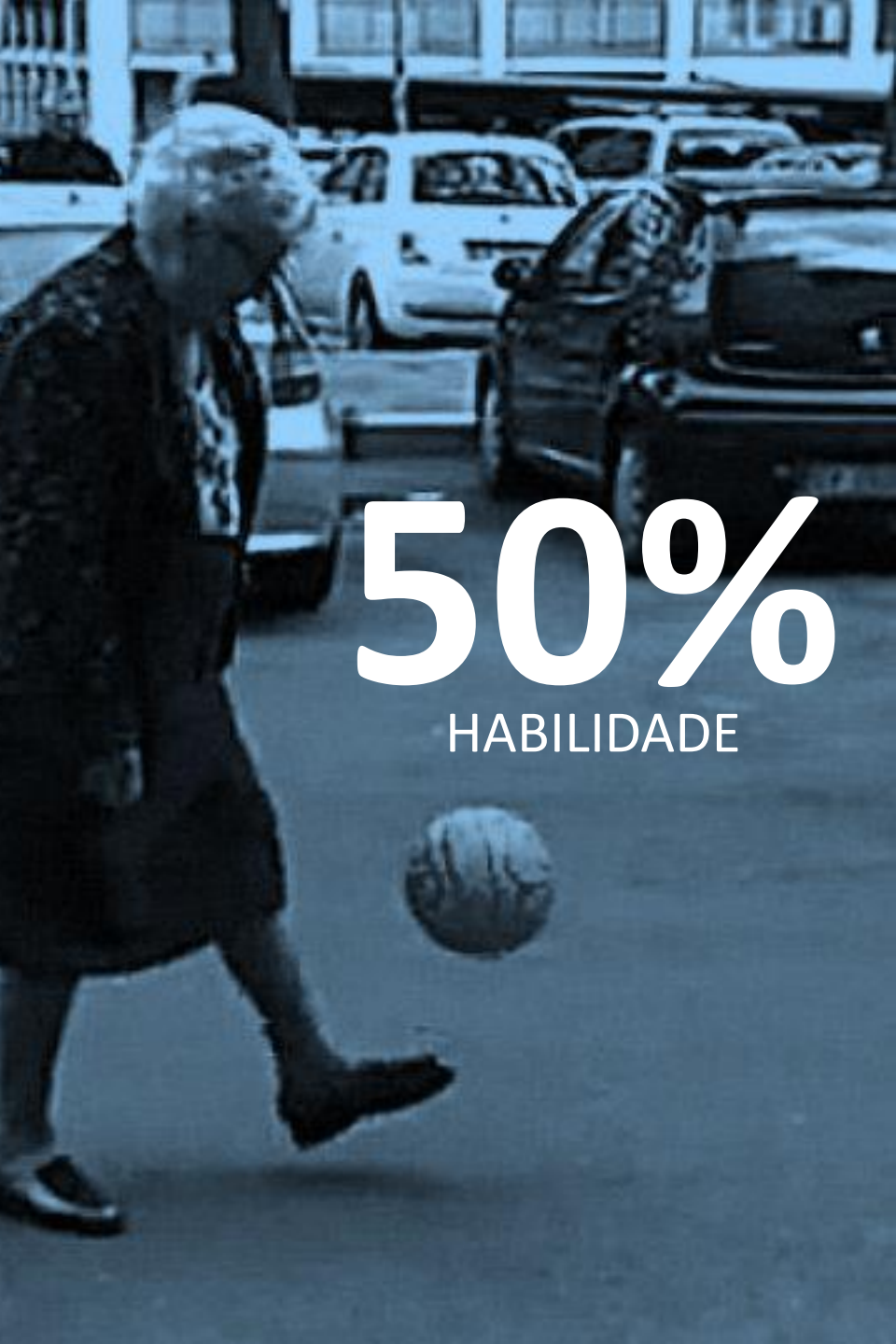
EXTREMAMENTE RARO

GOOOOOOOL!!!



50%

HABILIDADE



50%
HABILIDADE



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
Children	1
Agent	Luis Correia
Agency	Gestifute International



Next #31 >

Window Snip

Cristiano Ronaldo on
Forbes Lists

#30 Celebrity 100 (2014)

#14 in Money

#2 in Press

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



Cristiano Ronaldo on Forbes Lists

#30 Celebrity 100 (2014)

#14 in Money

#2 in Press

#30 Cristiano Ronaldo

+ [Follow](#) (321)

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Agency	Gestifute International



Next #31 >

[Window Snip](#)

**\$ MILHÕES
EM HABILIDADE**

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

\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$





**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.

PERDIGÃO

BRASILEIRÃO

NOVA BRANHA DOS TIMES

VIVO SEMPRE

Bivik JEANS

Itaú

EXEMPLO NO FUTEBOL



A wide-angle shot of a soccer match during a penalty kick. The ball is on the penalty spot. Several players are positioned in the penalty area, and a goalkeeper is ready in the goal. The background features various advertisements on the stadium walls.

EXEMPLO NO FUTEBOL

**O JOGO DO
PÊNALTÍ**

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

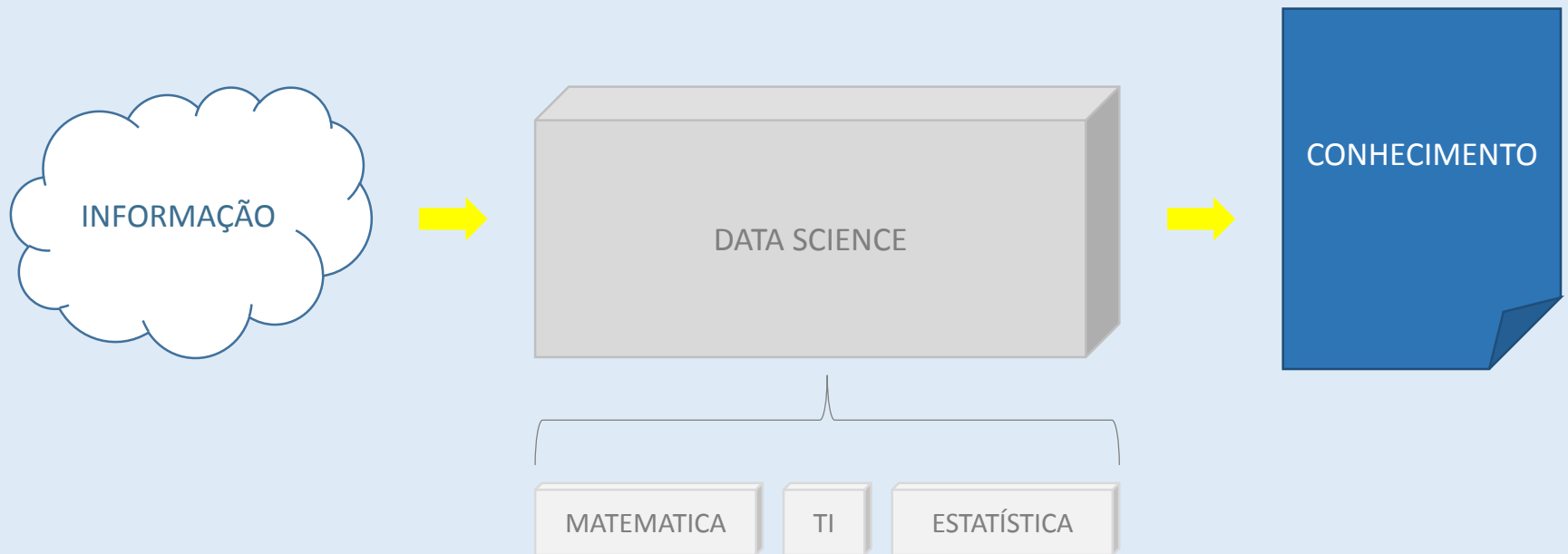
**PARA ENTENDER O JOGO
PRECISAMOS DE
MUITA
INFORMAÇÃO**

data

center educational physical statistics groups made areas metrics funding social across
career university one process budget environment methodology annual
annually roles studio engineering described breakthrough methods anticipate
faculty projects reproducibility see alternative open students use

per community include effort space nsf working also researchers collaborations focused area additional
group administrative seed section project scientists support office
education UW practices computing bridge three escience among incubator
staff director common people evaluation participants graduate activity assessed well
visiting collaboration aligned establish established campus online impact time including long-term environments
success fields year libraries training participate paths courses postdocs

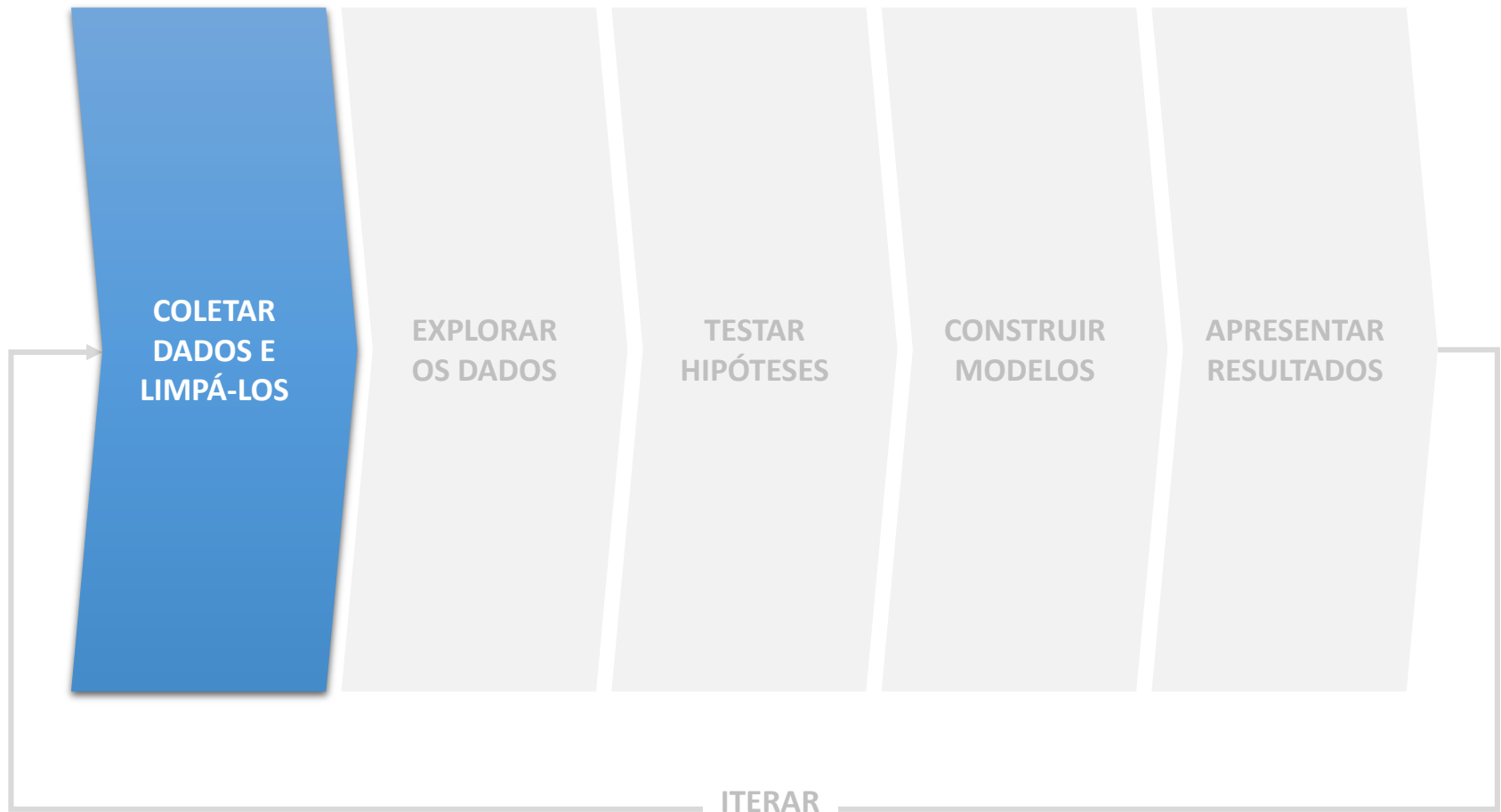
ScIENCE
domain
range
goal team activities professor many executive
program institute
development leaders
positions appendix methods proposal theme computer culture
universities initiative programs new work funded



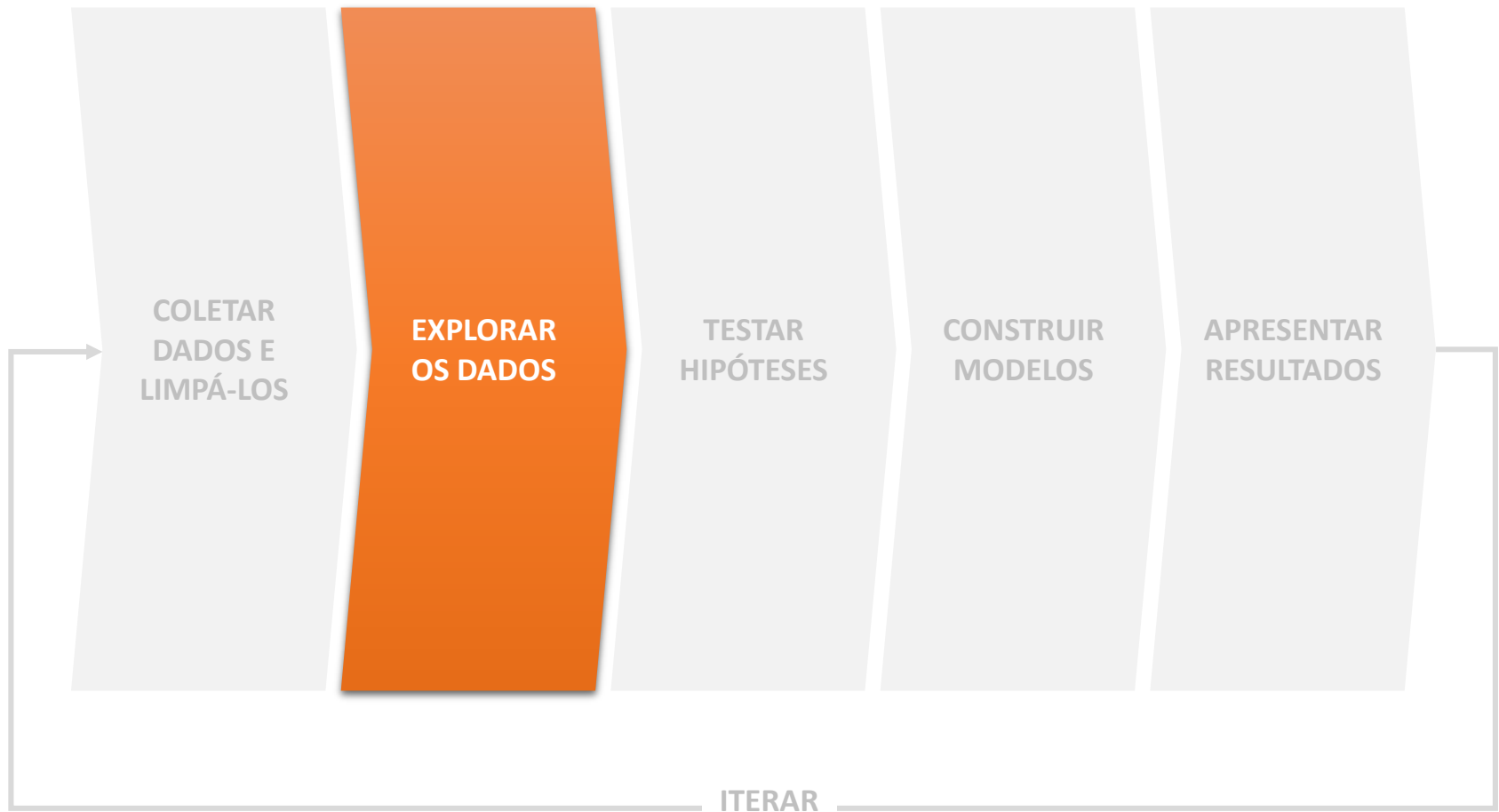
O Ciclo da Data Science



Obter informações do mundo real



Encontrar perguntas para responder

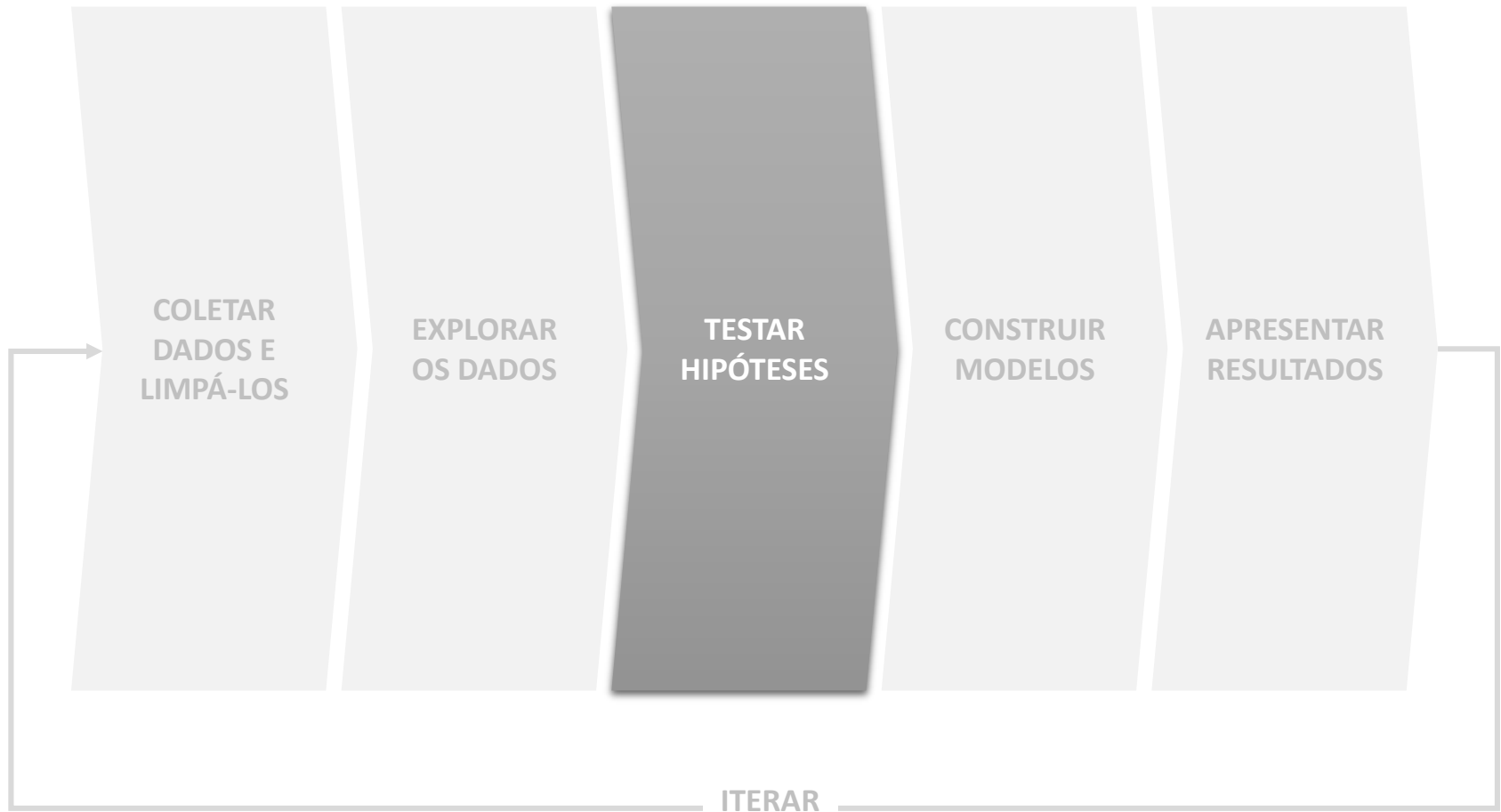


Testar as respostas das perguntas

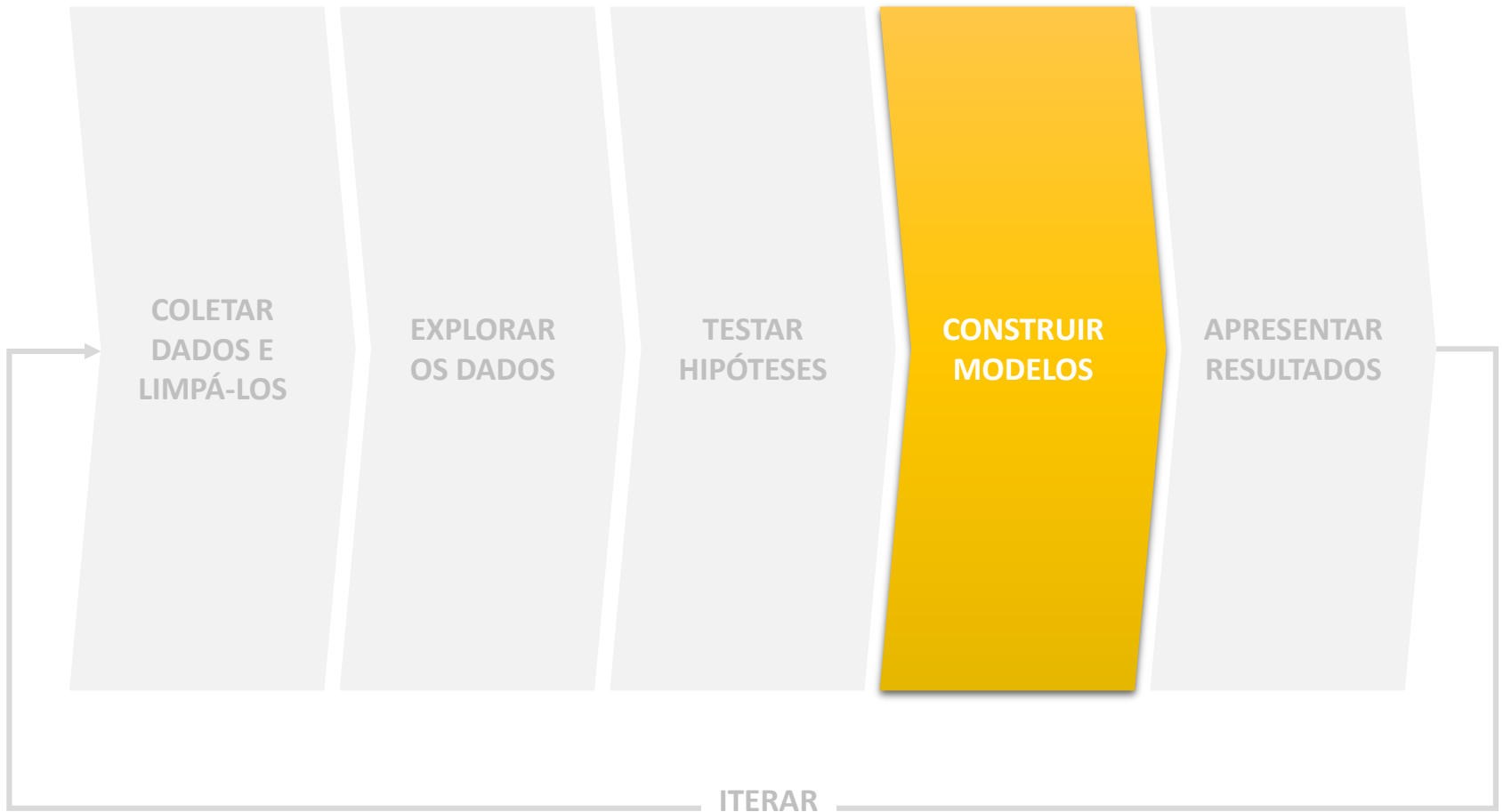


Testar as respostas das perguntas

A computação e a internet permitem trabalhar com mais informações



Preparar para reprodução



Criar produtos de dados

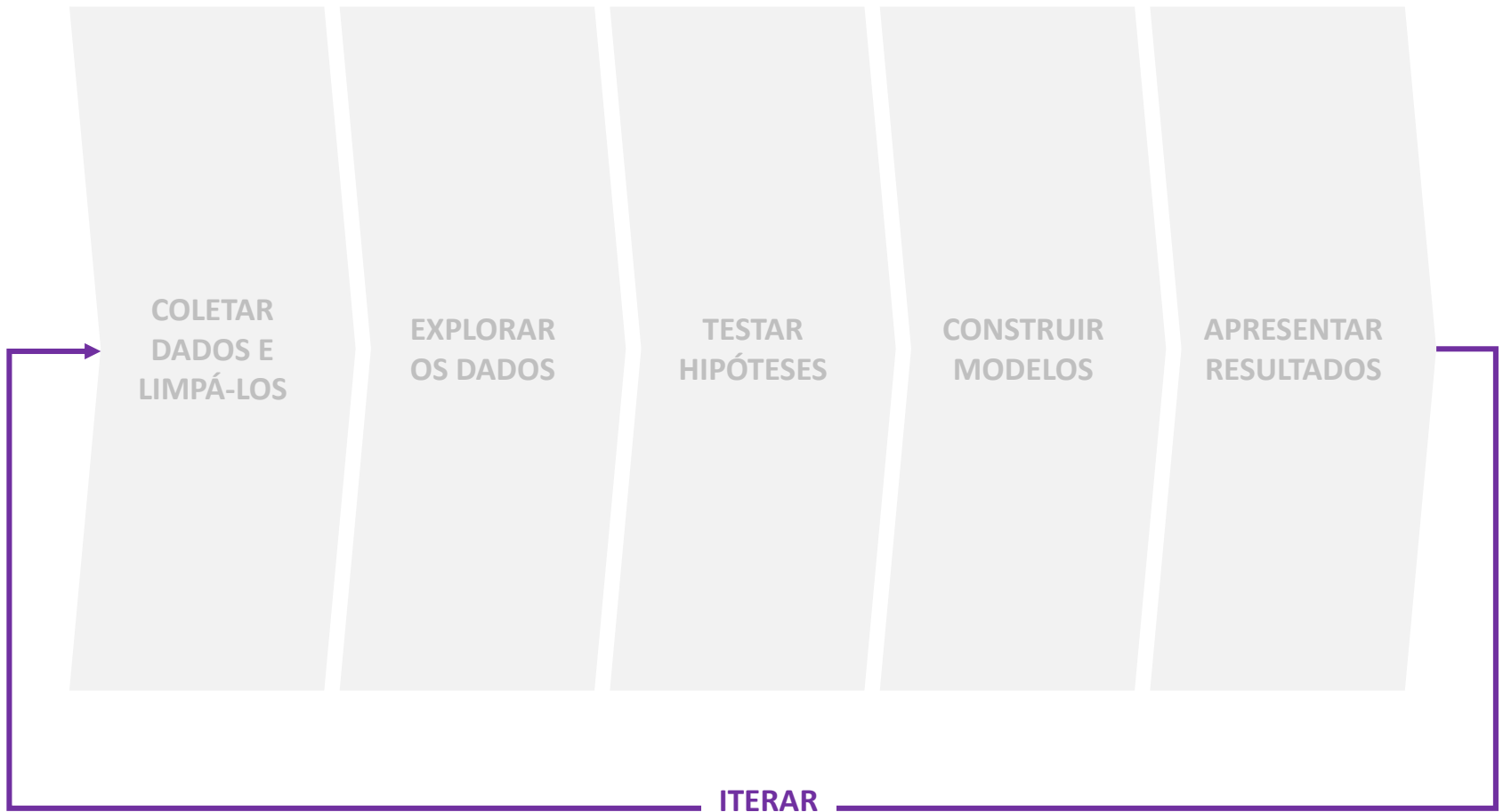


Criar produtos de dados

Transmitir o conhecimento de forma correta



Evoluir com o mundo real

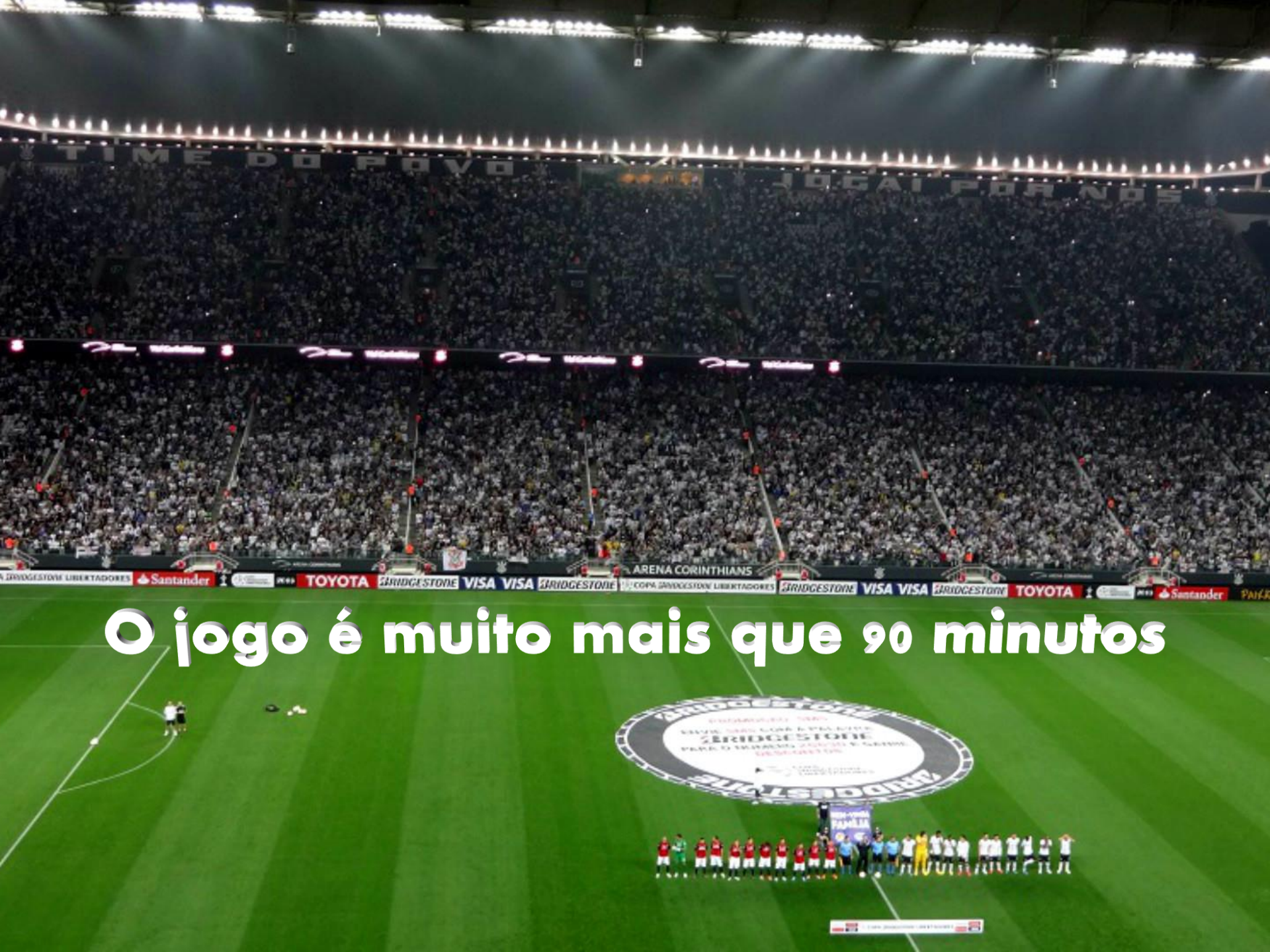


O Ciclo da Data Science



Data Science no Corinthians

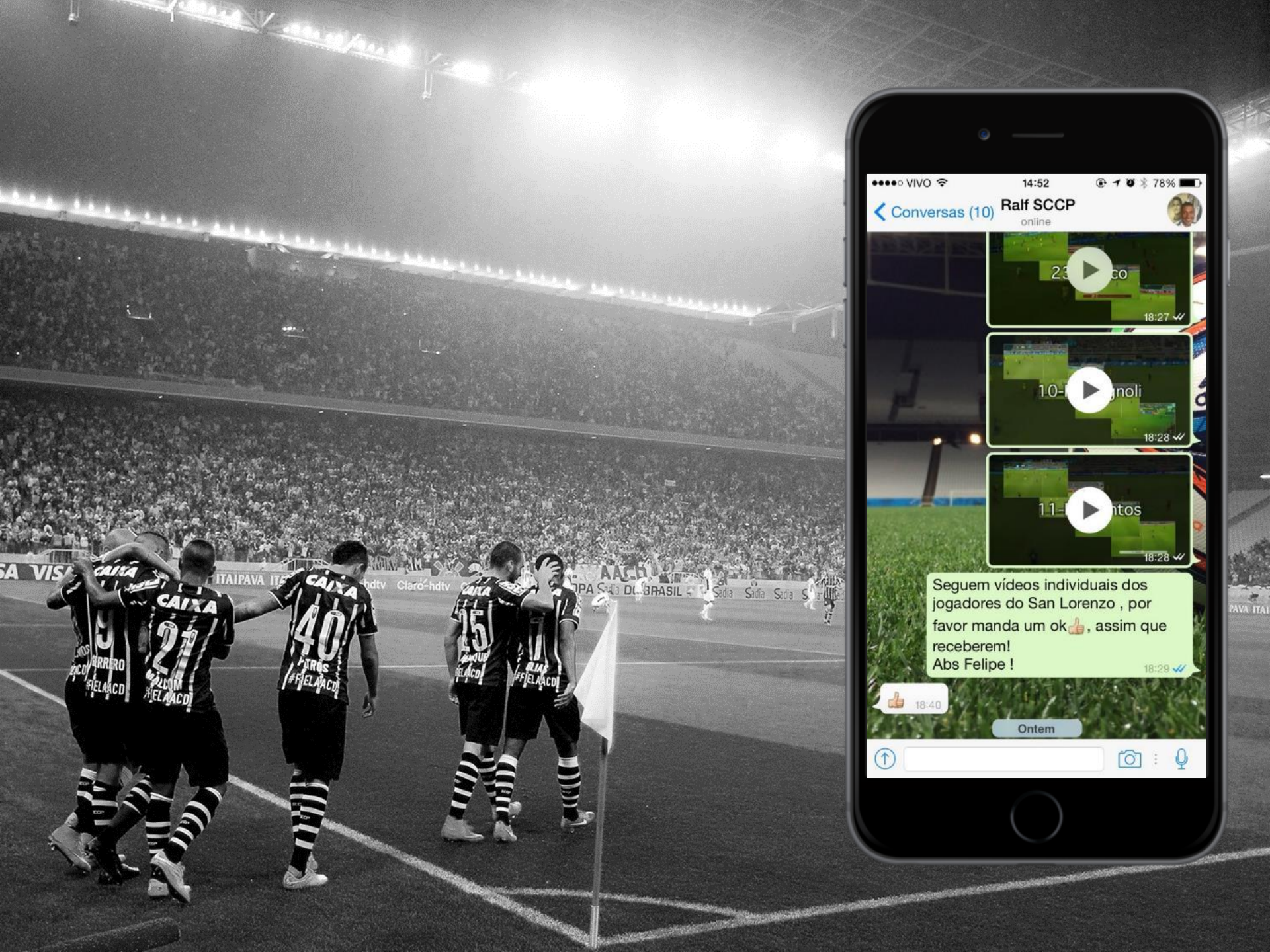




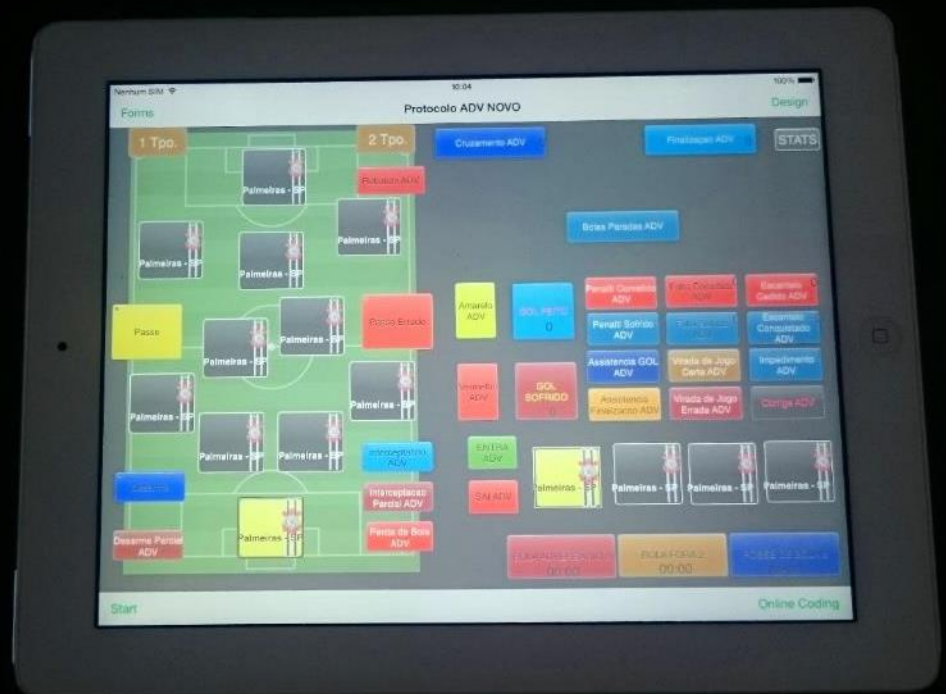
O jogo é muito mais que 90 minutos

Captura de Dados Pré Jogo





Captura de Dados Durante o Jogo



Apresentação: Durante o Jogo

	SCCP	0 — 0	San Lorenzo	
---	------	-------	-------------	---

5	Finalizações	0
2	Finalizações Certas	0
64.5%	% Posse de Bola	35.5%
195	Passes Certos	120
22	Perda da Bola	18
16	Desarmes	13
20	Interceptações	12
5	Cruzamentos	1
0	Escanteios	0
6	Faltas	11

Posse SCCP

1.9%	0.7%	3%
14.9%	12.4%	8.9%
6.9%	8.5%	7.8%
10.8%	15.5%	8.3%
0%	0.4%	0%

Posse ADV

1.2%	8.7%	2.7%
13%	9.8%	7.8%
11.2%	9.9%	8.5%
14.2%	3.4%	8.3%
1.4%	0%	0%

Finalizações SCCP

0	1	0	0	0
0	2	0	0	0
0	1	0	0	0

Finalizações Adv.

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0



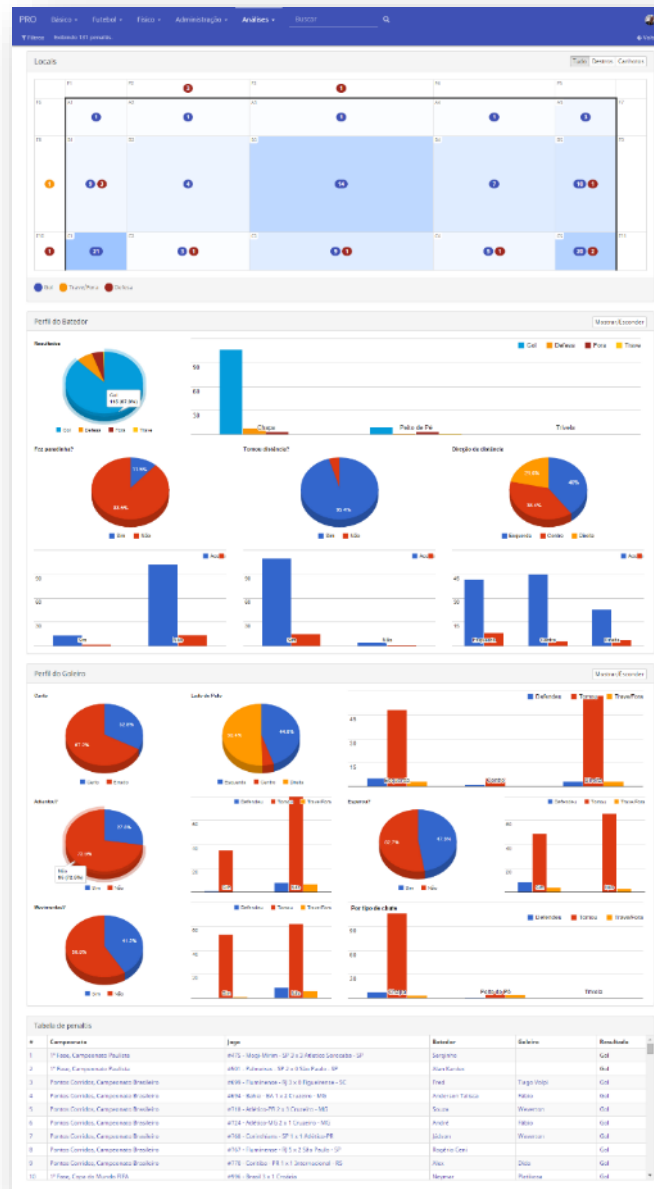
**Captura de Dados
Pós Jogo**

Apresentação: Antes e após o Jogo

Apresentação: Antes e após o Jogo



Apresentação: Antes e após o Jogo



The image displays three screenshots of the PES 2013 game interface, specifically the 'Local de Jogo' (Home Stadium) screen for three different teams. Each screenshot shows a green football pitch with player positions and names. The top navigation bar includes 'PRO', 'Banco', 'Transfer', 'Plano', 'Administração', 'Atalhos', and 'Sair'. The bottom right corner shows a 'Transfer' button.

- Local de Jogo (Lazio):** The first screenshot shows the Lazio team's home stadium. The pitch is green with white lines. Player names and numbers are visible on the pitch.
- Local de Jogo (Lazio da Assistência):** The second screenshot shows the Lazio da Assistência team's home stadium. The pitch is green with white lines. Player names and numbers are visible on the pitch.
- Local de Jogo (Lazio do Chute):** The third screenshot shows the Lazio do Chute team's home stadium. The pitch is green with white lines. Player names and numbers are visible on the pitch.

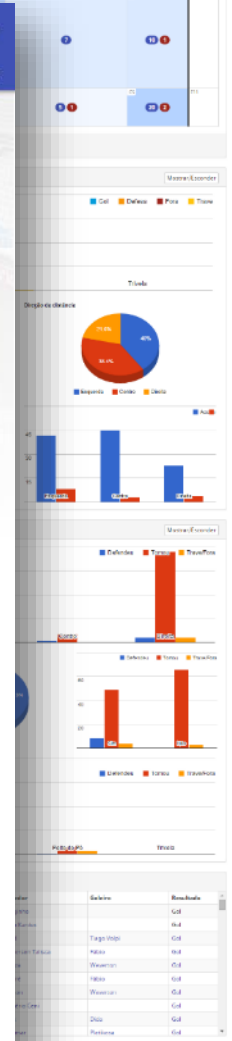
Visão geral Pré-jogo ▾ Atividades Pós-jogo ▾ Utilidades ▾

5ª rodada. Fase de Grupos do Copa Libertadores

5ª rodada. Fase de Grupos do Copa Libertadores

Jogo sem descrição

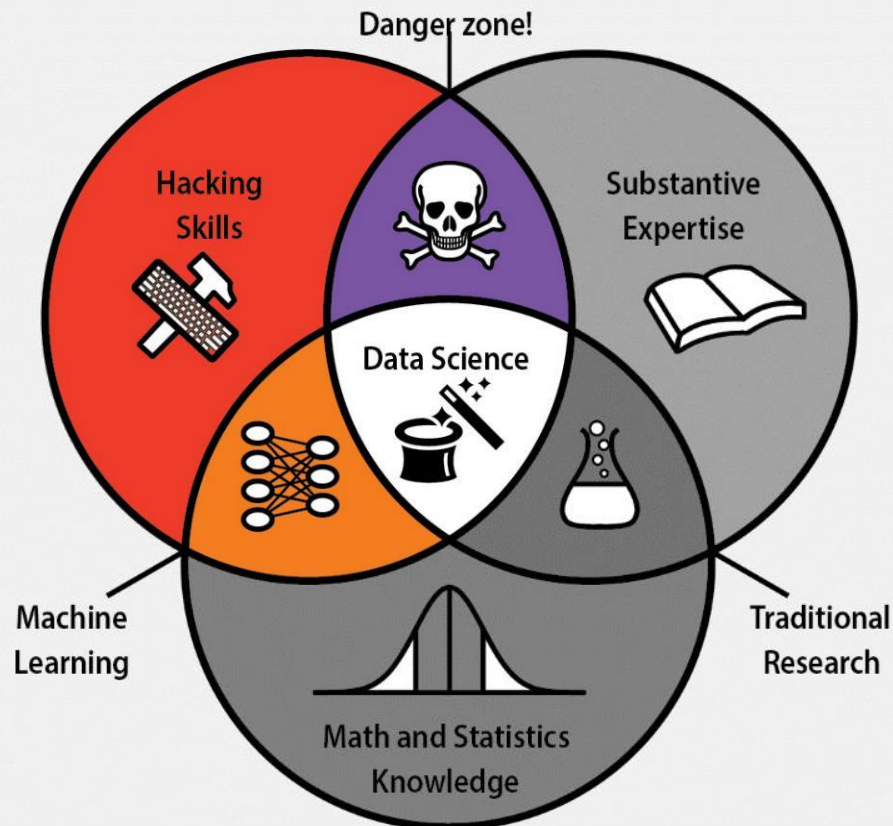
San Lorenzo		
12	GOL	Sebastián Torrico
21	LATE	Emanuel Más
7	LATD	Buffarini
3	ZAG	Yepes
6	ZAG	Matías Caruzzo 
20	VOL	Néstor Ortigoza
10	MEI	Romagnoli 
23	MEI	Sebastián Blanco  
5	MEI	Juan Ignacio Mercier
15	ATA	Villalba 
26	ATA	Mauro Matos
22	MEI	Alan Ruiz  
11	MEI	Pablo Barrientos 
28	MEI	Franco Mussis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





**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.

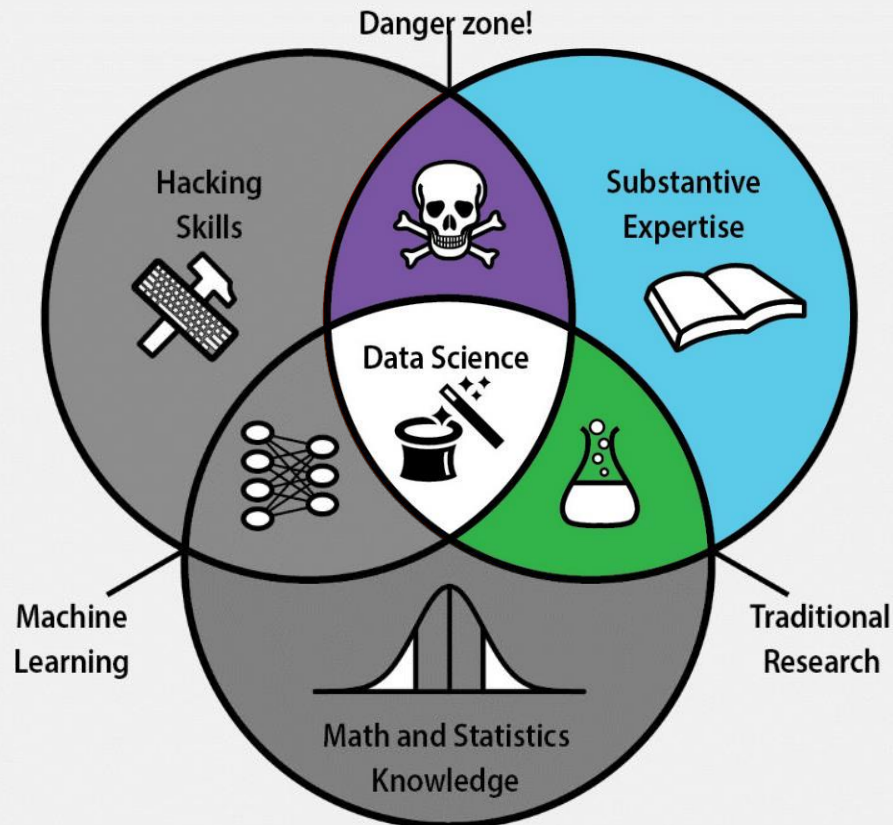


Machine learning stems from combining hacking skills with math and statistics knowledge, but does not require scientific motivation.



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

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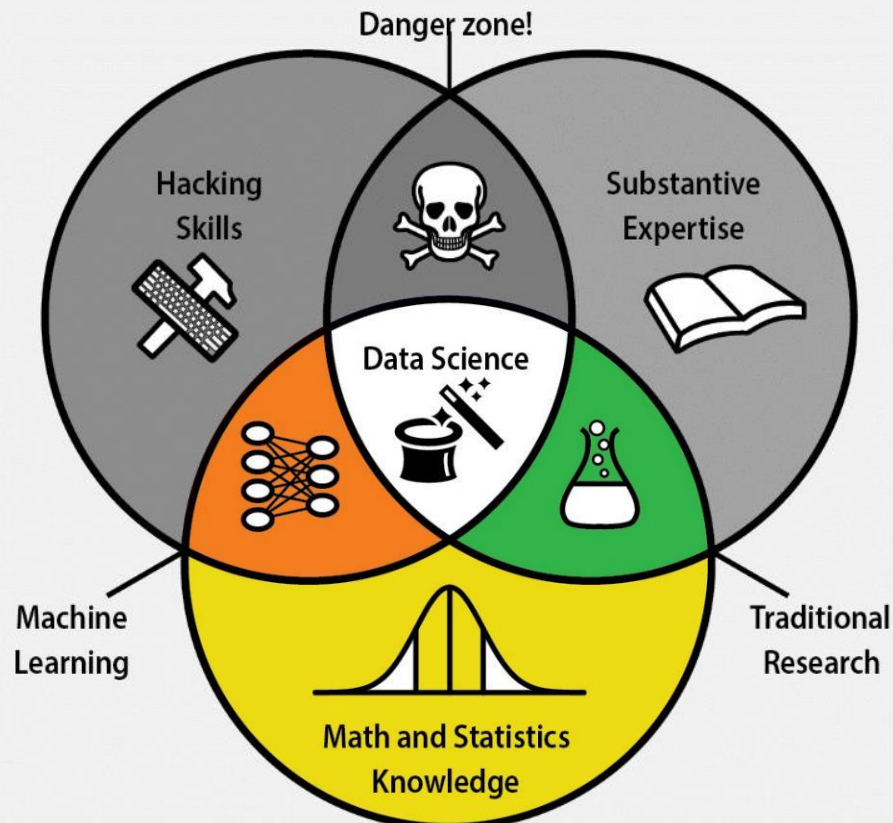


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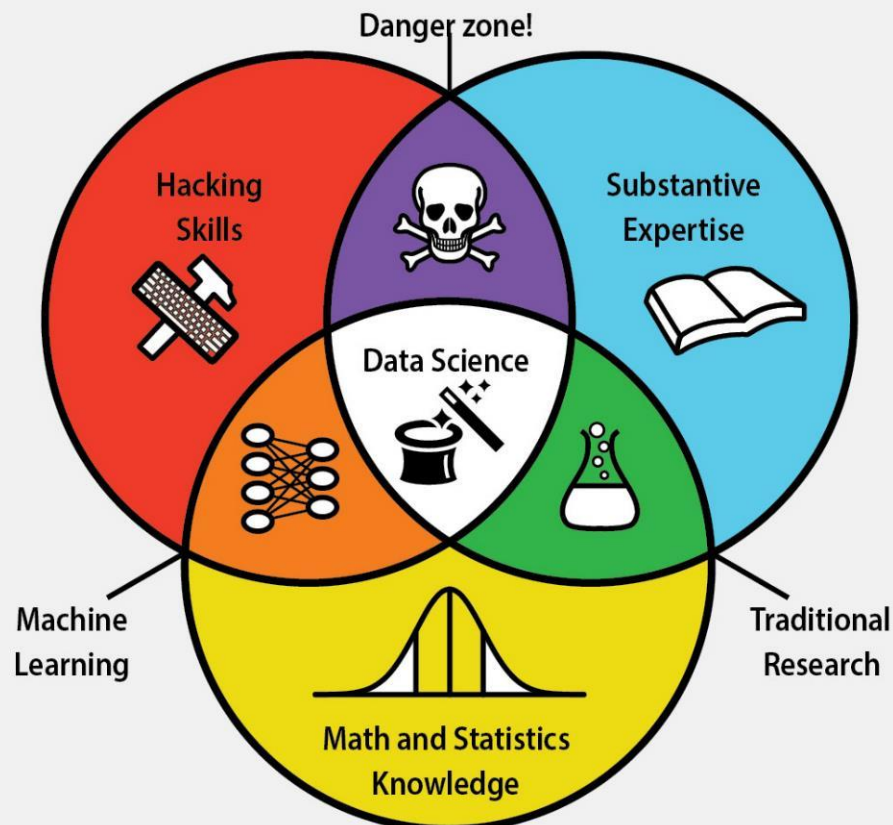


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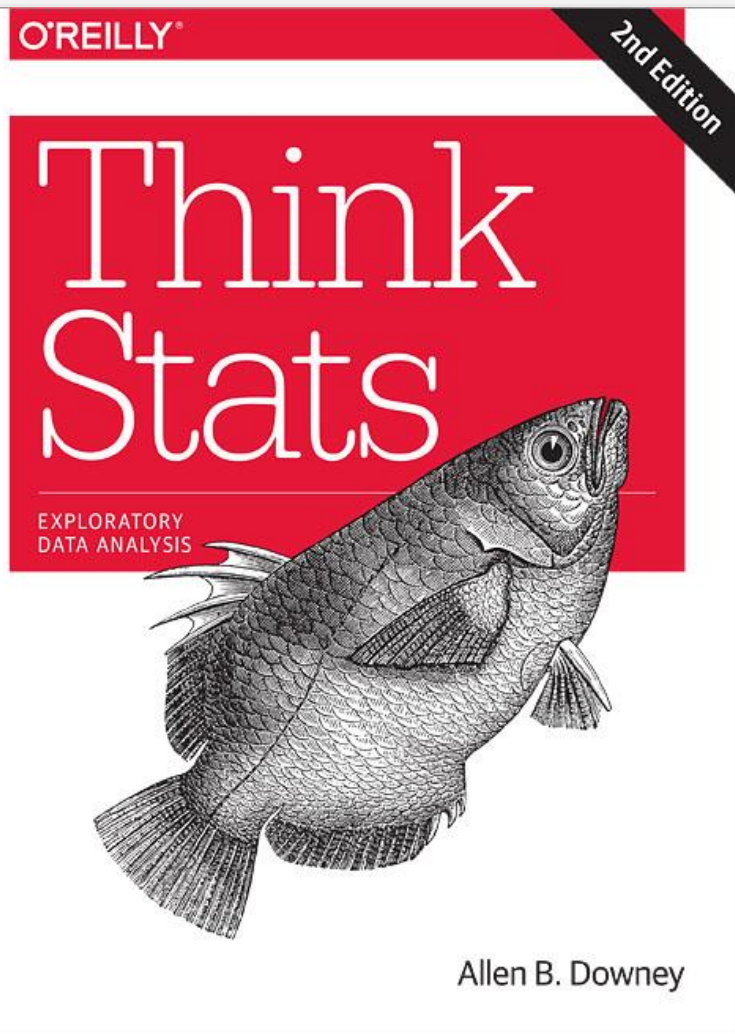
Danger zone! Hacking skills combined with substantive scientific expertise without rigorous methods can beget incorrect analyses.

Como aprender mais?



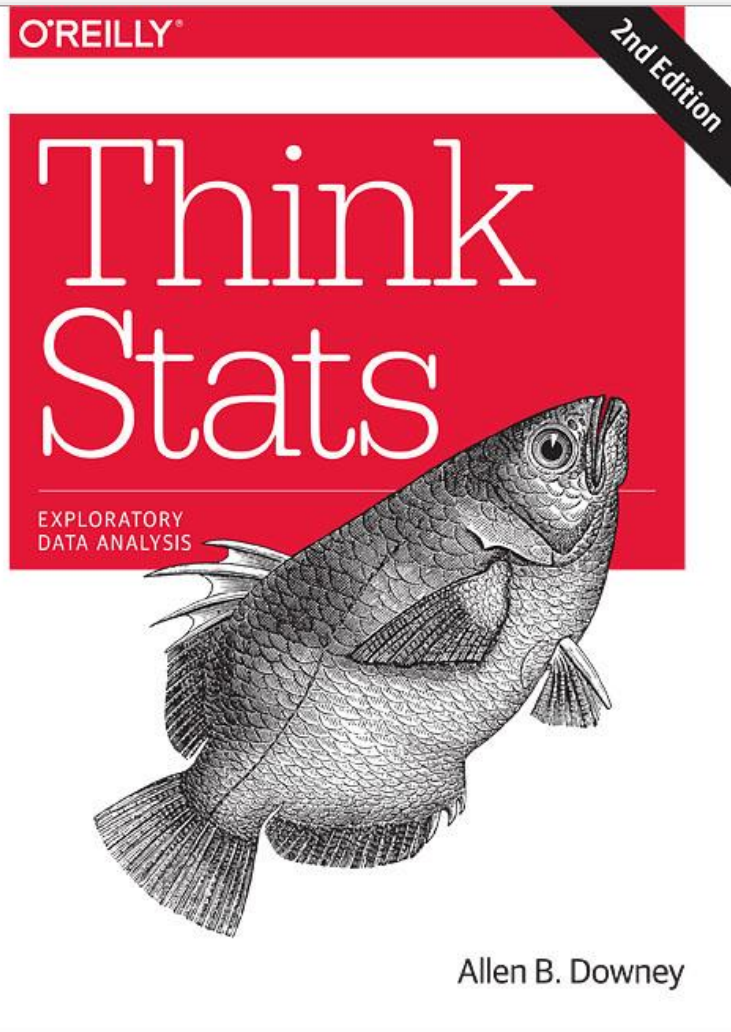
Estatística

Estatística



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

Estatística

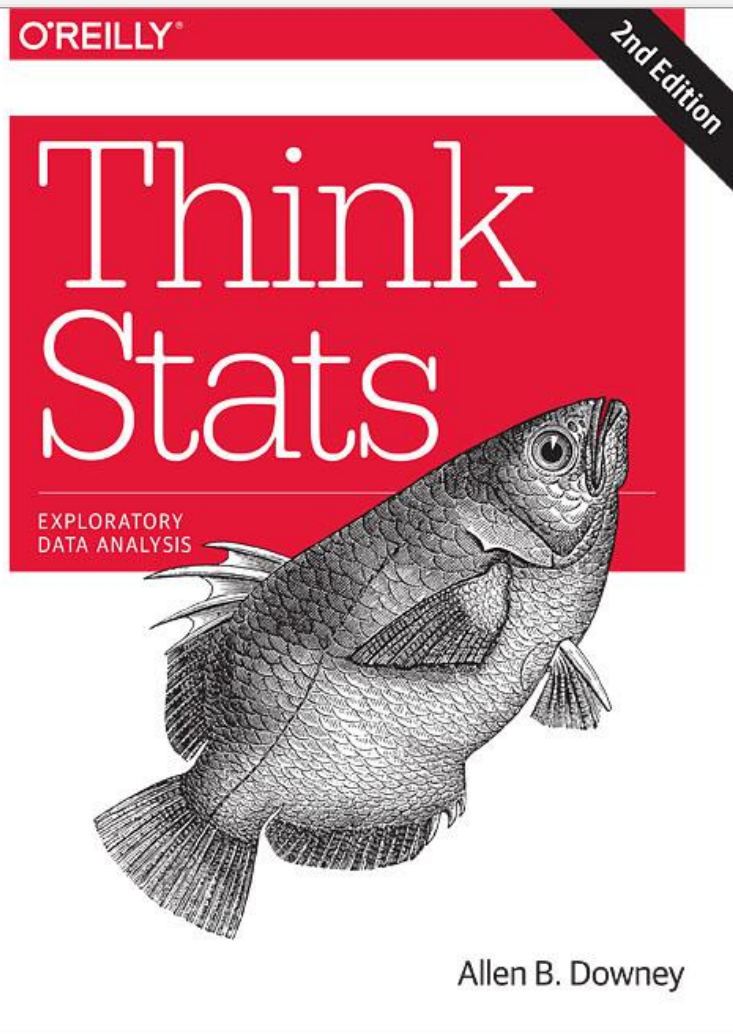


Statistics, Making sense of Data

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

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

Estatística



<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

Stanford
University

+ coursera

Machine Learning

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

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

Machine Learning

A Programmer's Guide to Data Mining



The Ancient Art of the Numerati

Ron Zacharski

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

Stanford
University

+ coursera

Machine Learning

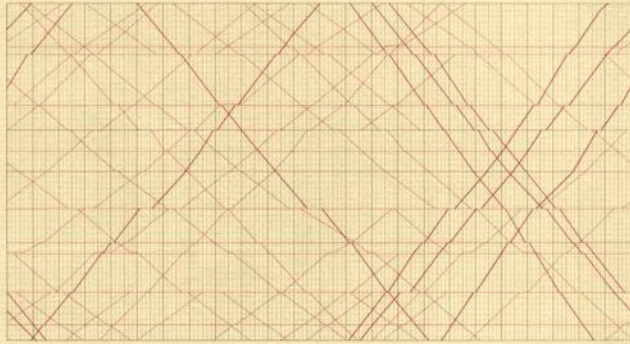
<http://j.mp/zerando-jogo-09>



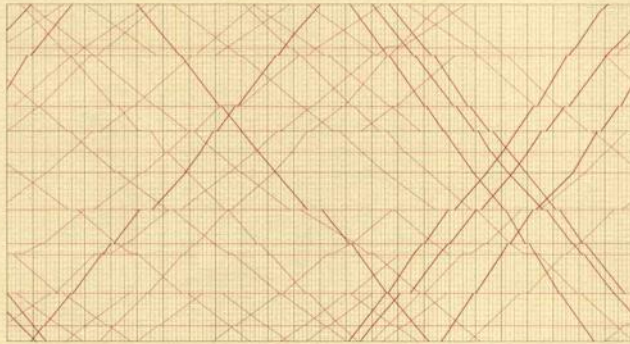
<http://j.mp/zerando-jogo-10>

Visualização

Visualização



Visualização



The Visual Display of Quantitative Information

EDWARD R. TUFTE



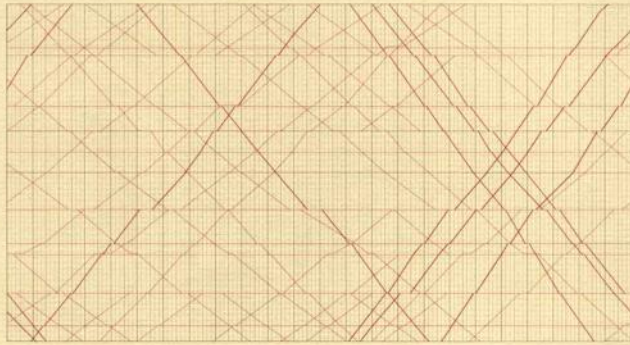
RICE[®]

Data Visualization (stat645)

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

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

Visualização



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



Data Visualization (stat645)

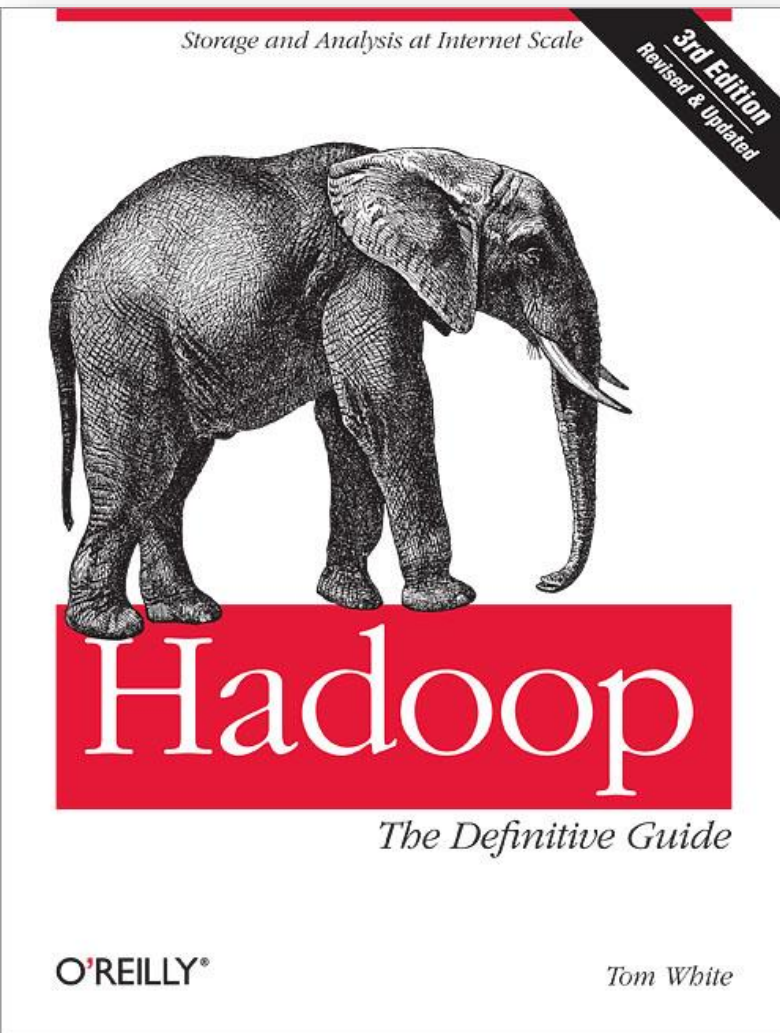
<http://j.mp/zerando-jogo-12>



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

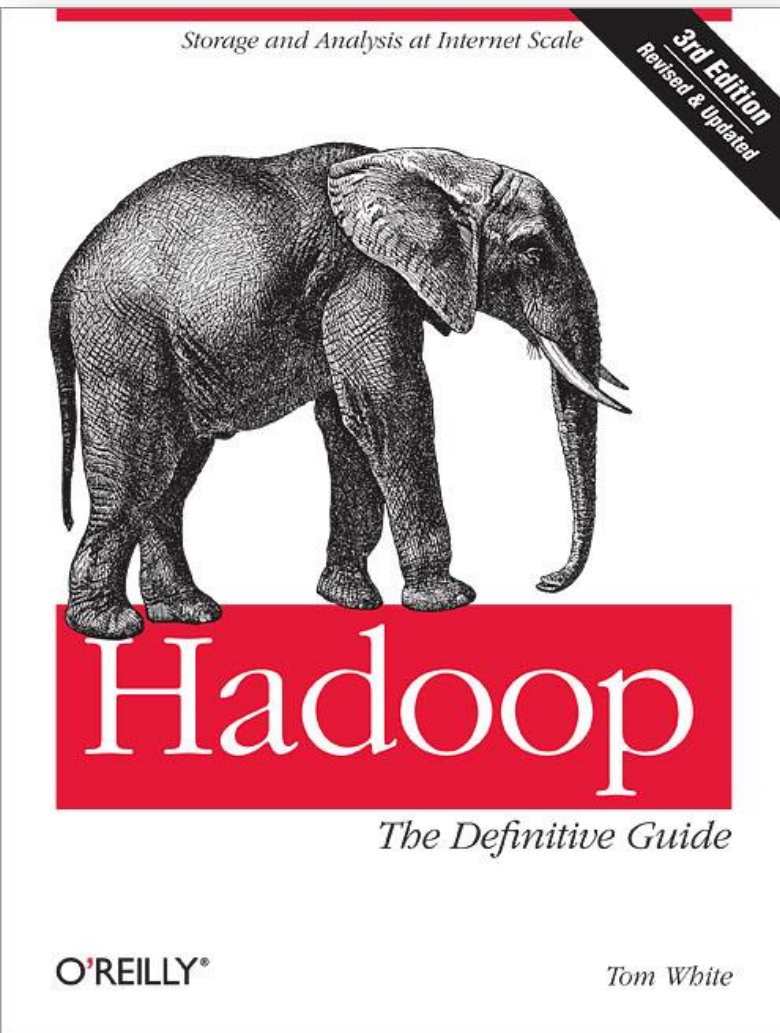
Computação em Escala

Computação em Escala



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

Computação em Escala

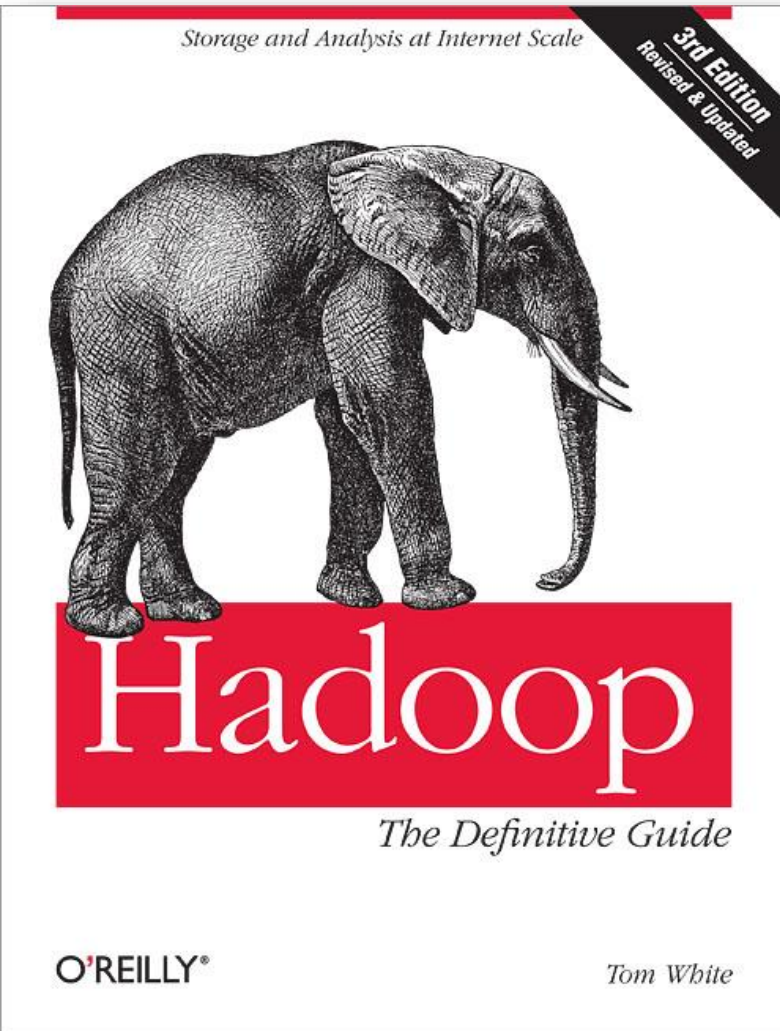


Web Intelligence and Big Data

<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?



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?**

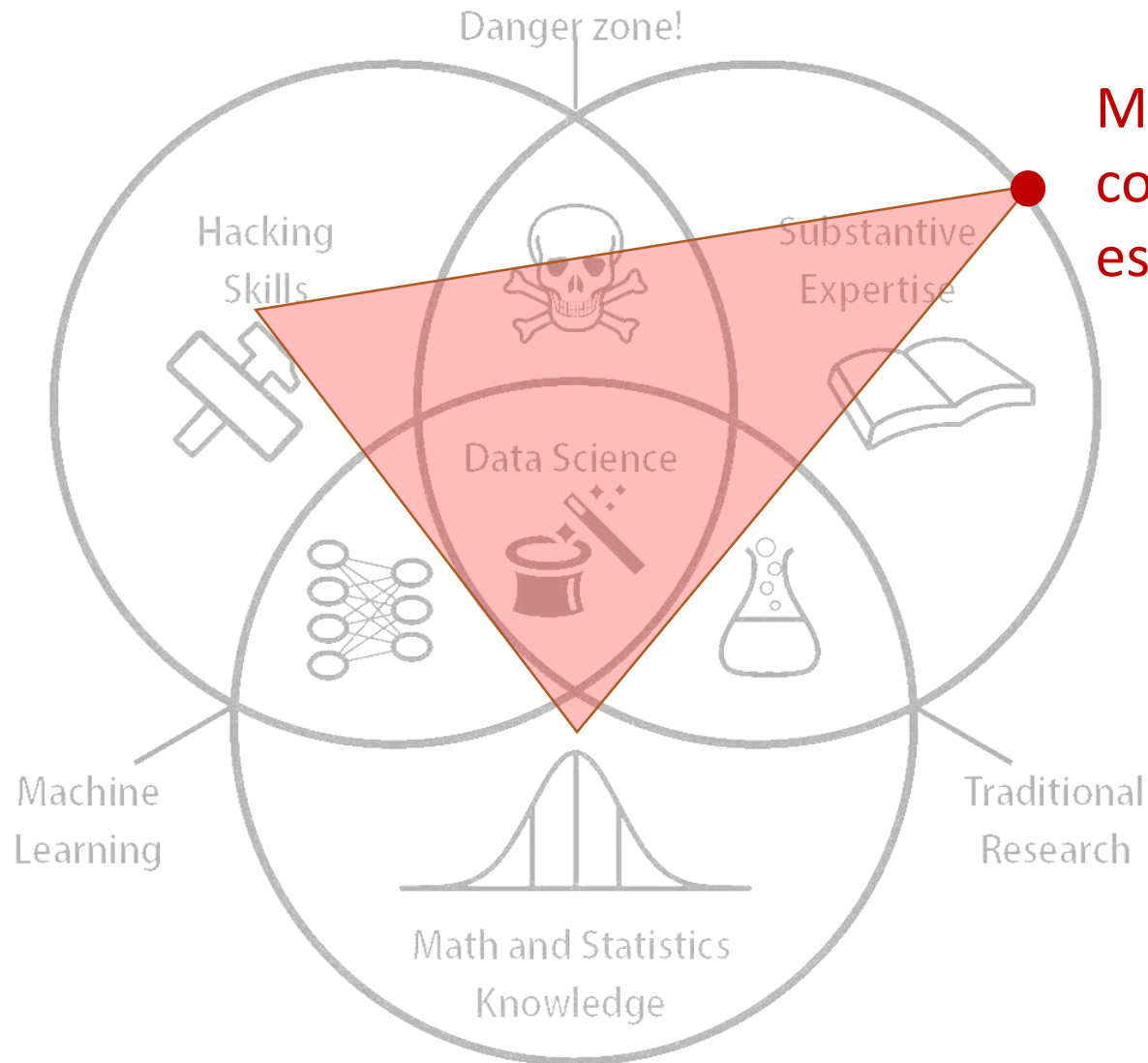
Complexidade do Futebol

A close-up, slightly low-angle shot of a young man, likely a soccer player, looking off to the side with a focused expression. He has short, dark hair and is wearing a red and white striped shirt. The background is a blurred green field, suggesting an outdoor sports setting.

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

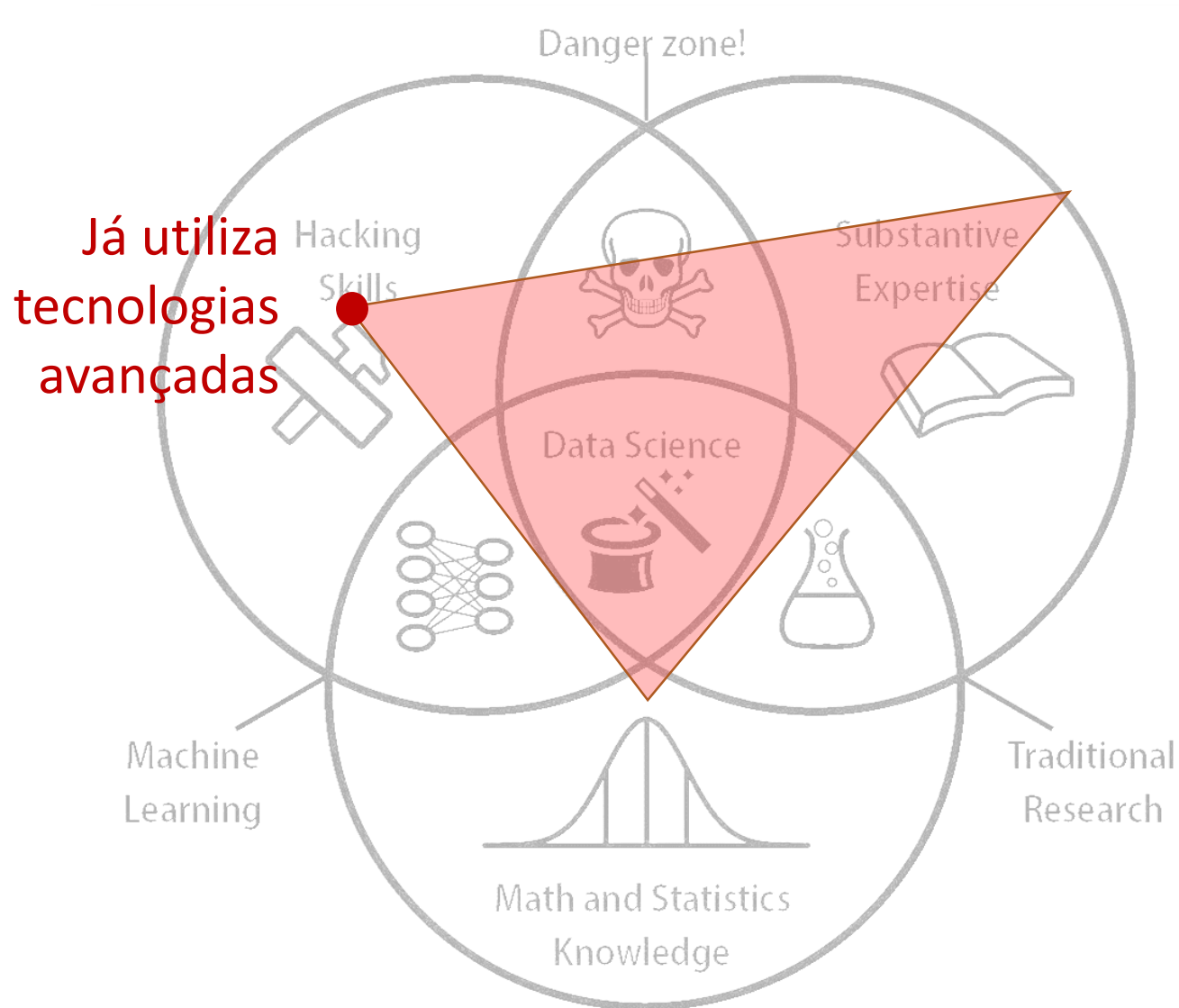
Mas futebol é isso que aconteceu, porque eu não sei o que aconteceu.

Data Science no Futebol Hoje

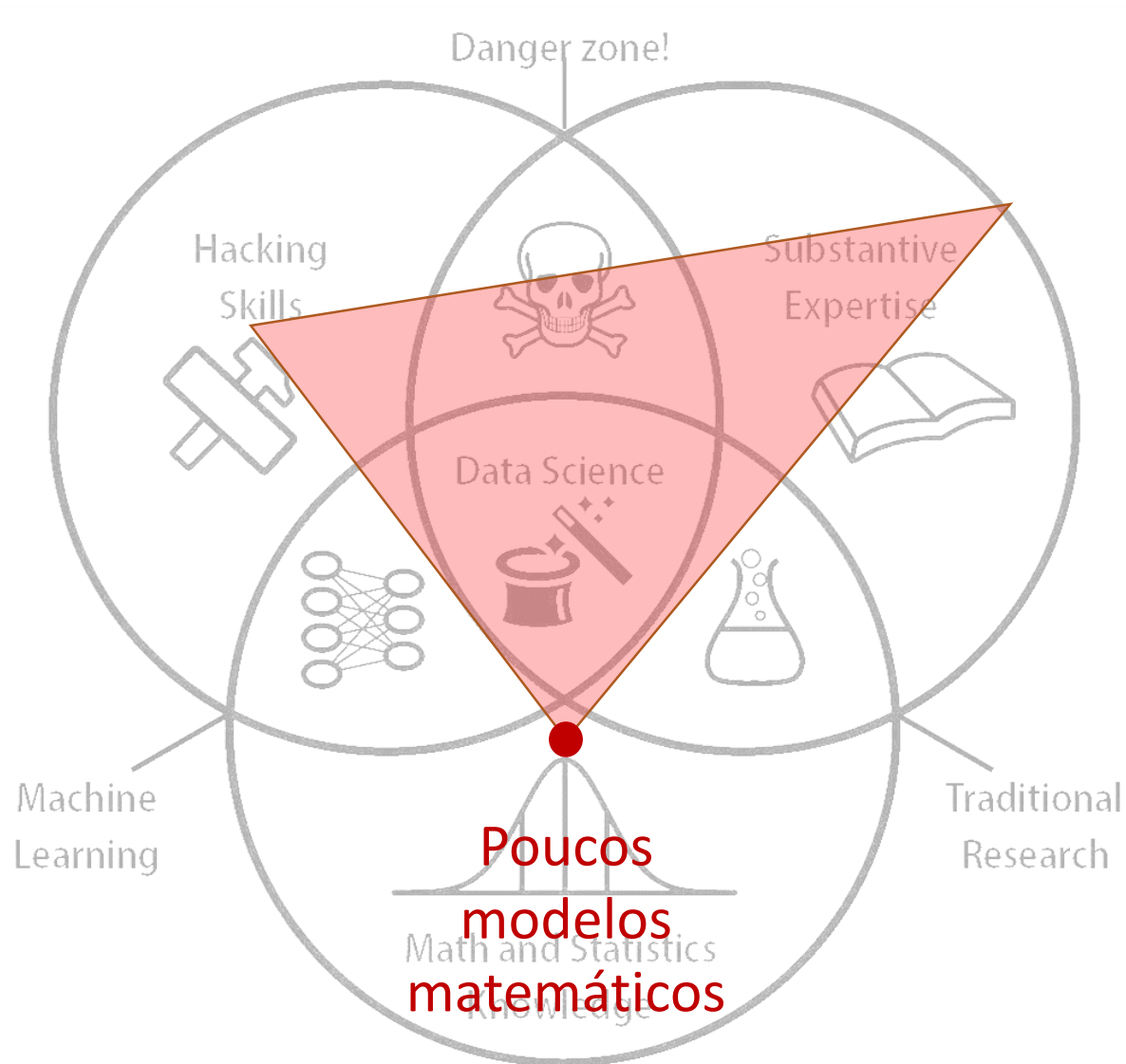


Muito
conhecimento
específico

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
facebook.com/folksilva
folksilva@gmail.com
folksilva.github.io



Perguntas?

twitter.com/folksilva
facebook.com/folksilva
folksilva@gmail.com
folksilva.github.io

Sobre a apresentação

