



Learning-To-Rank Framework

Farm your ranking models

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MICES 2025

MLx-Camp E-commerce Search

Ilan Dubois
ML Engineer, OLX Group

Marcin Gumkowski
ML Engineer, OLX Group



Image by [pch.vector on Freepik](#)



About us



From **Normandy**, France

BSc and MSc in **Computer Engineering**

@ EPITA (2013-2018)

Ilan Dubois

Senior Machine Learning Engineer

Berlin, Germany



About us

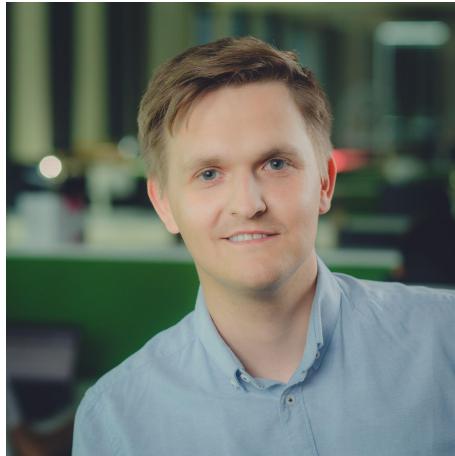


From **Poznań**, Poland



BSc and MSc in Computer Science

@ Poznań University of Technology
(2009-2014)



Marcin Gumkowski

Senior Machine Learning Engineer

Poznań, Poland



LTR framework

Meet the team



Ilan Dubois

Senior Machine
Learning Engineer



Marcin Gumkowski

Senior Machine
Learning Engineer



**Catarina
Gonçalves**

Data Scientist



**Katarzyna
Wagner-Wojciska**

Senior Data
Product Manager



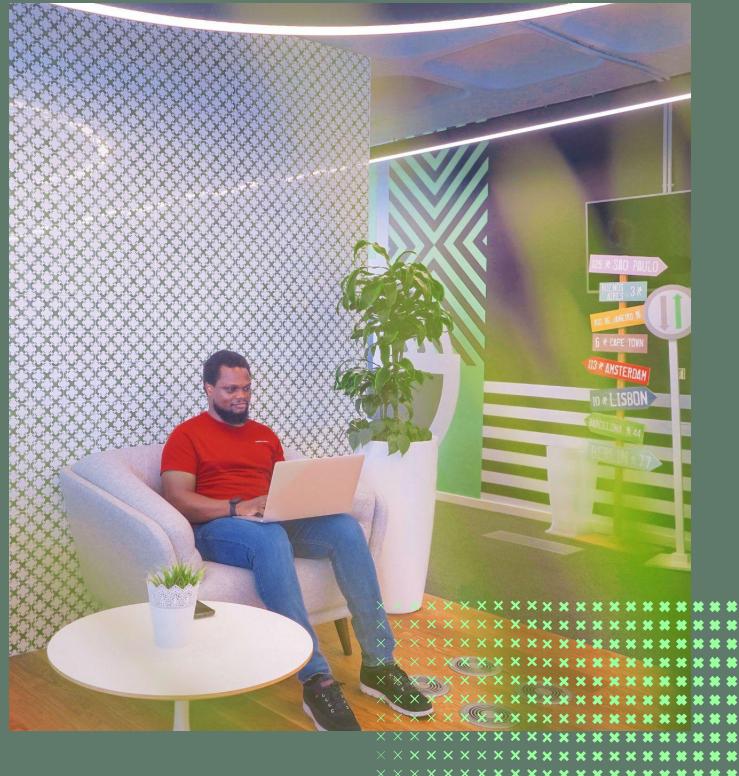
Cristian Martinez

Data Science
Manager



Agenda

- OLX Group
- Learning to rank - algorithm intro (OLX use case)
- OLX Group challenges
- LTR Framework
- Business Use Cases
 - Ranking Personalization
 - Package/Group Kickers

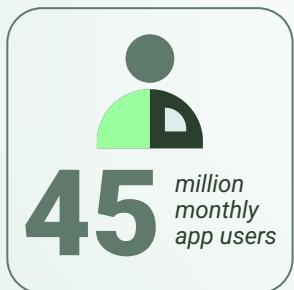




We are
OLX



OLX TODAY



*Source: CEB - C-Sat with users (buyers and C2C sellers) on OLX EU Platforms from April 23 - April 24



Associates:

OLX Brasil

dubizzle
group

OfferUp

We empower millions of people in making **key life decisions***

>11M
found a
new home
with our
platforms



Moves away

Starts their career



>4M
found a
job on OLX

>10M
found a
car with our
platforms



Get a car

Starts a family



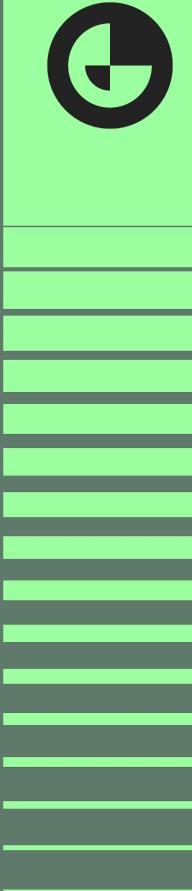
0.5M found a
Wedding planner on OLX

0.6M found
baby stroller on OLX

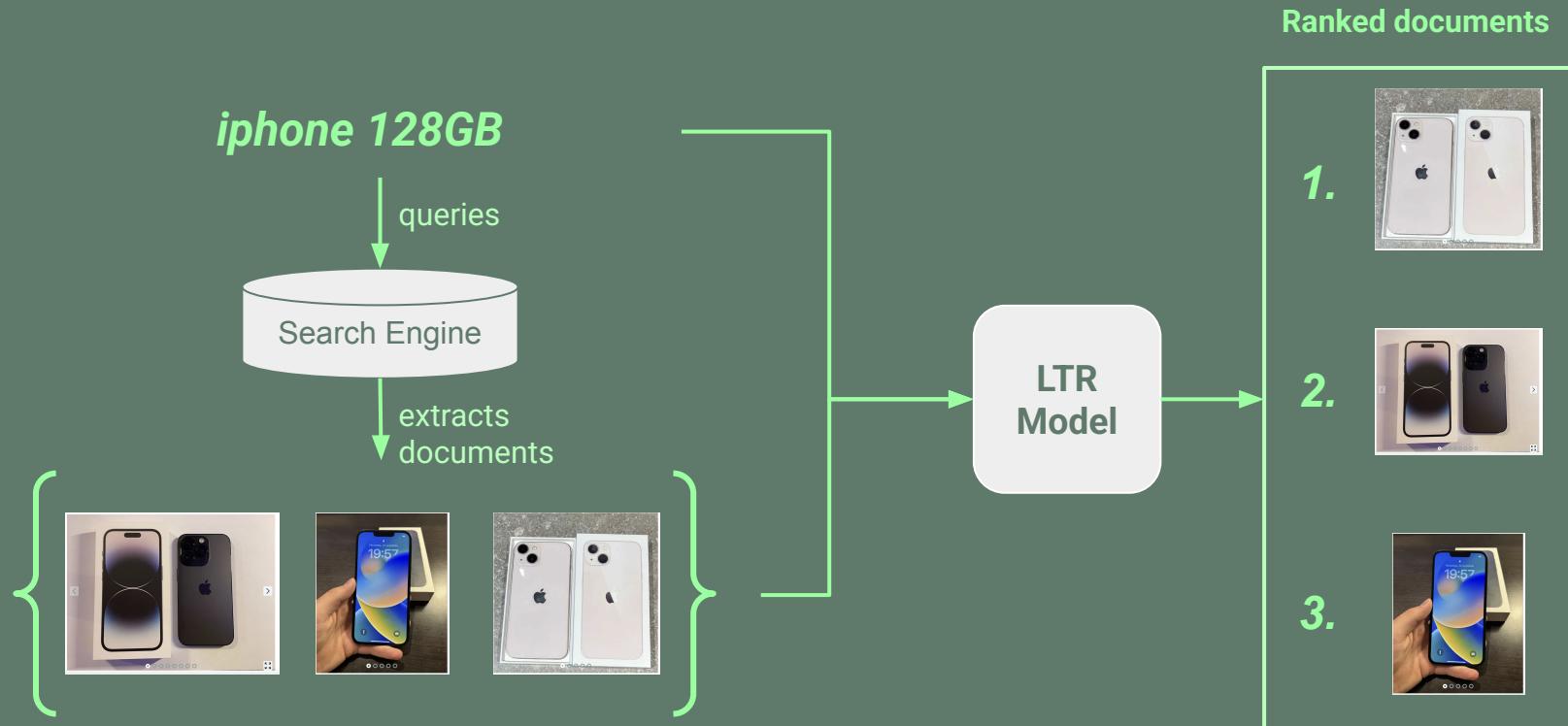
>2M found a **video game**
or console on OLX

01

Learning to Rank Algorithm Introduction



Learning to Rank



What are the characteristics that make an ad relevant?



Iphone

X

Iphone 14 128GB 95% battery MIDNIGHT BLACK

Used

Zabrze - June 5, 2024

PLN 1,900 to negotiate

Service service with OLX Parcel

Heart icon with a green arrow pointing to it.

23:06

Green arrows pointing from the search bar to the listing and from the listing to the heart icon.

User Signals - clickstream events

Just an item

PLN 3,249

Price with OLX Shipping

PLN 3,274 + delivery from PLN 12 [Price details](#)

Buy

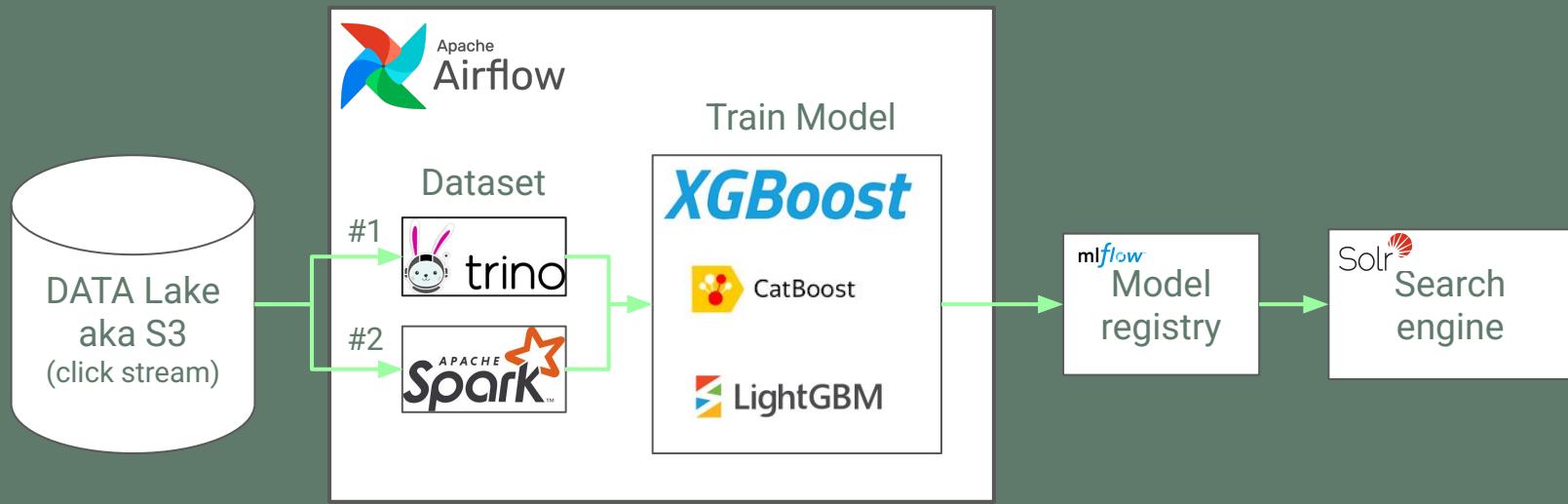
Send a message

Call

Green box highlighting the 'Buy' button.

Green arrow pointing from the listing above to this detail page.

Usual LTR pipeline



02

Challenges in OLX Group



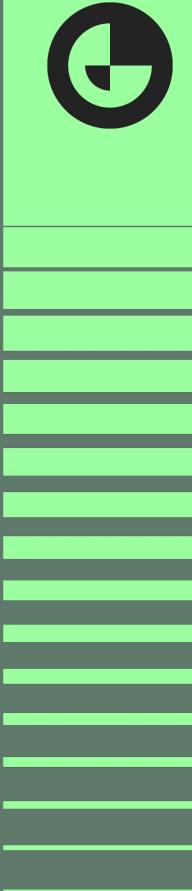
Core



Real Estate



Motors



#1 challenge



Many Targets to optimize...

Delivery ad

PLN 4,500
Service service with OLX Parcel

PLN 3,300
Service service with OLX Parcel

PLN 1,800

Iphone 14 pro max 512GB idream insurance gold gold set
Used
Łódź, Bałuty - Refreshed on June 9, 2024

iPhone 14 pro black, battery 92%, proof of purchase
Used
Scarves - June 9, 2024

I will sell an iPhone 14 pro max, 256GB memory, Space Black
New
Brenna - June 10, 2024

VAS type #1

VAS type #2

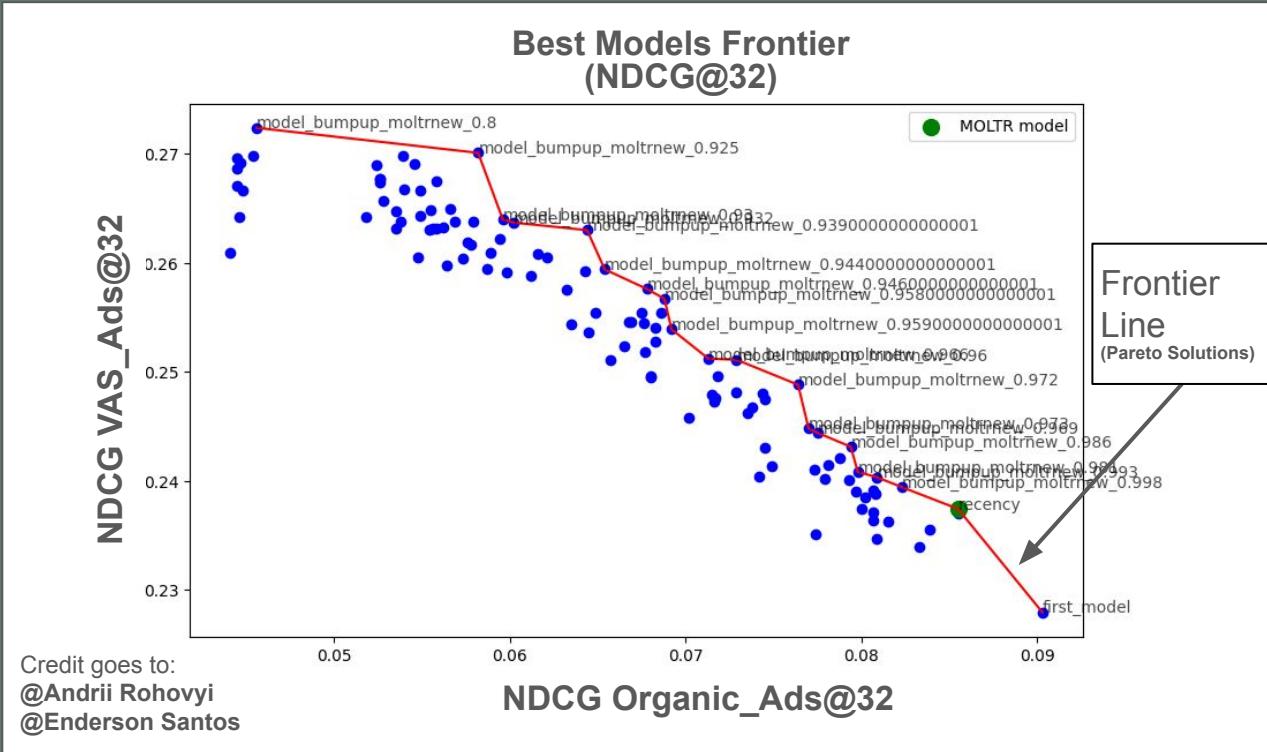
VAS type #1

Organic ad

*VAS - value added-service

#1 challenge

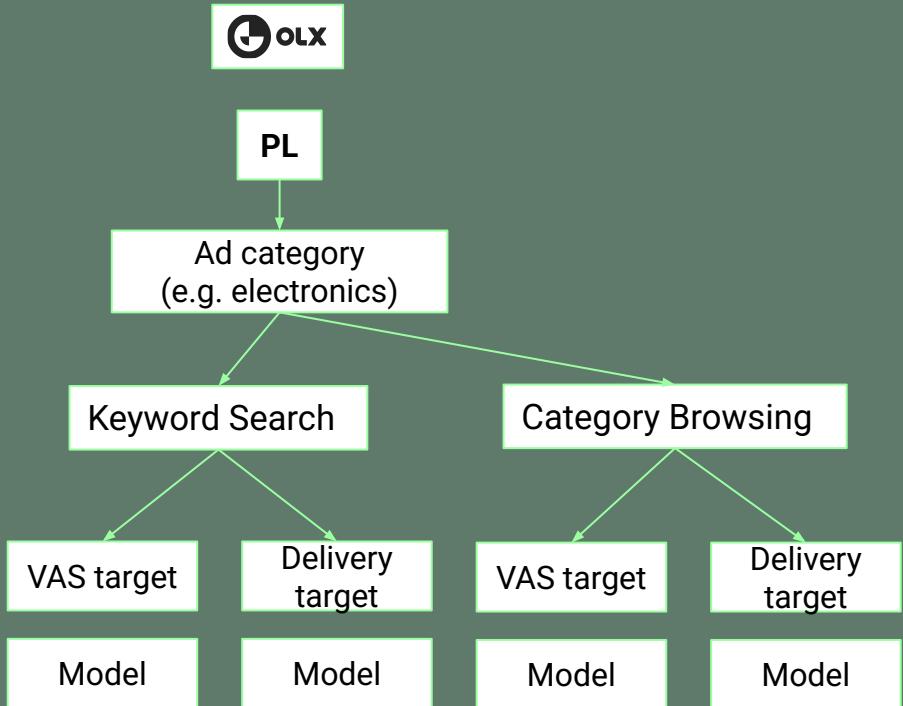
Multi objective-optimization



#2 challenge



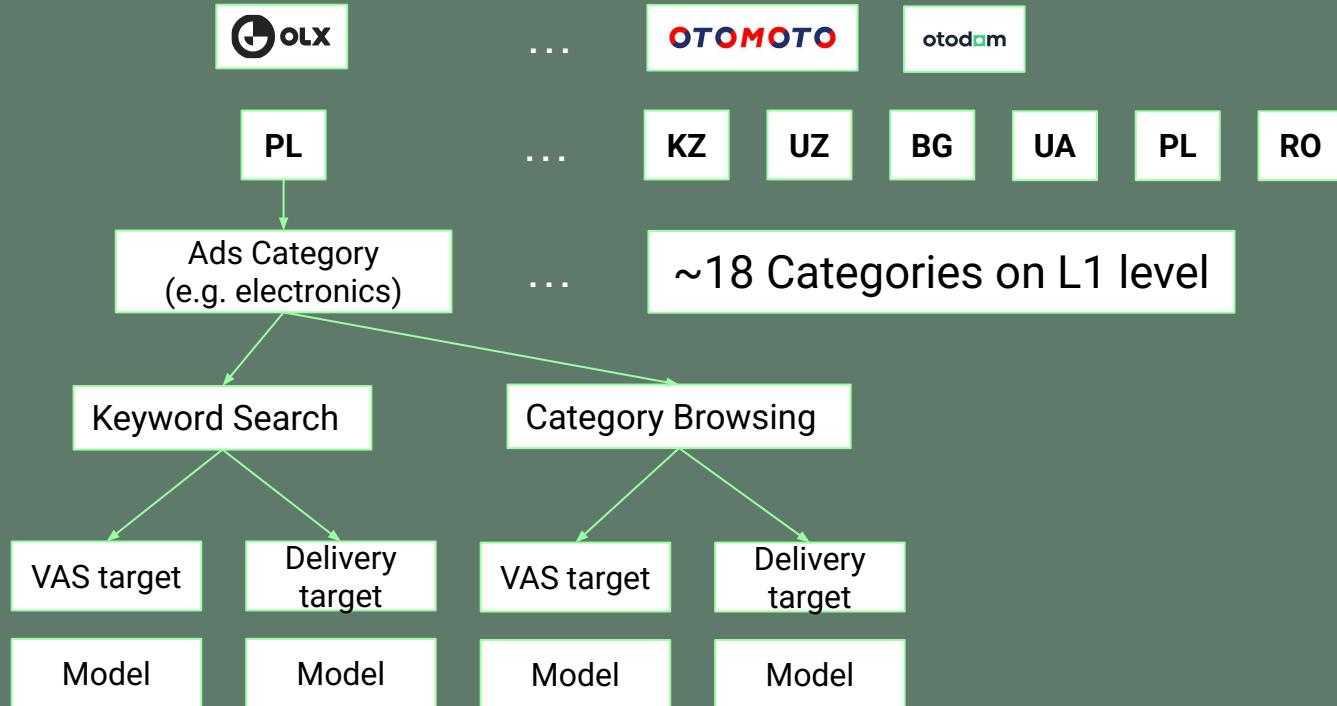
Multiple models



#2 challenge

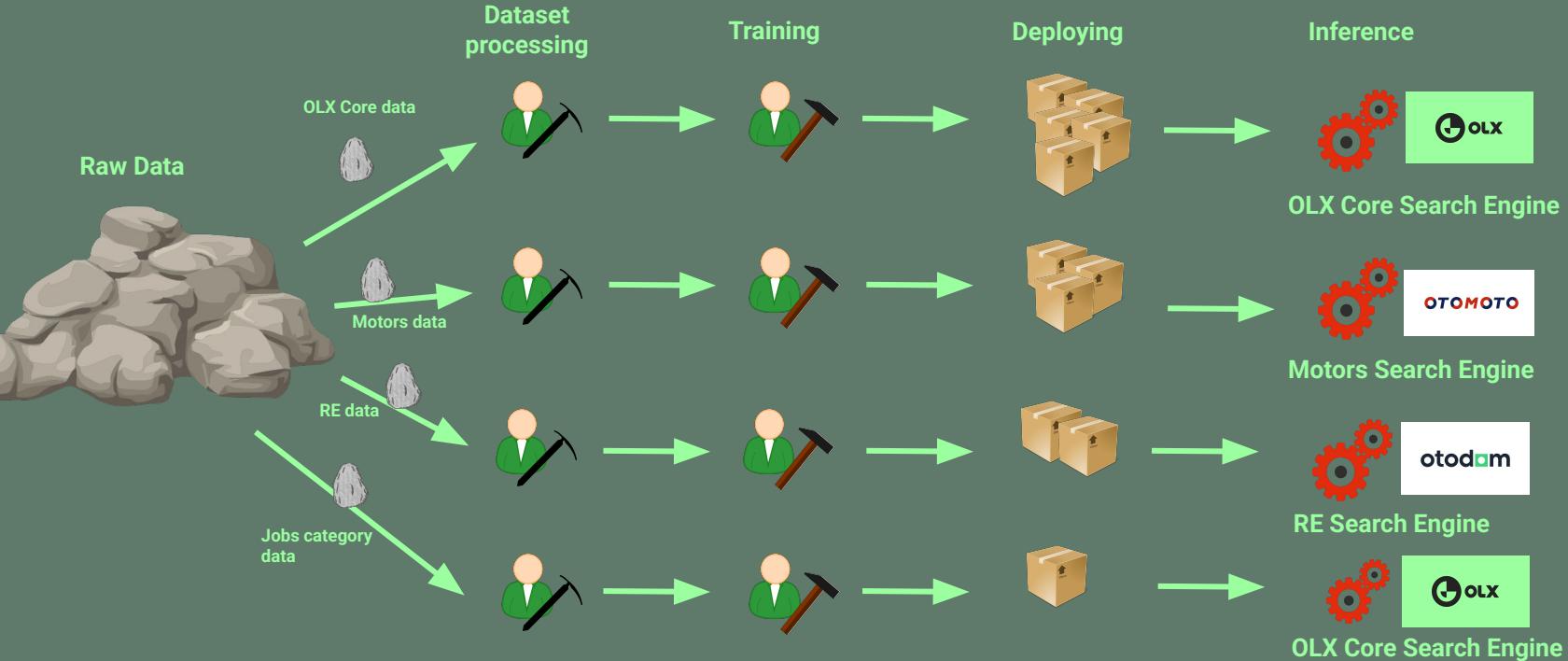


Multiple models



#3 challenge

The pipelines hell



Ctrl+C, Ctrl+V



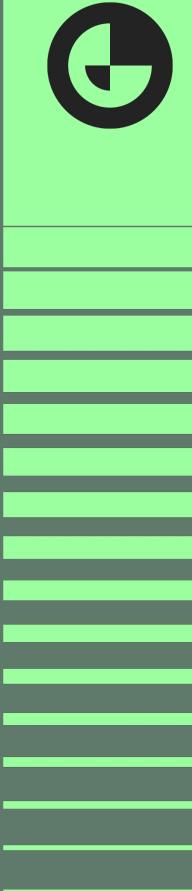
LTR Framework motivation



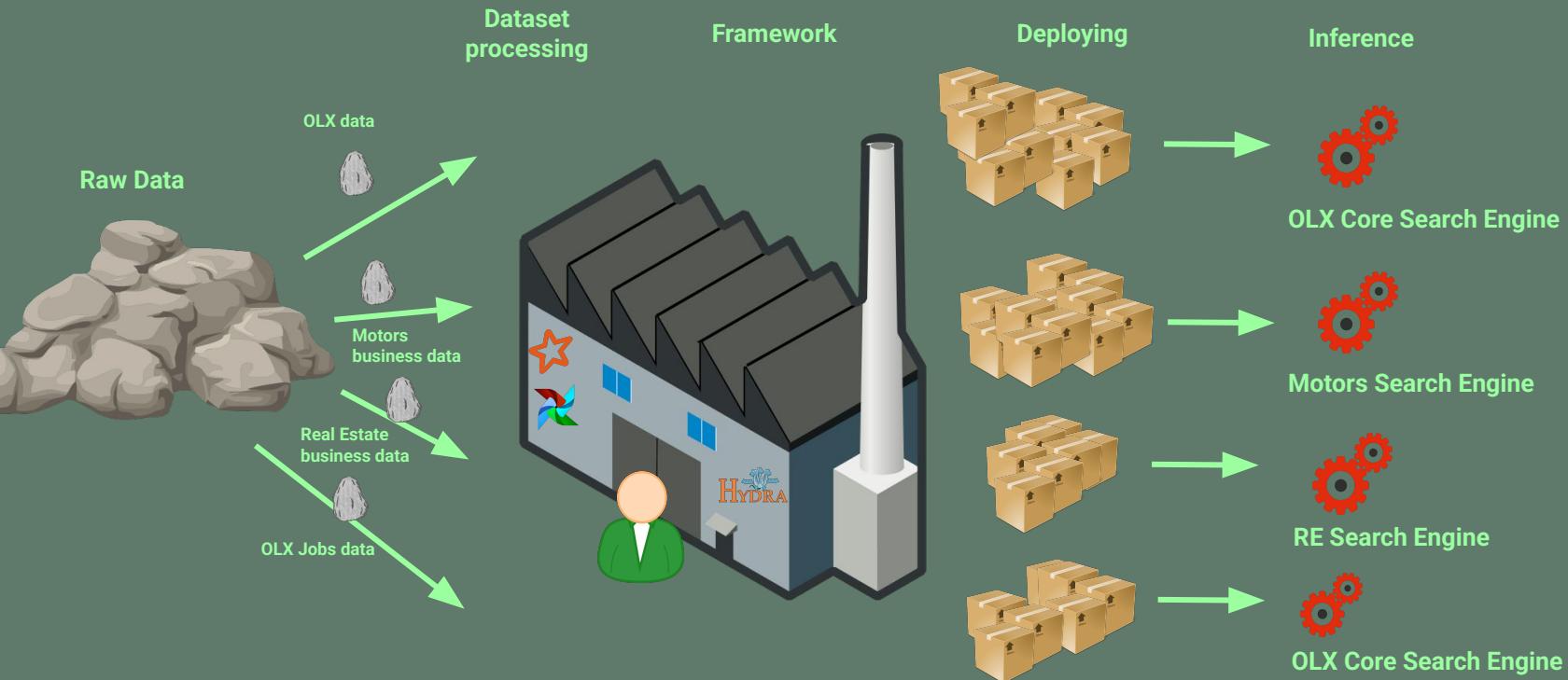
- stop **duplicating efforts** for rankings
- stop growing **technical debt**
- add **synergy** to the LTR projects
- enable **rapid experimentation**
- **reduce costs** across teams

03

LTR Framework



LTR Framework



Configuration Setup



3 units   

1+ model

3+ countries

1+ target

3 environments

GOAL

Increase Flexibility

Enhance Experimentation

Better Organization

LTR framework **speeding** **up the development**



Adding **new features**
to dataset

75%
faster

Adding new features
(ENTIRE PROCESS)

25%
faster

Model Training

UP TO
75%
faster

OLD WAY VS LTR FRAMEWORK

Percentual impact on **time needed** to conclude each step

LTR framework

Motivation

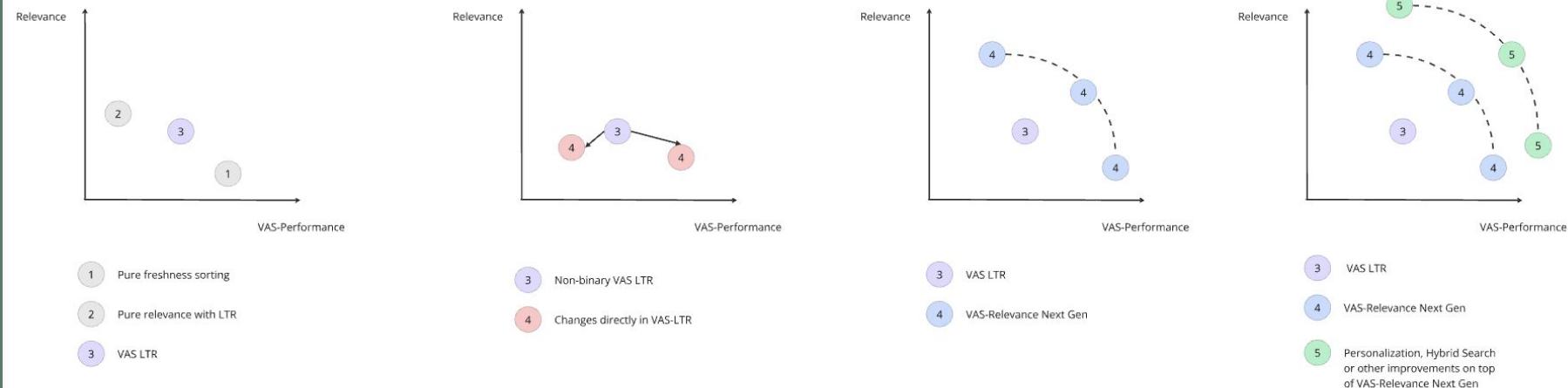
Overview



MOTIVATION 	Status
Stop duplicating efforts	✓
Stop growing technical debt	✓
Add synergy to the LTR projects	✓
Enable rapid experimentation	✓
Reduce costs across teams	✓



Directions for improvement





Business Use Cases

1. Ranking personalisation
2. Package / group kickers

Personalisation

**Improving
relevance for
our customers**



Classic problem, looking for “golf”

olx

Volkswagen Golf •Gwarancja w Cenie• 1.4 125 km • 94 tys. kilom. •
Auto z Niemiec • **48 000 zł**

Lipno - 13 czerwca 2025
2014 - 94 000 km

WYRÓŻNIONE

Golf 6 Black Shadow 1.4 Turbo 160 KM !! Kompresor !! Z Niemiec **15 900 zł**

Świeradów-Zdrój - Odświeżono dnia 15 czerwca 2025
2009 - 220 000 km

WYRÓŻNIONE

Alufelgi 18 5x112 VW Golf Passat Tiguan Jetta Touran Atreon T-Roc 218# **1 699 zł**

Używane

Žory - Odświeżono Dzisiaj o 14:17

Kije golfowe Wilson Multi Metal S Flex Iron Driver Putter kij do golfa **500 zł**

523.50 zł z Pakietem Ochronnym

Bielawa - Dzisiaj o 10:38

Some example where it will be useful

“Golf”

Here, we can disambiguate the meaning or the “intent” of the search

“Bike”

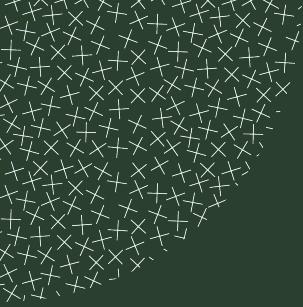
For a bike, a close location to the seller is crucial. Personalization would help bring closer results up the list

“Halloween costume”

If the user visited male cloth of size M in the past, that query will be able to bring matching costumes up

“Brake disc”

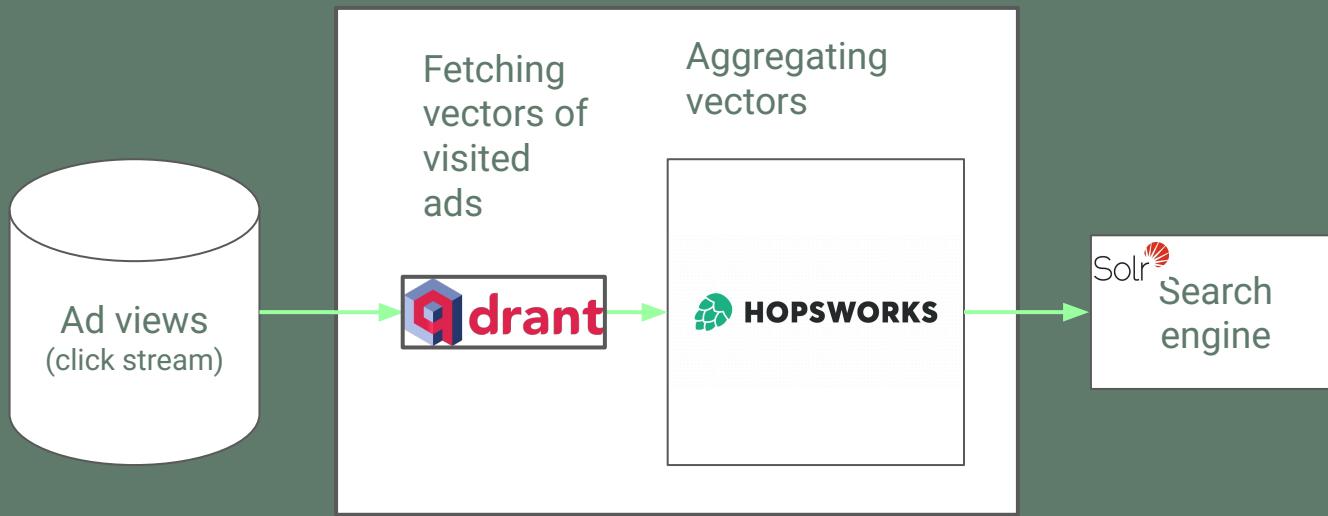
Personalisation will help us display break disc ads of the right type according to ads previously seen.



Why only vectors ?

- Feature engineering on history showed encouraging results, vectors will do better
- Using PII data would increase costs, time and complexity of building such pipeline while the performance gains would be uncertain
- Using real-time history base profiling allows for very quick response of our re-ranking algorithms

Architecture overview



Previous experiments related to the solution

Personalisation with basic features

- +4.33% of successful events
- No impact on paid traffic performance

Vector search experiment

- +4.99% ad views from search

Package/group Kickers

**Fine grain
control over
monetization
strategy**





New challenges



Hey Ranking Team,
The rules have changed



New challenges



Hey Ranking Team,
The rules have changed

There are more things
to optimize for



New challenges



Hey Ranking Team,
The rules have changed

There are more things
to optimize for



The problem

Mitsubishi Lancer 1.8 Inform
1798 cm³ - 140 KM - Mitsubishi Lancer sportback 2010

14 700 PLN
Sprawdź możliwości finansowania

Wyróżnione **Zweryfikowane dane**

1/ 238 000 km Benzyna Manualna 2010

Zerazydowice (Silesia)
Podobte 7 minut temu

Prywatny sprzedawca

Skoda Superb
1798 cm³ - 160 KM - Sprzedam Skoda Superb

39 900 PLN
W granicach średniej
Sprawdź możliwości finansowania

Wyróżnione **Zweryfikowane dane**

1/ 180 000 km Benzyna Manualna 2015

Zaklików (Silesia)
Podobte 6 minut temu

Prywatny sprzedawca

BMW Seria 2 M235i sport
2079 cm³ - 320 KM - M235i Sport

89 700 PLN
Sprawdź możliwości finansowania

Wyróżnione

1/ 93 900 km Benzyna Automatyczna 2016

Warszawa (Mazowieckie)
Podobte 6 minut temu

Prywatny sprzedawca

Opel Astra 1.3 CDTI DPF Active
1248 cm³ - 95 KM - stan idealny.

15 375 PLN
W granicach średniej
Sprawdź możliwości finansowania

Wyróżnione

1/ 350 000 km Diesel Manualna 2011

Zary (Lubuskie)
Podobte 9 minut temu

Prywatny sprzedawca

Subaru WRX
2467 cm³ - 310 KM - Subaru WRX STI

145 000 PLN
Sprawdź możliwości finansowania

Wyróżnione

1/ 32 000 km Benzyna Manualna 2021

Mogilany (Małopolskie)
Podobte 9 minut temu

Prywatny sprzedawca

Lexus RX 200t / 300 Prestige
1998 cm³ - 238 KM - Lexus 200t / 300 Prestige Gwarancja, Oferta Dealera

119 900 PLN
W granicach średniej
Sprawdź możliwości finansowania

Wyróżnione

1/ 133 970 km Benzyna Automatyczna 2016

Długoleka (Dolnośląskie)
Podobte 9 minut temu

Toyota Długoleka



The problem

Mitsubishi Lancer 1.8 Inform
1798 cm³ - 140 KM - Mitsubishi Lancer sportback 2010
Wyróżnione Zweryfikowane dane
1/1 238 000 km Benzyna Manualna 2010
Zielonowice (Silesia)
Podobte 7 minut temu
Prywatny sprzedawca

Skoda Superb
1798 cm³ - 160 KM - Sprzedam: Skoda Superb
Wyróżnione Zweryfikowane dane
1/1 180 000 km Benzyna Manualna 2015
Zaklikow (Silesia)
Podobte 7 minut temu
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Wyróżnione
1/1 133 970 km Benzyna Automatyczna 2016
Dlugoleka (Dolnoslaskie)
Podobte 9 minut temu

Group 1

Group 2

Group 3

Help us distribute Ad Leads in the following way

Leads

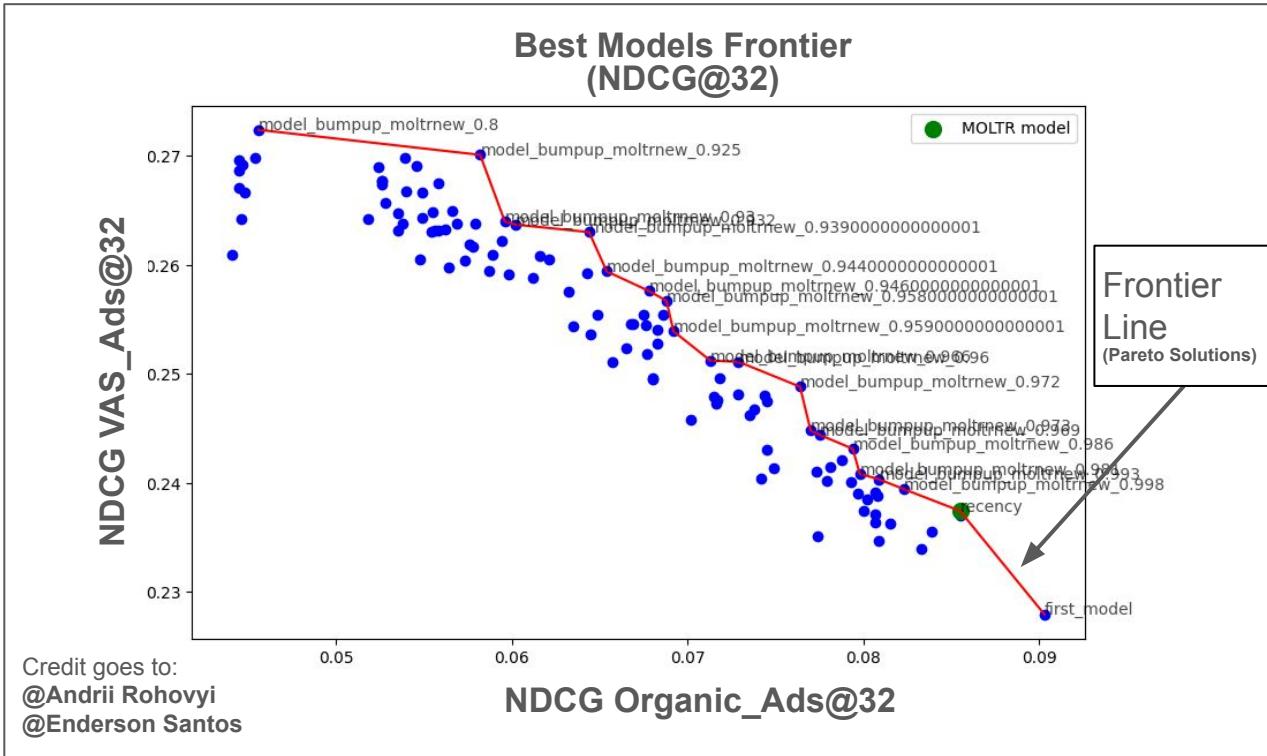
~0.1x Group 1

~0.5x Group 2

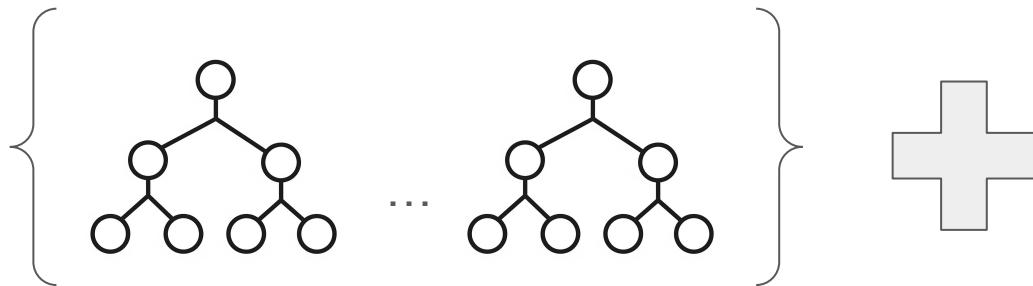
~0.4x Group 3



Multi-objective optimization



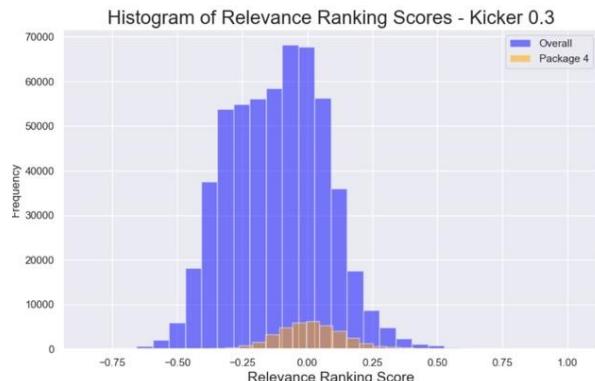
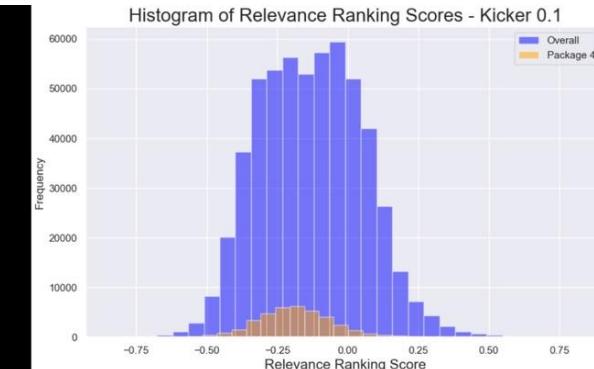
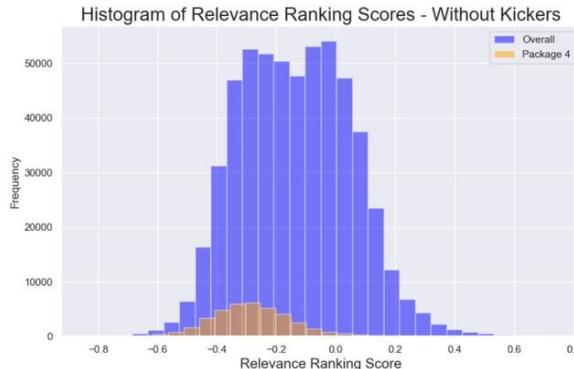
Apply Group/Package kickers



Multi-additive Tree Model
(our existing MOO model)

$w_1 \times \text{Group 1}$
 $w_2 \times \text{Group 2}$
 $w_3 \times \text{Group 3}$

Package Kickers



Credits to @Enderson Santos

LTR Framework for Package kickers



- Help train multiple ranking models 
- Use past configurations and add only new kickers 
- Rely on existing models that fulfilled Multi-objective criteria 
- Run 4 A/B experiments to evaluate different kickers values 
- Help business decision regarding paid traffic 



Go to market

Special thanks

Enderson Santos is the initiator of the talk and leads the Kicker project. Here's his blog post about LTR at OLX:



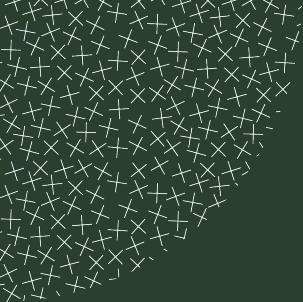
Hiring (also in

We are looking for a **Lead Data Scientist** position on all ranking topics



OLX





Q&A

Any questions?



OLX