Prof. Steven Verstockt, Prof. Erik Mannens, Ing. Jelle De Bock

FACULTY OF ENGINEERING AND ARCHITECTURE

AI4TV

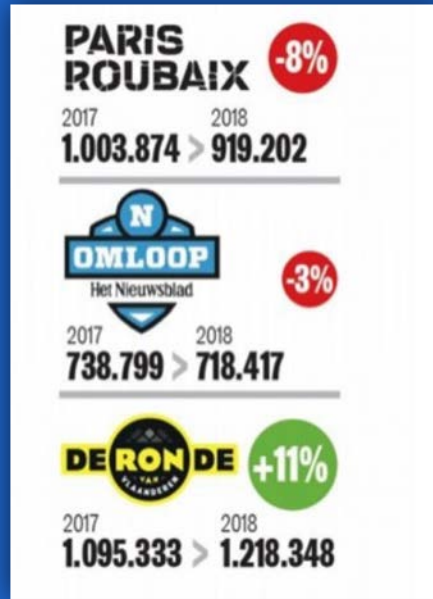**Data-driven Summarization and Synchronized second-screen enrichment of Cycling Races**

Using Live and Historical Sports Data to Reinvent Traditional Reporting

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KOERS MUSEUM VAN DE WIELERSPORT

IDLab INTERNET & DATA LAB

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Cycling on TV: hot or not?

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Cycling WEEKLY

Peter Sagan: 'For me cycling is a boring sport, and as a fan I only watch the last five kilometres'

Sagan says he 'doesn't get' why professional cycling believes people want to watch long stages with no action

Gregor Brown
September 17, 2018 11:49 am

Going gray: Sports TV viewers skew older

Study: Nearly all sports see quick rise in average age of TV viewers as younger fans shift to digital platforms

—

By John Lombardo and David Broughton, Staff Writers
June 5, 2017

THE IRISH TIMES

The cycling boom: How popular is it and is it expensive?

Sport has seen huge increases in participation levels but are the costs prohibitive?

⏱ Mon, Aug 12, 2019, 20:00

Ruaidhrí Croke
🐦 Follow

The Ring of Kerry charity event has grown hugely over the years, so much so that organisers had to put a cap on numbers. Photograph: Nick Bradshaw/The Irish Times

You hear them before you see them. That unmistakable clack . . . clack . . . . clack across the wooden floor of a coffee shop on a Sunday morning means only one thing: the cyclists have arrived.

And that sound is only becoming more common as the popularity of cycling increases in Ireland. In the latest Irish Sports Monitor survey, cycling is now only behind exercise (mainly consisting of gym-type activities), running and swimming in terms of participation and Cycling Ireland currently has over 25,000 members. That figure is up from just over 15,000 in 2012 and a huge increase on the 2,000 members of the organisation back in 1980.

Cycling Broadcasting

- **Weakening interest in watching cycling races on TV**
  - Predictable races (the Sagan, MVdP, Ineos syndrome)
  - Old-fashioned race capturing
  - Younger audience moves to digital platforms
- **Not focussing enough on new technologies**
  - Personalization and interaction can revive cycling broadcasting interest
- **Apart from sponsoring teams cycling on tv has huge undiscovered commercial potential**
  - Tourism
  - Heritage promotion
  - Highlighting culinary culture

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Cycling technology

- **Internet-of-Things (IoT-devices)**
  - Attach lightweight sensors to a rider's bike, dashcams in follower cars etc
  - Broadcast and process all data in real-time in an open way (e.g. REST apis)
- **Technology is still hardly used, why?**
  - Adequate translation of raw values into interesting narrative elements
  - Detect events (i.e. something happened) based on the "raw" sensor data

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http://intherace.com/
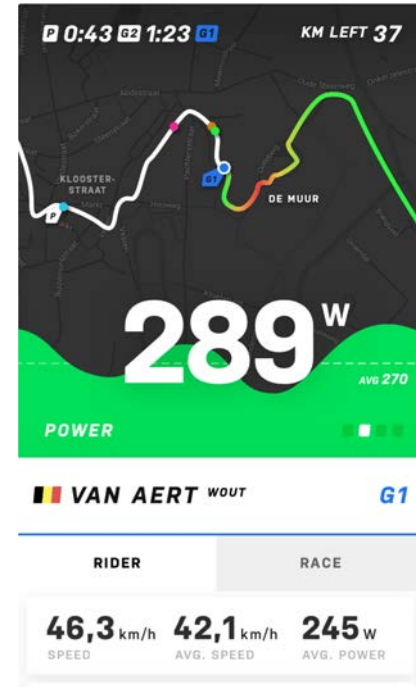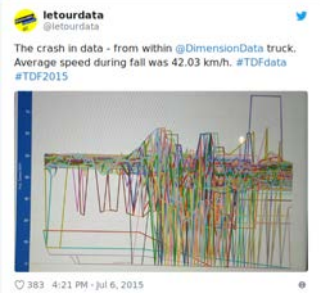
"Every race has a lot of hidden stories"

Data-driven cycling

Data-driven analysis and summarization of sport videos

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Proposed summarization methodology
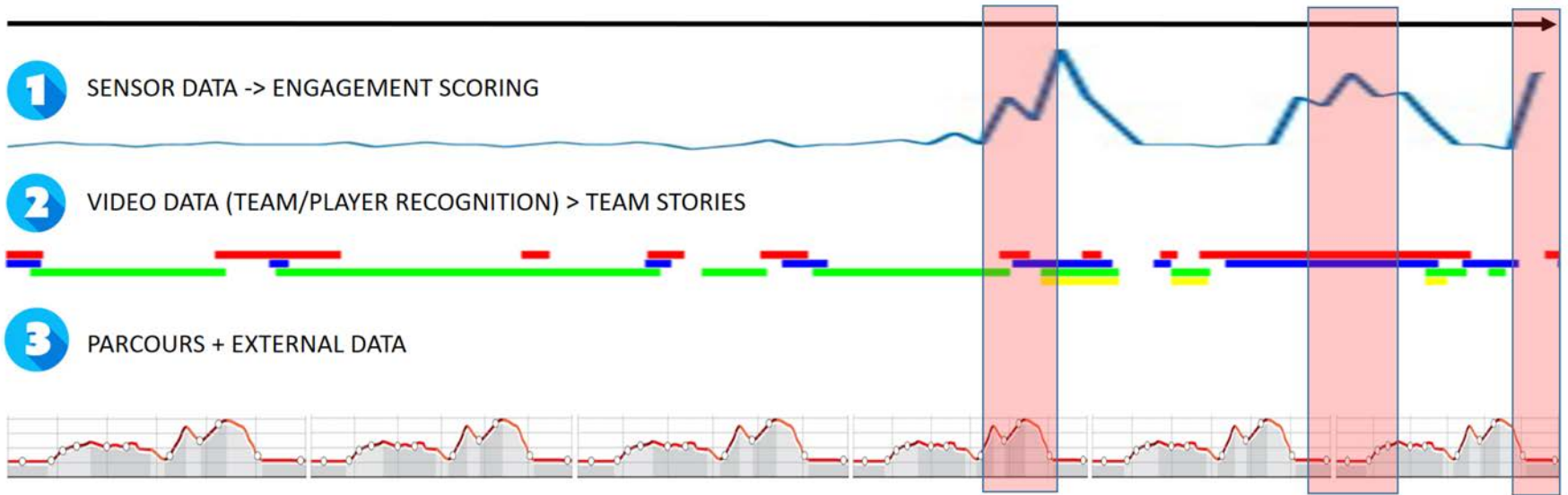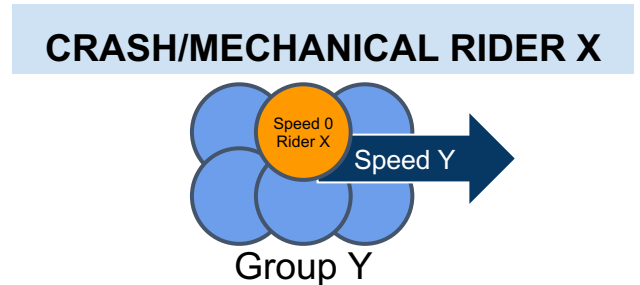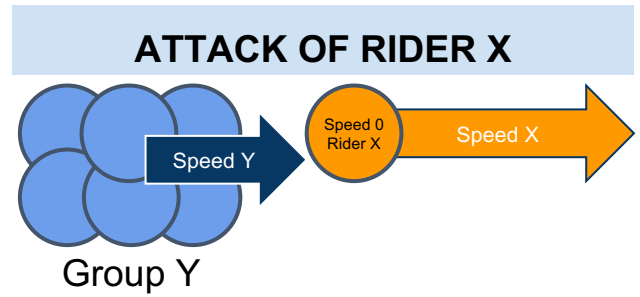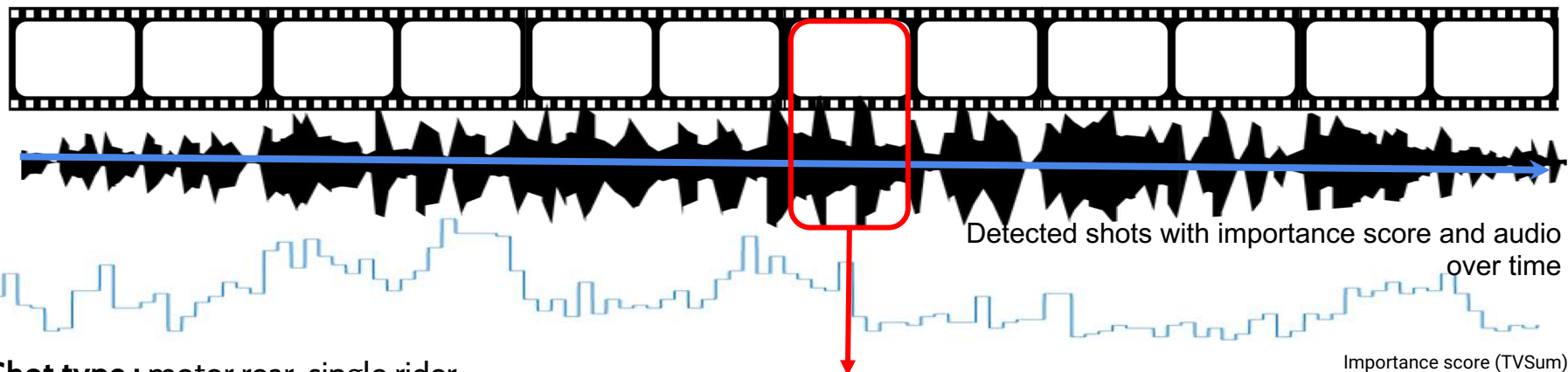

= summary of 8min focusing on high engagement, team/riders shown in red and different segments of the parcours

① SENSOR DATA

— **Input from race dataprovider** STRAVA Velon™ gracenote A NIELSEN COMPANY

— **Speed/group-based event detection**

→ Detect based on location and speed of a rider compared to median of closest group

→ Check if detected event is impacting race outcome ("moves" in the 5th chasing group might be less important)

— **Use event-detection mechanism to find interesting attacks, crashes or moves within a group**

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ATTACK OF RIDER X

Speed Y | Speed 0 Rider X | Speed X

Group Y

CRASH/MECHANICAL RIDER X

Speed 0 Rider X | Speed Y

Group Y

RIDER X GETS DROPPED

Rider X | Speed Y

Group Y

② VIDEO DATA

Detected shots with importance score and audio over time
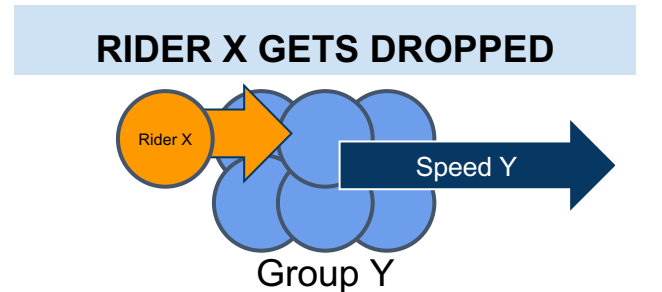
Importance score (TVSum)

Shot type : motor rear, single rider
Objects :
[cyclist (1), helmet (1), bike(1), bicycle wheel(1)]
Average shot importance score: 2.5
Detected team: Jumbo Visma
Detected text:
7 4,7 km LIVE EUROSPORT. 1 HD 131 13 JUMBO 6VISMA
Detected rider by text: Primož Roglič

Speed: 22 kph
Location: 53.1234, 3.3445
Heart rate: 177 BPM
Power: 403 Watt
Elevation: 1050m
Grade: +7%

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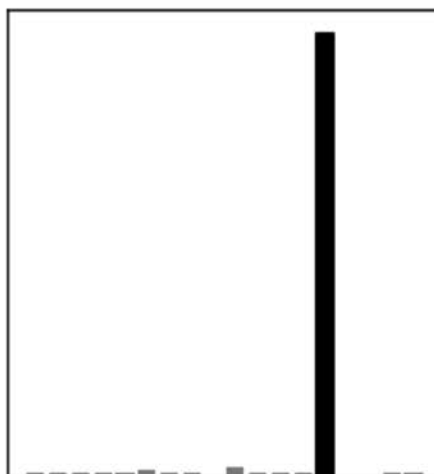# OpenPose pose detection

- **Very useful for detecting the camera angle**
    - Side shot
    - Rear shot
    - Front shot
- **Smart cropping**
    - Numbers can only be found on back, near pelvis
    - Main sponsor mostly on chest area at front

# IDLAB team detection

Team Jumbo-Visma 95%

AG2R(0.37 %)
Astana Pro Team(0.18 %)
Bahrain Merida(0.34 %)
Bora - Hansgrohe(0.29 %)
CCC Team(0.30 %)
Deceuninck - Quick Step(0.87 %)
EF Education First(0.07 %)
Groupama(0.10 %)
Lotto Soudal(0.06 %)
Mitchelton Scott(1.55 %)
Movistar Team(0.16 %)
Team Dimension Data(0.63 %)
Team Ineos(0.10 %)
Team Jumbo-Visma(94.77 %)
Team Katusha Alpecin(0.05 %)
Team Sunweb(0.03 %)
Trek - Segafredo(0.06 %)
UAE - Team Emirates(0.07 %)

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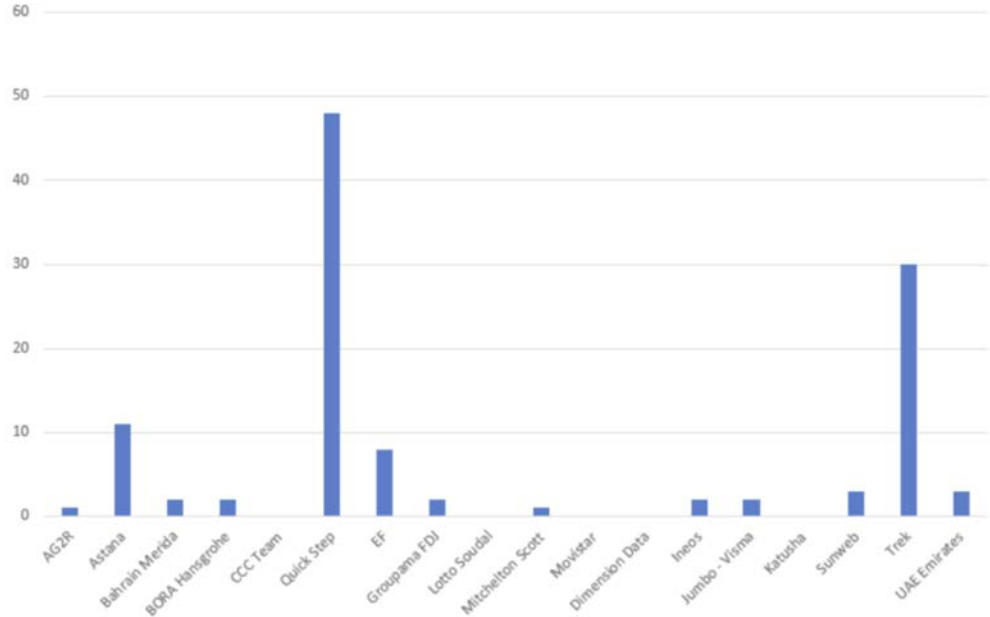# ③ Parcours and external data

Karnemelkbeekstraat, Ronse [50.7562547,3.5395908]

NEARBY CYCLING HERITAGE: (1) Van Wijnendaele Karel | statue
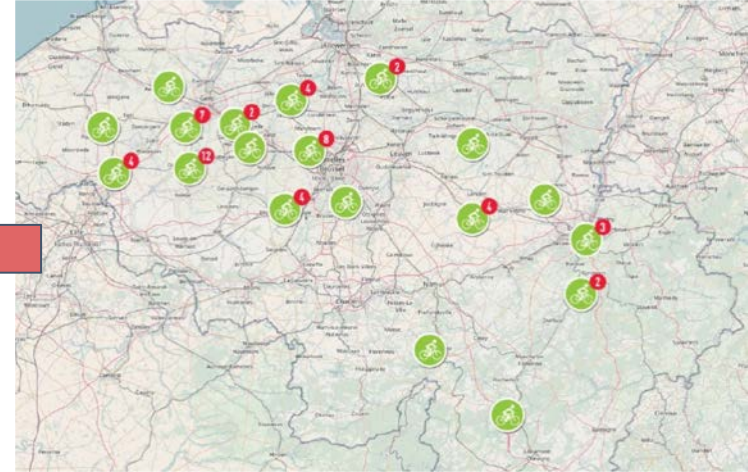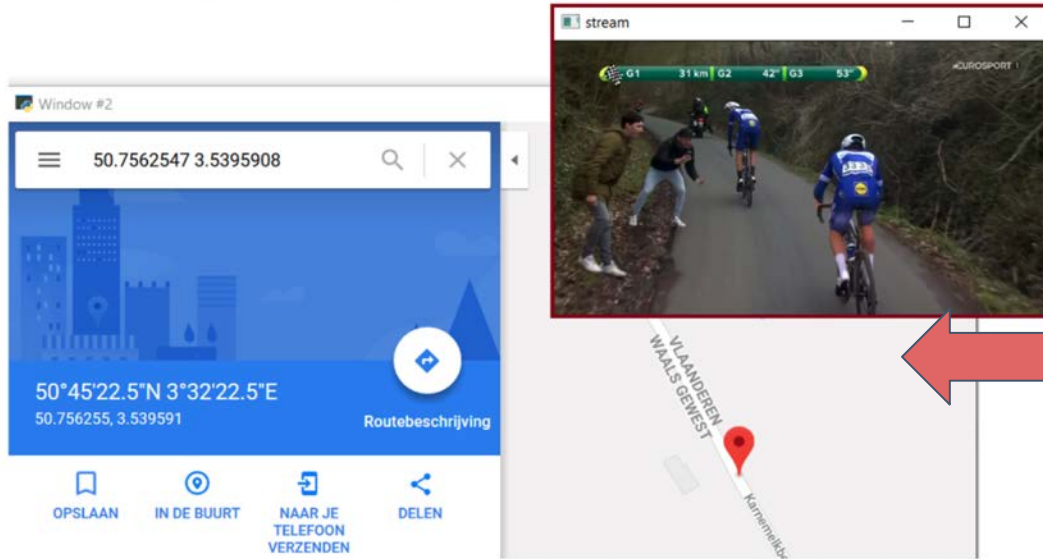
POSSIBLE APPLICATIONS

- Team stories
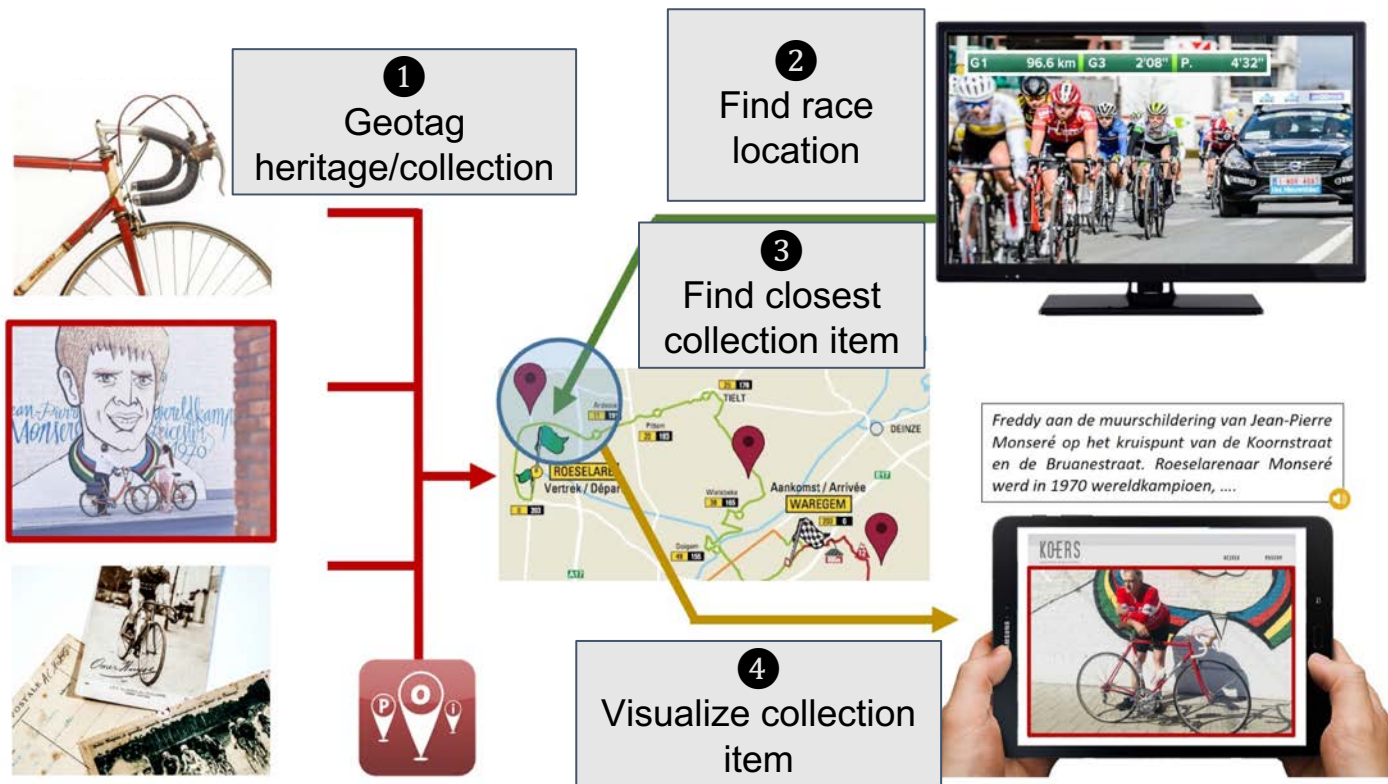- Publicity reporting
- Tactical insights

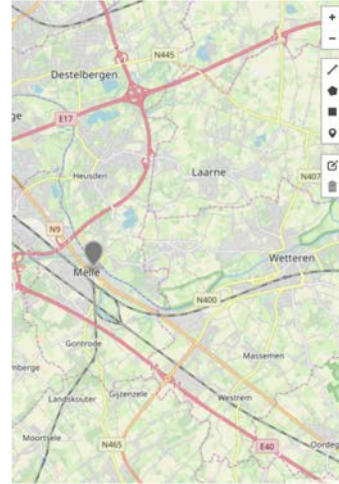Classica San Sebastian - last 40km - detected teams in footage

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Synchronized 2nd Screen enrichment

General procedure

1 Geotag heritage/collection

2 Find race location

3 Find closest collection item

4 Visualize collection item

Freddy aan de muurschildering van Jean-Pierre Monseré op het kruispunt van de Koornstraat en de Bruanestraat. Roeselarenaar Monseré werd in 1970 wereldkampioen, ...

① Geotag heritage/collection

- GeoJSON file of collection
- Themed around certain topic
  - Cycling cafes
  - Cycling monuments
  - Castles
  - …
- Geospatially indexed features

Cycling fan clubs geojson file visualized on http://geojson.io

2 + **3**
Find race location and relevant collection items

- Several techniques can be applied
  - Datastream monitoring (e.g. Gracenote, Velon, …)
  - Optical Character Recognition on live broadcast combined with race route file
- Find collection items within a certain radius of the current race location

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2 + 3 FUTURE EXTENSION
Find relevant collection items for team/rider on screen

Using the same **mechanisms** as **broadcast summarization**

Select relevant collection items **based on user preference and/or rider/team on screen**

Philippe GILBERT

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④ Visualize

https://users.ugent.be/~jcdbock/granddepart/preview/

Questions, Remarks and/or interesting ideas?

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