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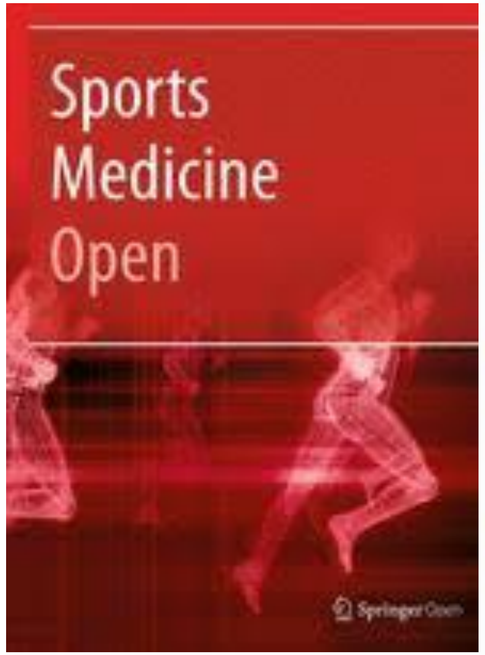
Bate-Bola: Utilização de Dados na Ciência do Esporte

Adriano Machado, João Claudino e Daniel Capanema



Systematic Review | Open Access | Published: 03 July 2019

Current Approaches to the Use of Artificial Intelligence for Injury Risk Assessment and Performance Prediction in Team Sports: a Systematic Review

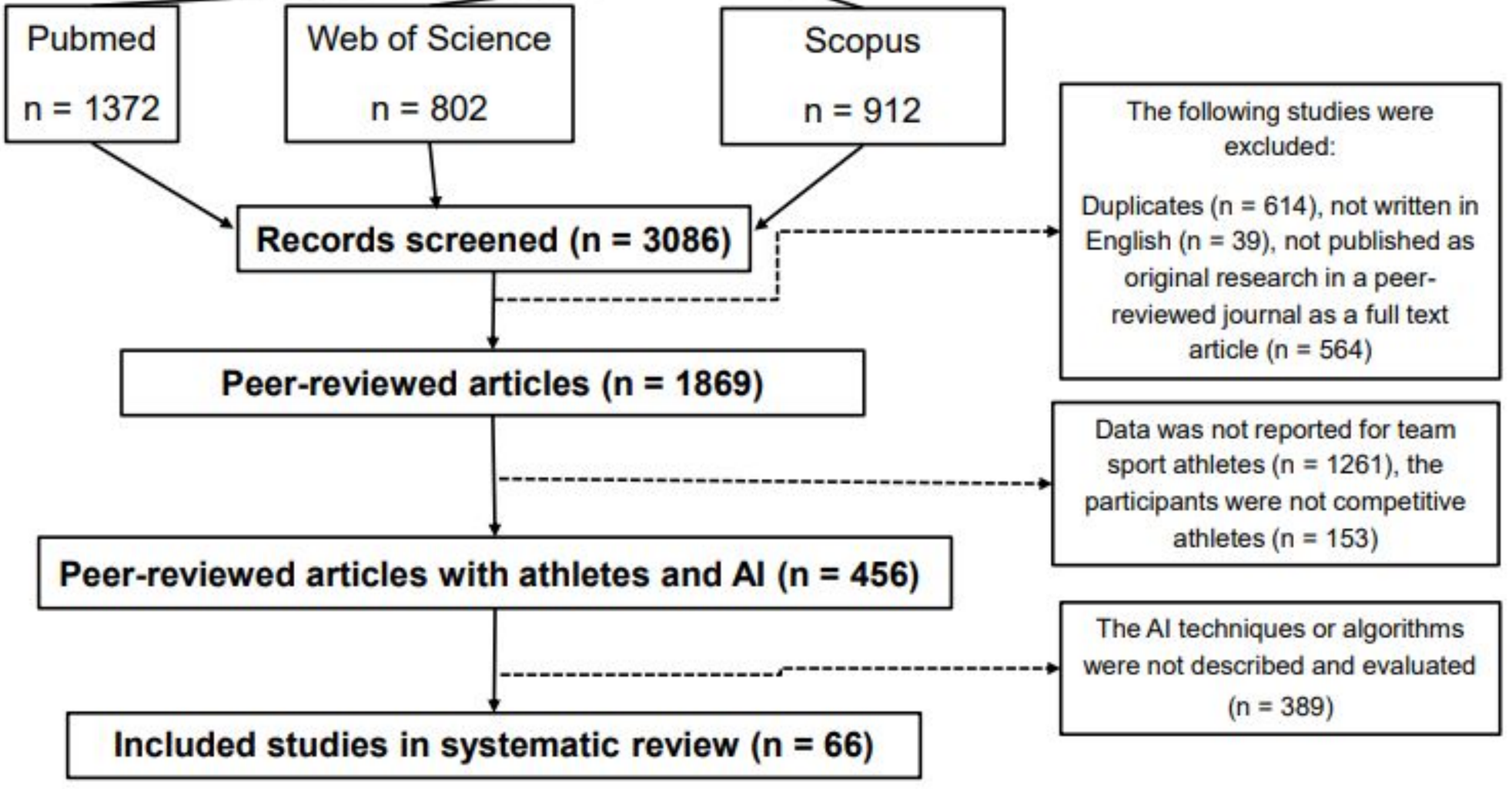
João Gustavo Claudino, Daniel de Oliveira Capanema, Thiago Vieira de Souza, Julio Cerca Serrão, Adriano C. Machado Pereira & George P. Nassis

Sports Medicine - Open **5**, Article number: 28 (2019) | Cite this article

31k Accesses | **82** Citations | **91** Altmetric | Metrics

OBJETIVO: **identificar quais abordagens de IA** foram aplicadas para investigar o **desempenho esportivo** e o **risco de lesão** e descobrir quais técnicas de **IA** cada **esporte (coletivo)** tem usado.

("machine learning" OR "predictive modelling" OR "injury prediction" OR "learning algorithms" OR "data mining" OR "naïve bayes" OR "logistic regression" OR "random forest" OR "support vector machine" OR "neural network" OR "deep learning" OR "artificial intelligence" OR "extreme learning machines" OR "data science" OR "knowledge discovery" OR "injury forecasting" OR "injury detection" OR "decision trees" OR "business intelligence") AND ("team sport" OR "team sports" OR "sport" OR "sports" OR "individual sports" OR "individual sport" OR "athlete" OR "athletes") AND ("monitoring" OR "load" OR "training load" OR "controlling" OR "control" OR "load control" OR "regulating" OR "regulation" OR "managing" OR "management" OR "improvement" OR "improve" OR "optimizing" OR "optimize" OR "enhance" OR "enhancement" OR "performance" OR "reduce" OR "reducing" OR "decrease" OR "decreasing" OR "injury risk" OR "injury prevention")




Egypt
Germany
Spain
UnitedArabEmirate
NewZealand
Cuba
Netherlands
Australia
Belgium
Malaysia
Taiwan
Turkey
Italy
China
Norway
Nigeria
SouthAfrica
ShouthKorea
Slovenia
USA
Canada
UK
Sweden
Austria

Soccer (7) American Football (2) Australian Football (2) Basketball (2)
Handball (2) Baseball (1) Beach Volleyball (1) Rugby (1) Volleyball (1)

SPORTING PERFORMANCE

Basketball (11) Soccer (8) Volleyball (5) Baseball (4) Handball (4) Australian Football (3)
Ice Hockey (3) American Football (2) Cricket (1) Field Hockey (1) Rugby (1)

Artificial intelligence approaches applied in individual sports: a systematic review

Daniel Capanema[a] danielcapanema1@gmail.com, João Claudino[b,c,d] claudinojg@ufpi.edu.br, Vitor Principe[e] vitorprin@gmail.com, Thiago Souza[d] thiagovcomp@gmail.com, Gutenberg Dias[f] gutenberg@treinus.com.br, Igor Cruz igor.freitas.cruz@icloud.com, Raphael Silva[f] raphael.augusto@treinus.com.br, Rodrigo Gianoni[d] gianoniassessoria@gmail.com, Julio Serrão[b] jcserrao@usp.br, Elizabeth Wanner[a] efwanner@cefetmg.br, George P. Nassis[g,h] georgenassis@gmail.com, Adriano C. M. Pereira[a,i] adrianoc@dcc.ufmg.br

(Under Review)

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Expert Systems with Applications

An International Journal

Editor-in-Chief
Binshan Lin

3086 SCREENED STUDIES

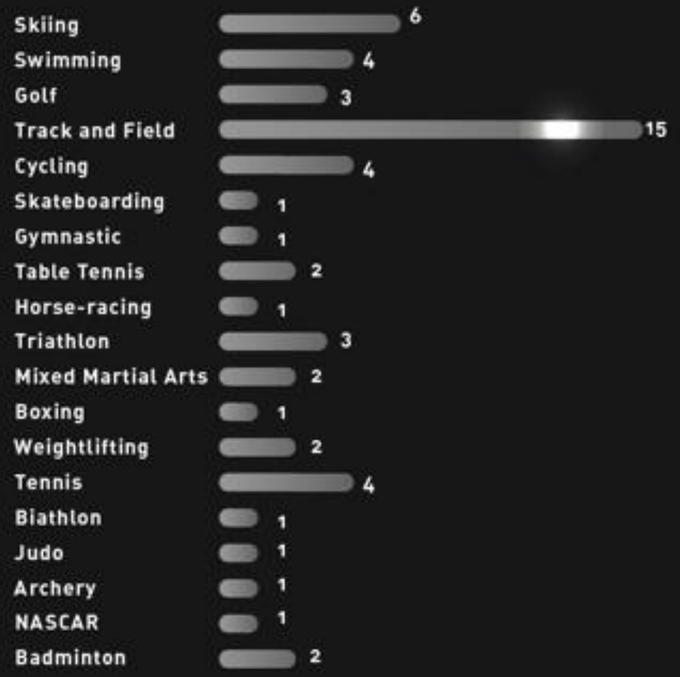
52 INCLUDED STUDIES

113.031 PARTICIPANTS

96% MALE

4% FEMALE

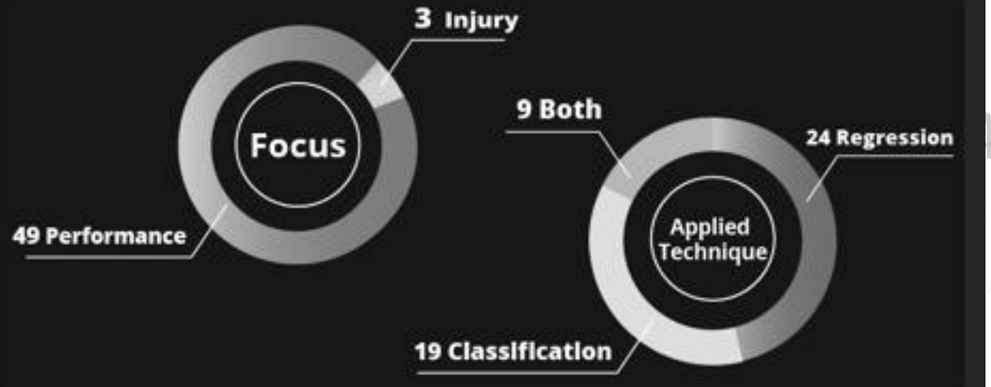
SPORTS

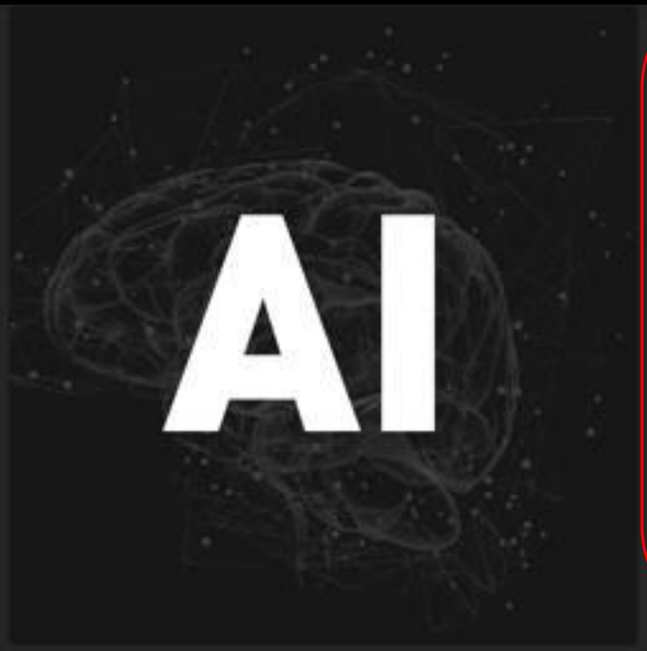


IMPLEMENTATION

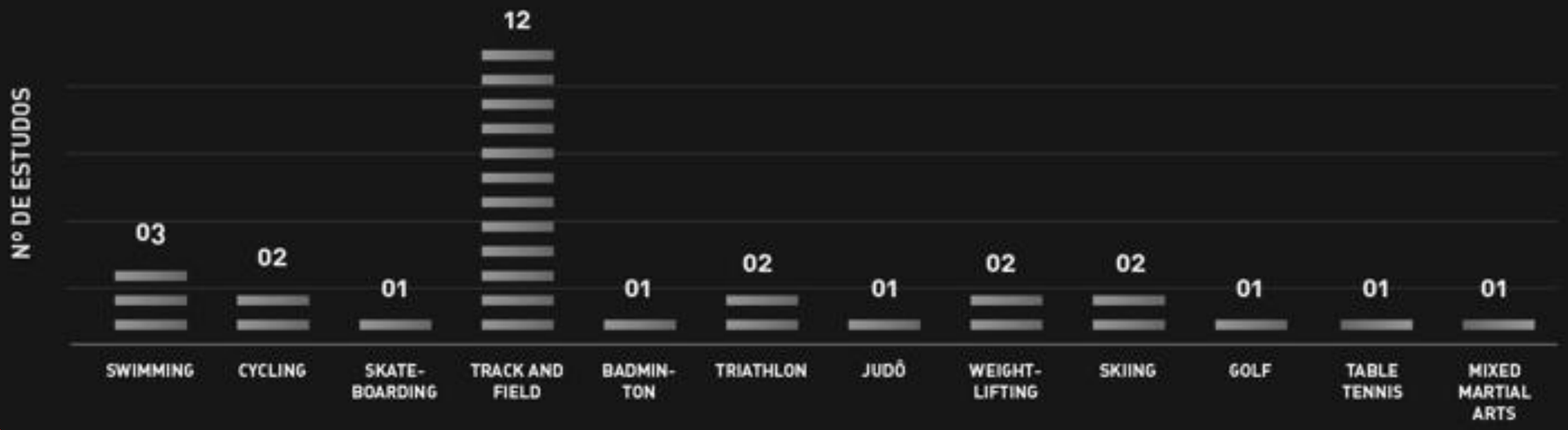
ATHLETES CATEGORY

MODEL EVALUATION METRICS





ANN

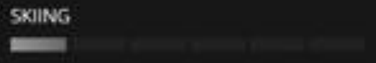


DECISION TREE

LASSO

SVM

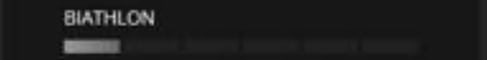
MARKOV CHAIN



K-MEANS

KNN

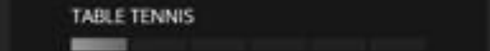
TREE BASED BOOSTING MODEL



LOCALLY WEIGHTED PROJECTION REGRESSION

BAYESIAN NETWORKS

FUZZY TRANSFORMATION



MULTI-STAGE MODEL-BASED CLUSTERING

WOCC

COMPUTER & SPORT SCIENCE CONFERENCES AROUND THE WORLD

COMPUTER & SPORT SCIENCE CONFERENCES AROUND THE WORLD

Asia-Pacific Sports Analytics Conference
Melbourne, Australia

Australia & New Zealand Sports Analytics Conference
Melbourne, Australia

Basketball Analytics Summit
Durham, United States

Business in Sport Summit
Austin, United States

Carnegie Mellon Sports Analytics Conference
Pittsburgh, United States

Carolina Sports Analytics Meeting (CSAM), Furman University
Greenville, United States

Cascadia Symposium on Statistics in Sports (CASSIS)
Vancouver, Canada

Columbus Blue Jackets Hockey Analytics Conference
Columbus, United States

eSports Business Innovation Summit
San Francisco, United States

EURO 2019
Dublin, Republic of Ireland

European College of Sport Science Annual Congress
Cologne, Germany

Fall 2018 Business Analytics Forum
Knoxville, United States

FAME 2022 - Symposium on Football Analytics, Modeling and Experience
Belo Horizonte, Brazil

Fields Sports Analytics Conference
Toronto, Canada

Great Lakes Analytics Conference Stevens Point
Stevens Point, United States

International Conference on Computer Science in Sport and Exercise
Istanbul, Turkey

International Conference on Information Technology and Contemporary Sports, Guangzhou, China

Mathematics and Computers in Sport
Melbourne, Australia

MathSport International
Reading, England

Mathsport International 2019 Conference
Athens, Greece

Midwest Sports Analytics Meeting (MSAM)
Pella, United States

MIT Sloan Sports Analytics Conference
Boston, United States

New England Symposium on Statistics in Sports
Cambridge, United States

OptaPro Forum
London, England

Ottawa Hockey Analytics Conference
Ottawa, Canada

Penn State Sports Analytics Conference
State College, United States

RIT Sports Analytics Conference (RITSAC)
Rochester, United States

Rochester Institute of Technology Sports Analytics Conference
Rochester, United States

Rocky Mountain Symposium on Analytics in Sports (RMSAS)
Denver, United States

Sabermetrics, Scouting & the Science of Baseball
Boston, United States

SABR Virtual Analytics Conference
Phoenix, United States

Seattle Hockey Analytics Conference
Seattle, United States

Sports Analytics Africa
Johannesburg, South Africa

Sport Data & Performance Forum
Budapest, Hungary

Sports Analytics Innovation Summit
London, England

Sports Innovation Conference
Madrid, Spain

Sports, Medicine and Health Summit
Hamburg, Germany

Stanford Sports Innovation Conference
Palo Alto, United States

StatsBomb Innovation in Football Conference
London, England

U.S. Soccer Hackathon
Chicago, United States

UConn Sports Analytics Symposium
Storrs, United States

UK Sports Analytics Conference
London, England

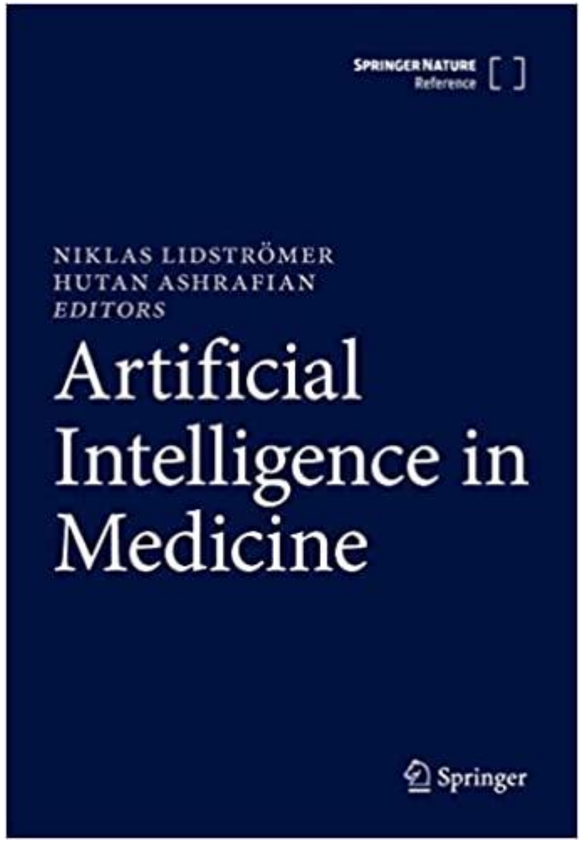
US Sports Technology Conference
Dallas, United States

Vancouver Hockey Analytics Conference
Vancouver, Canada

Wharton Moneyball Academy
Philadelphia, United States

Workshop on ML and DM for Sports Analytics
Dublin, Republic of Ireland

World Congress of Performance Analysis of Sport & International Symposium on Computer Science in Sport
Vienna, Austria

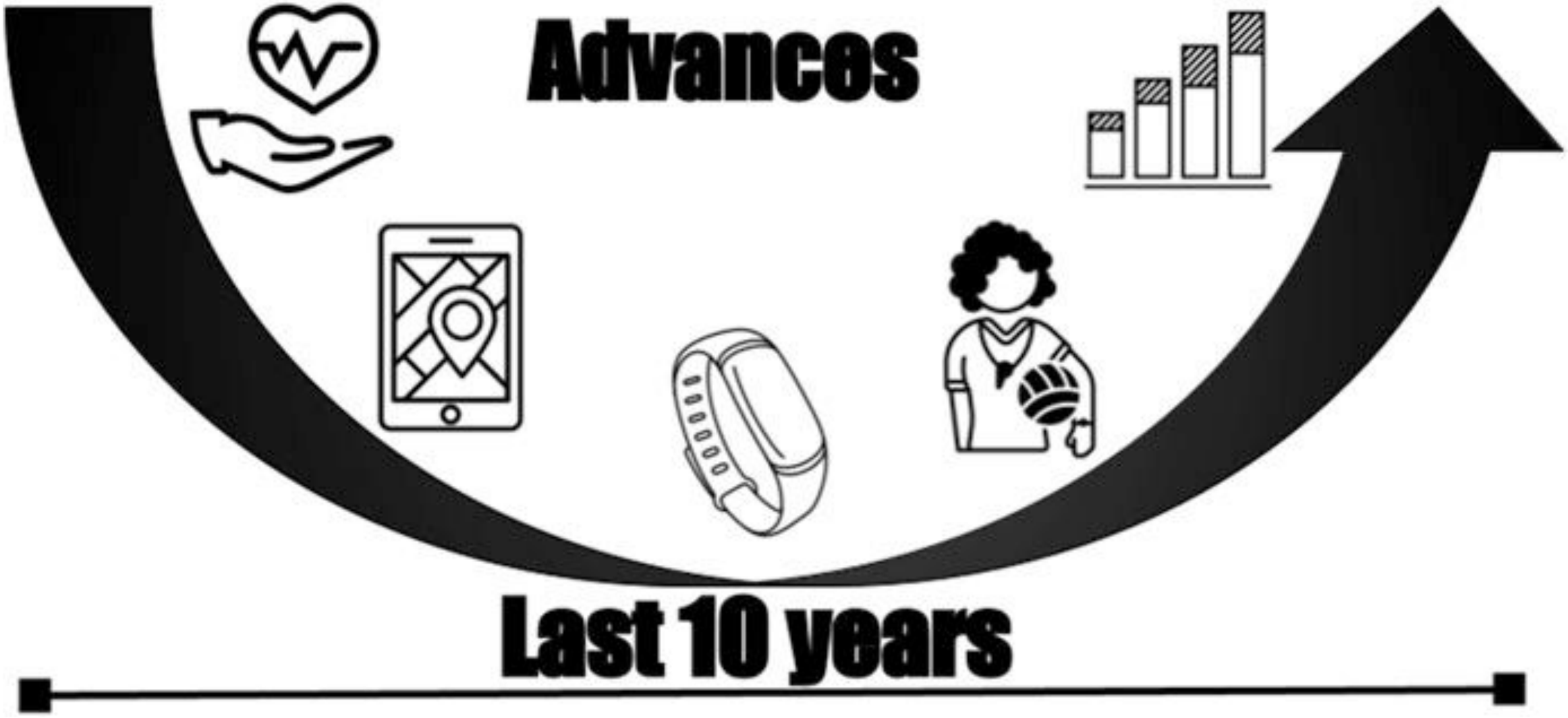


AIM in Sports Medicine

João Gustavo Claudino, Daniel de Oliveira Capanema, and Paulo Roberto Pereira Santiago

Contents

OBJETIVO: apresentar o **estado da arte** sobre o uso da **Inteligência Artificial** na **Medicina de Esporte**.


Advances
Last 10 years


recovery
training
routine
zzz
Monitoring
24/7

applied sciences

MDPI

Systematic Review

The Role of Veracity on the Load Monitoring of Professional Soccer Players: A Systematic Review in the Face of the Big Data Era

João Gustavo Claudino [1,2,*], Carlos Alberto Cardoso Filho [1], Daniel Boullosa [3,4,5], Adriano Lima-Alves [6], Gustavo Rejano Carrion [1], Rodrigo Luiz da Silva Gianonl [2], Rodrigo dos Santos Guimarães [7,8], Fúlvio Martins Ventura [9], André Luiz Costa Araujo [10], Sebastián Del Rosso [11], José Afonso [12] and Julio Cerca Serrão [1]

OBJETIVO: avaliar as evidências atuais da literatura científica relacionadas à **veracidade dos dados** para **monitoramento de carga no futebol profissional**.

Monitoramento de carga de jogadores de futebol:
Estado da arte do “V” mais importante do Big Data

O que já é conhecido?

Crescimento exponencial da tecnologia >>>>> Big Data no esporte >>>>> Monitoramento de carga

Garante carga adequada para ↑ desempenho e ↓ risco de lesões

Abordagens de Big Data sem **veracidade de dados** apropriada podem prejudicar a precisão dos modelos de análise preditiva e gerar erros fatais com um alto custo econômico.

Veracidade se refere à acurácia, qualidade, relevância, incerteza, confiabilidade e capacidade preditiva dos dados coletados.

Revisão sistemática

94 estudos foram incluídos nessa revisão sistemática.

168 dias **(amplitude: 1-1034)**

Duração média das intervenções de monitoramento de carga.

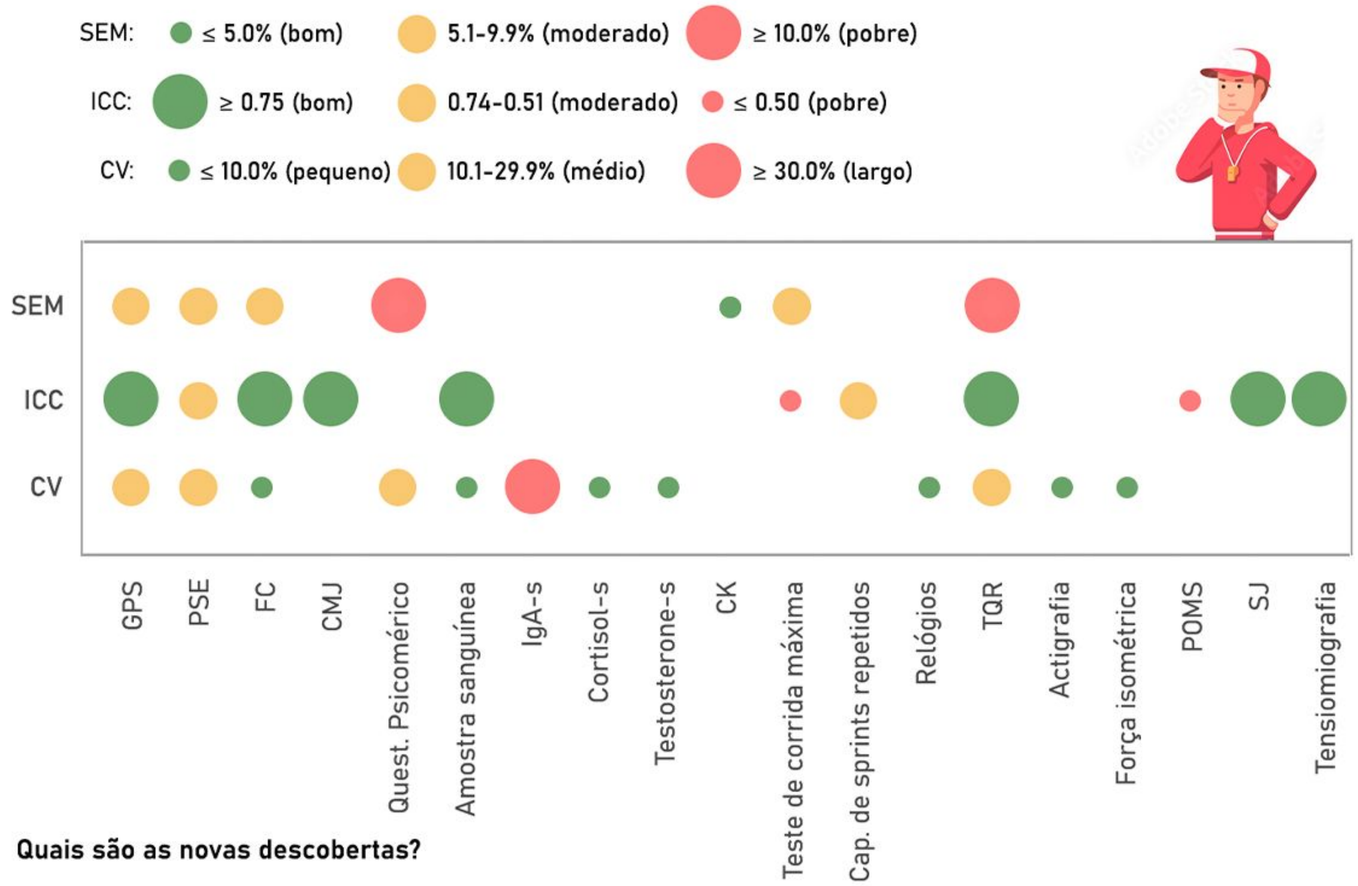
2066

Participantes incluídos na **amostra total**.
Idade: 24 ± 3 anos | Maioria homens (95%)

Jogadores profissionais de futebol de primeira divisão ou seleções (87%).

3 principais nacionalidades dos jogadores: **16%** **15%** **9%**

Principais descobertas



Quais são as novas descobertas?

1. **A veracidade dos dados não é comumente relatada** em estudos científicos que utilizam ferramentas e parâmetros para monitoramento de carga no futebol.

2. 2 Abordagens tradicionais ou de Big Data usadas para monitoramento de carga ainda **requerem a análise de suas métricas de veracidade.**

3. É necessário **analisar e compartilhar com mais frequência a veracidade dos dados** para realizar o melhor gerenciamento e análise de dados ao aplicar Big data.

Estudos em andamento

Dados treinos, jogos e exames

- 3 clubes
- 2018-2022

Lesão x Performance

Lesão

Grupo	Num Atletas	Num Lesionados
0	14	0
1	9	4
2	4	0
3	9	3
4	2	0

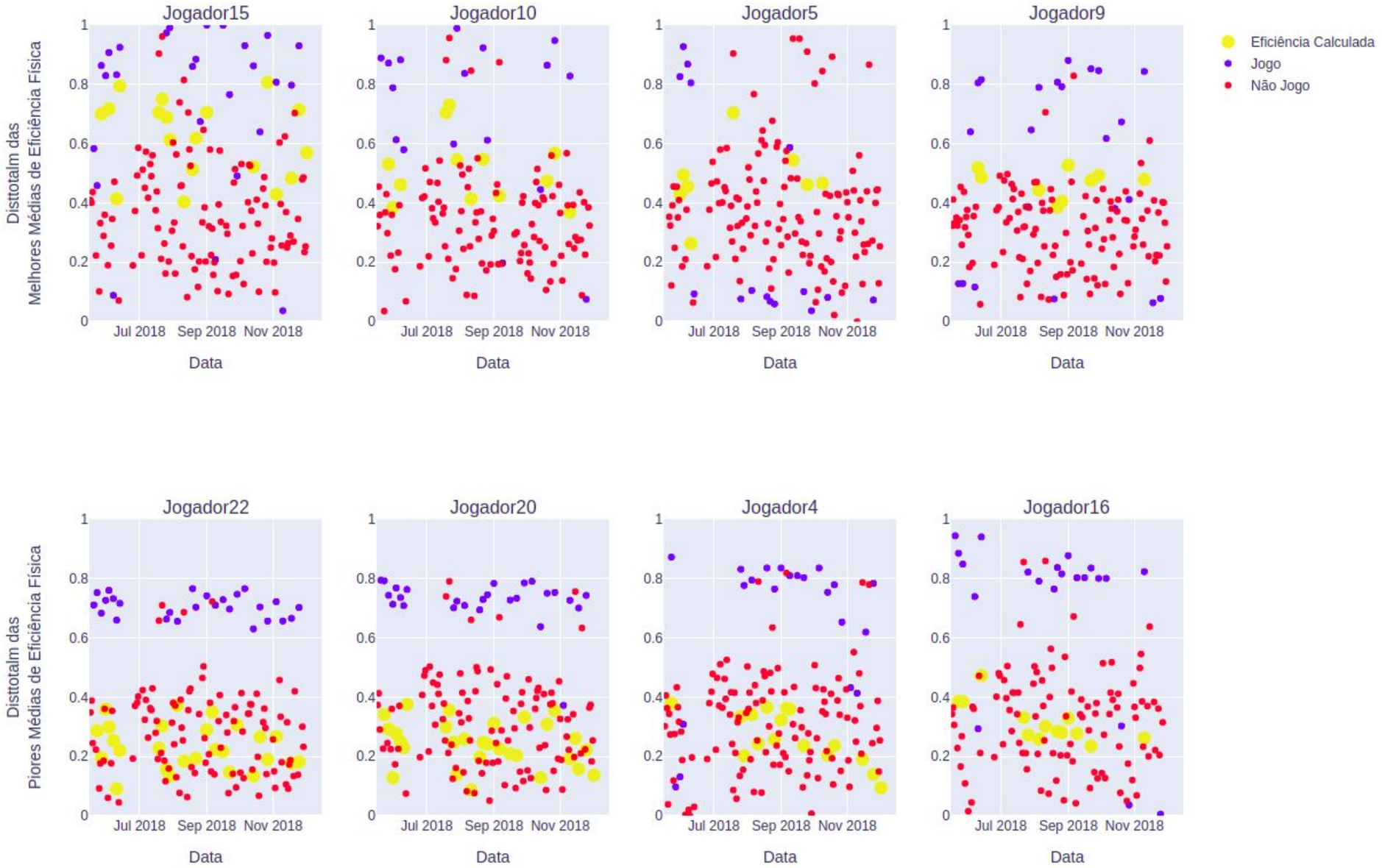
Percepção do EF e distância percorrida

Performance

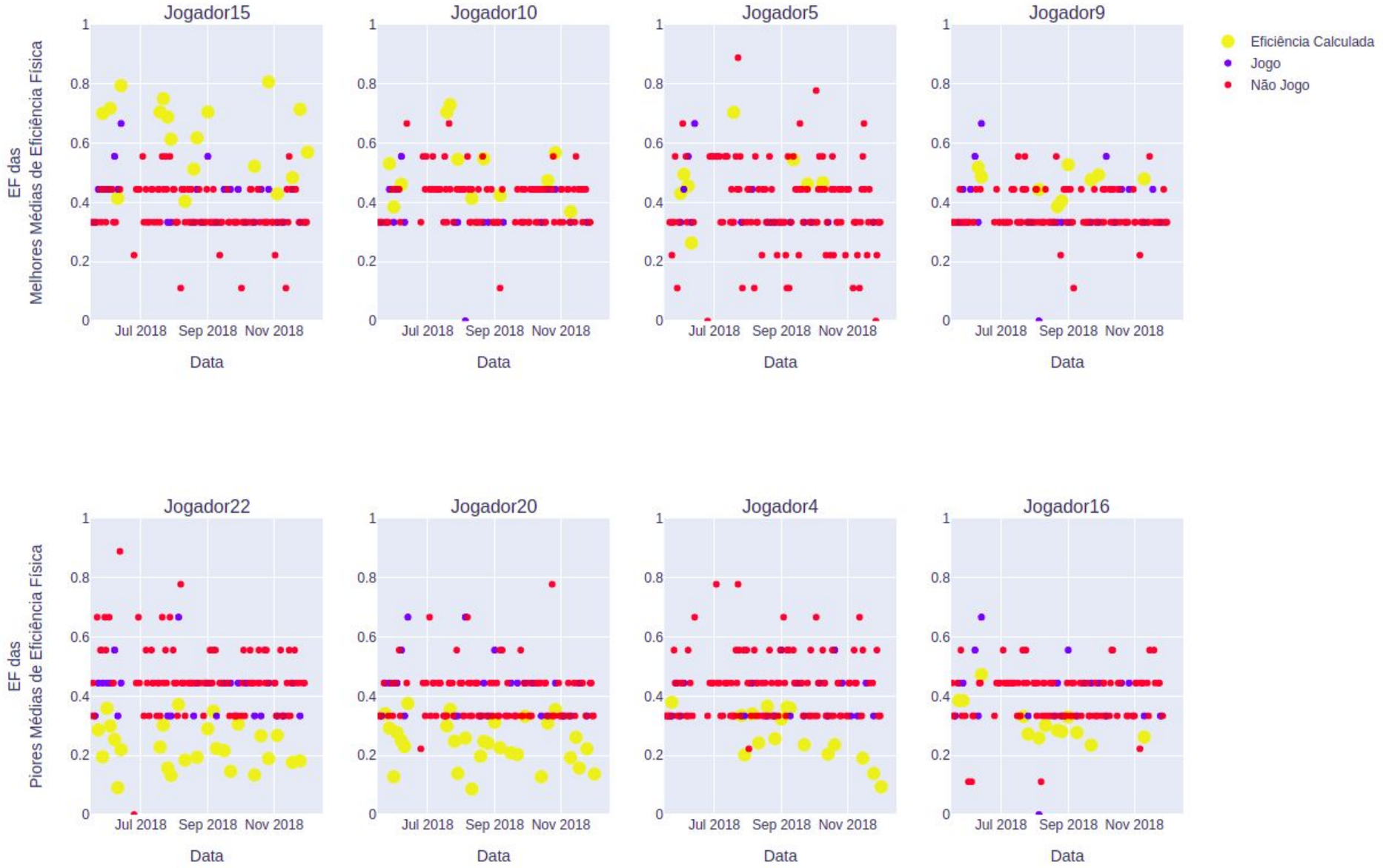
Análise da Eficiência Física dos jogadores:

- Comparação piores e melhores médias

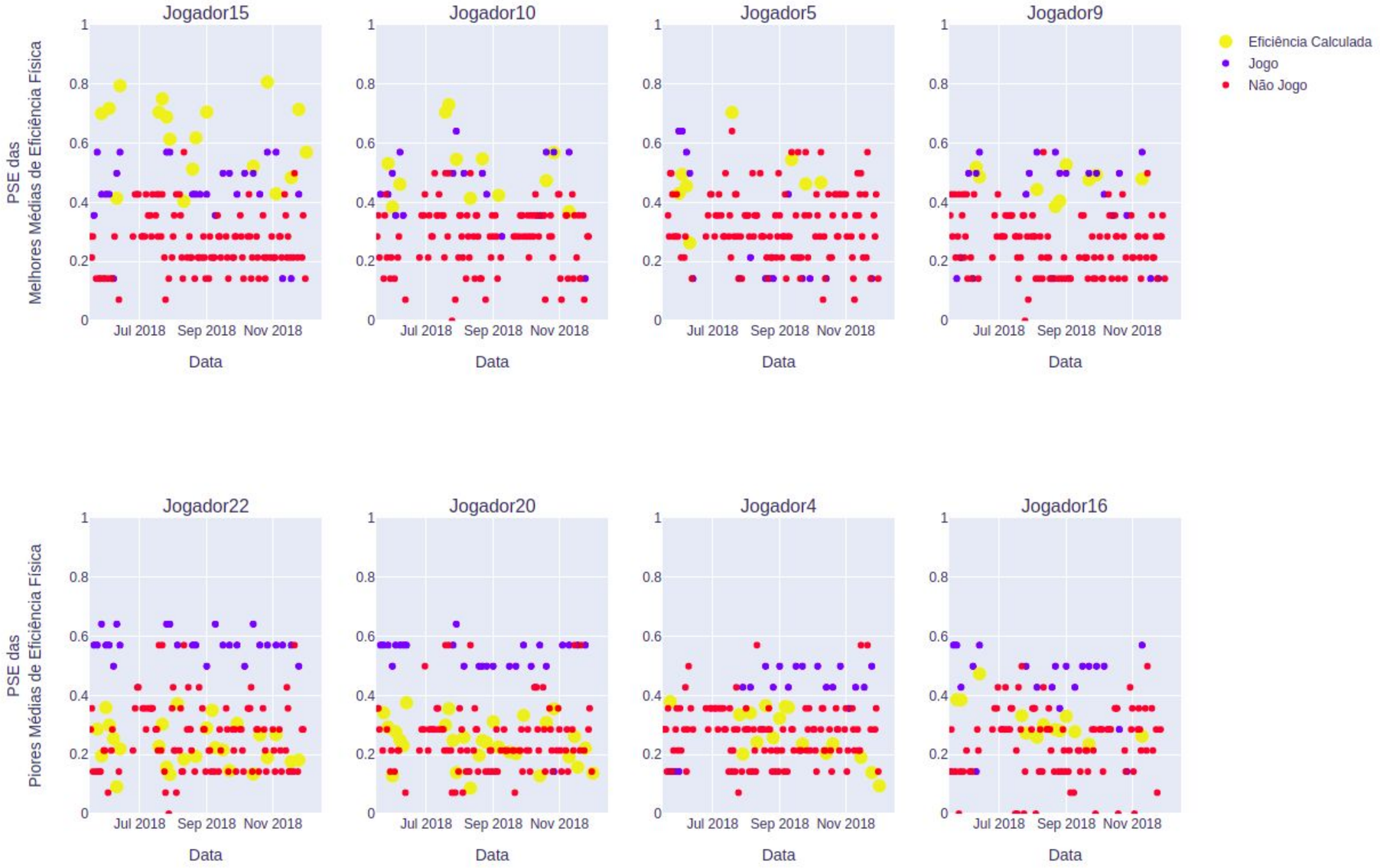
Distância


Jogador15
Jogador10
Jogador5
Jogador9
Jogador22
Jogador20
Jogador4
Jogador16
Disttotalm das Melhores Médias de Eficiência Física
Disttotalm das Piores Médias de Eficiência Física
0
0.2
0.4
0.6
0.8
1
Jul 2018
Sep 2018
Nov 2018
Data
Eficiência Calculada
Jogo
Não Jogo

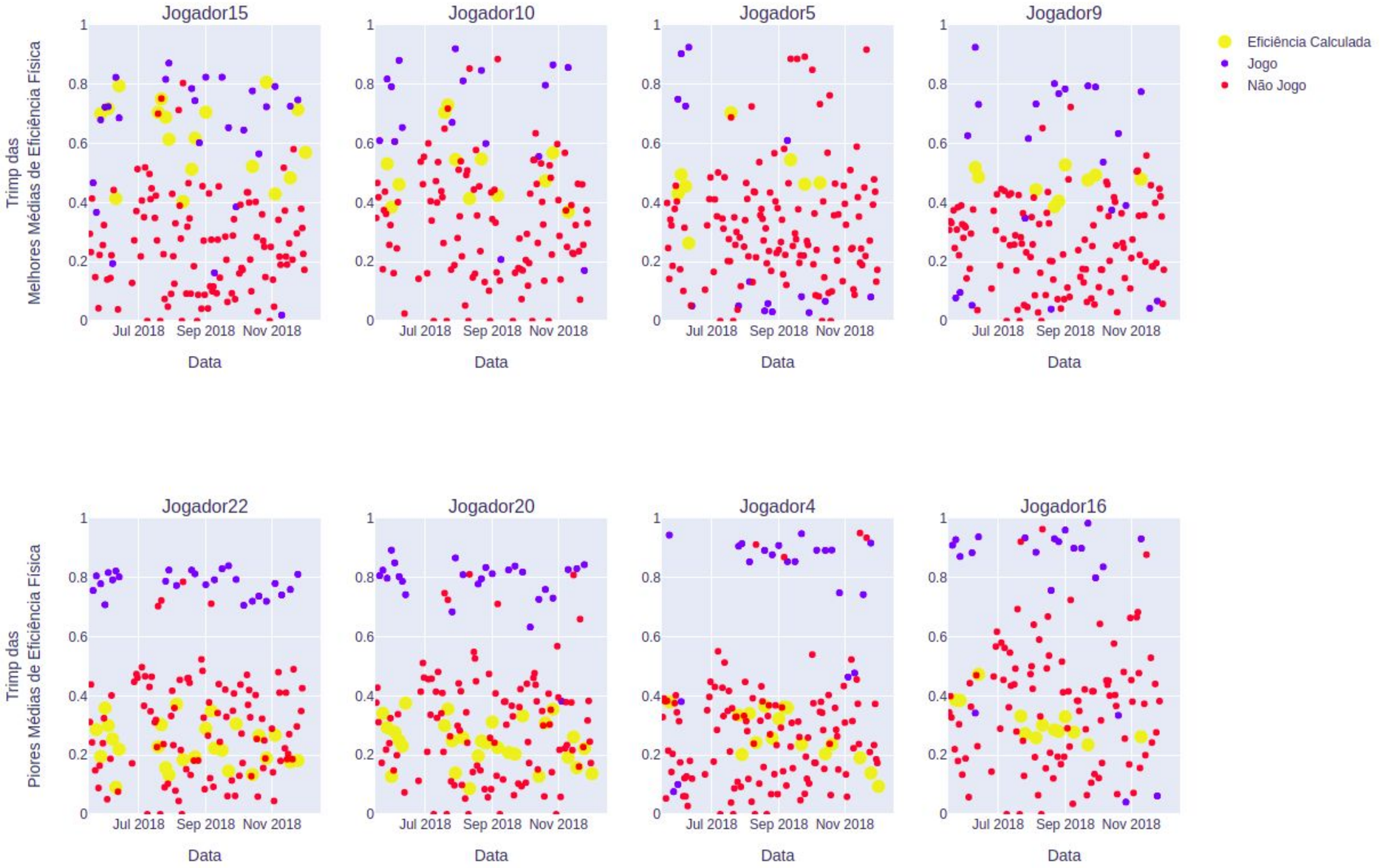
Percepção antes



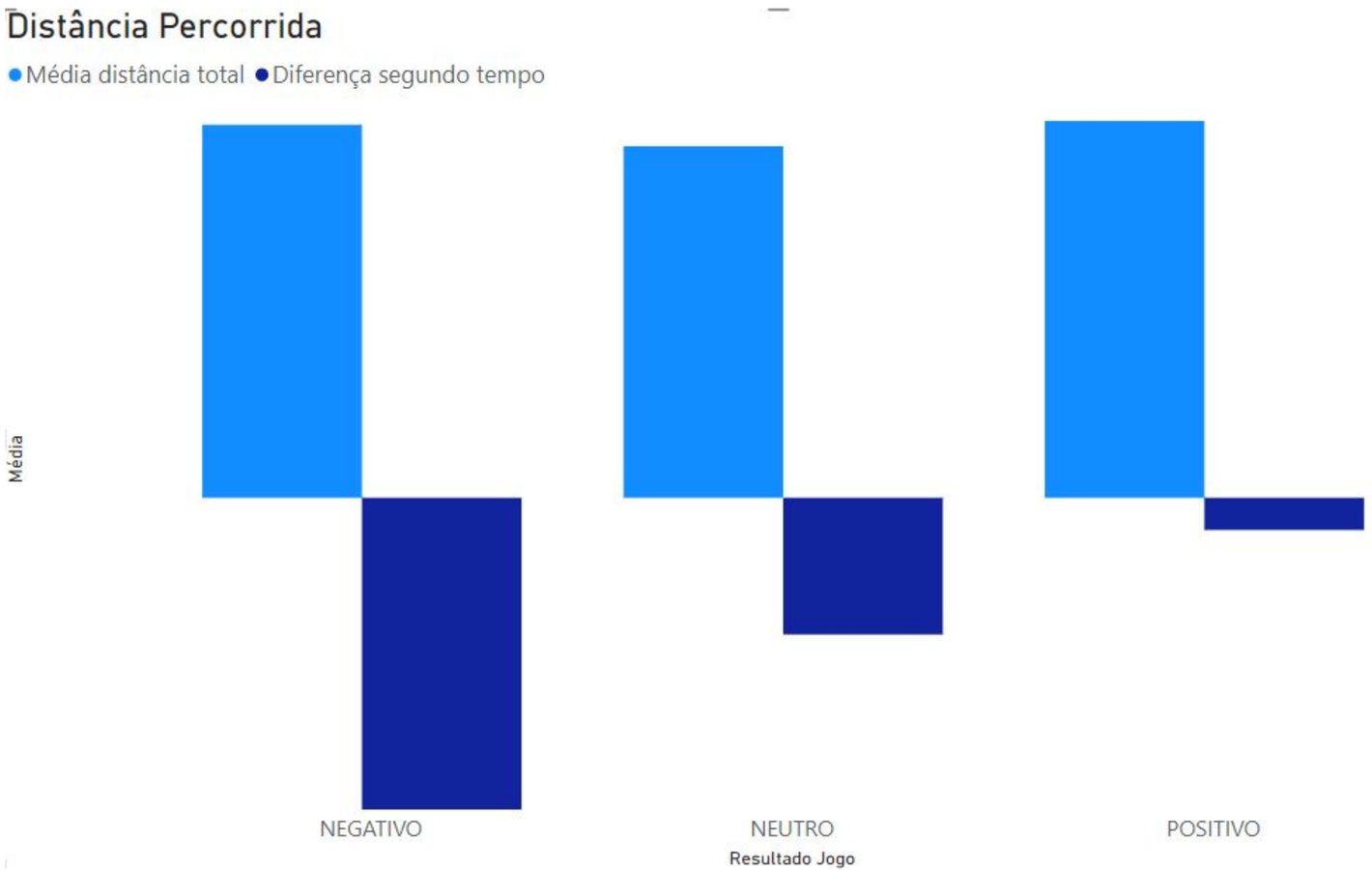
Percepção depois



Frequência cardíaca



Análise por resultado do jogo



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Obrigado!!!