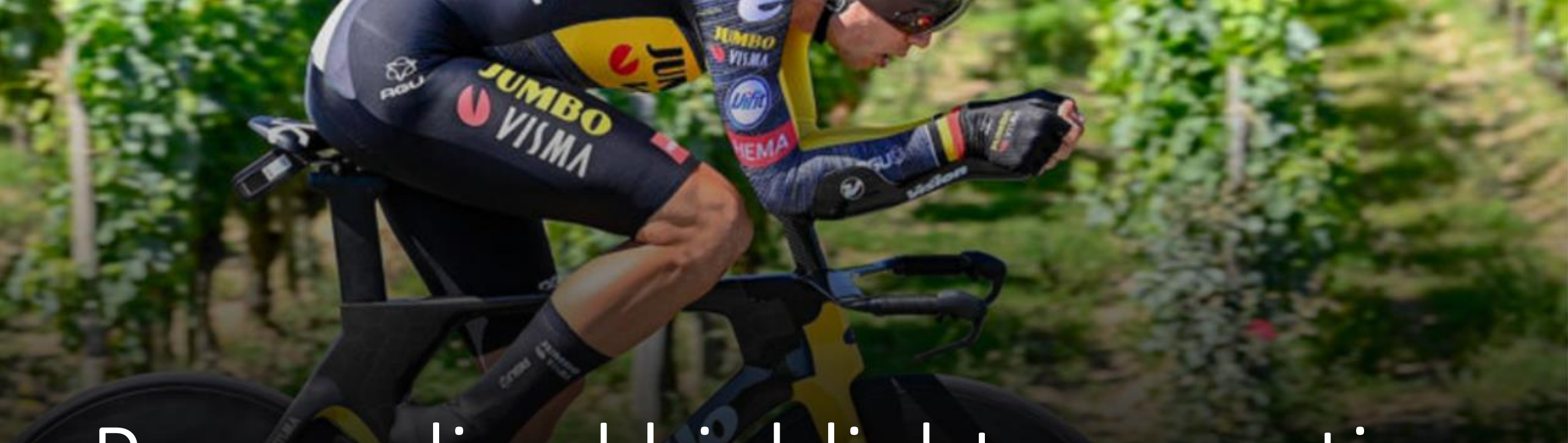

Personalized highlight generation during cycling races

STRADA - Sensor-driven Tripod for Recording Athlete DAta

Science & Cycling Bilbao - 29/06/23
Robbe Decorte, Jelle De Bock, Maarten Slembrouck, Steven Verstockt

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WHY STRADA

Was this a difficult race? What was the most challenging segment? Who were the most active riders?
CYCLING
VLAANDEREN

Can someone take a picture of me in the leading group?

I can’t see her. Is she still in the bunch/peloton?

WHY STRADA

Sensor/data overload

A lot of cut & paste activities to find/create useful insights

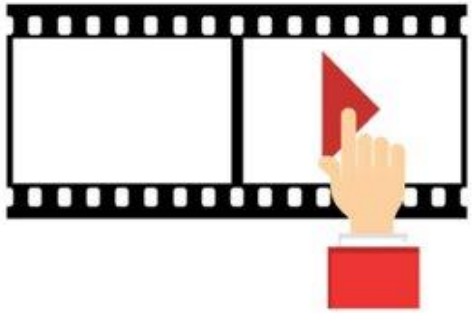
Time/delay impact on value of data

PROPOSED SOLUTION

Hardware:
Tripod
Smart camera (programmable)
Sensor data capturing device (ANT+)
Computing unit

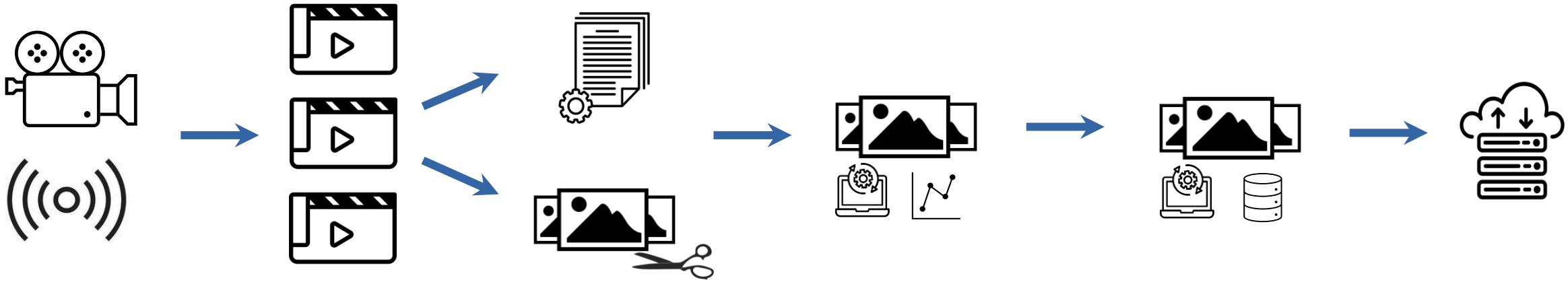
Software:
Collecting all data streams
Automatic video clip generation

short, personalized
video clips



STRADA-0

ARCHITECTURE



Recording setup

Incoming recordings

Transmission
Structured sensor information + video optimization

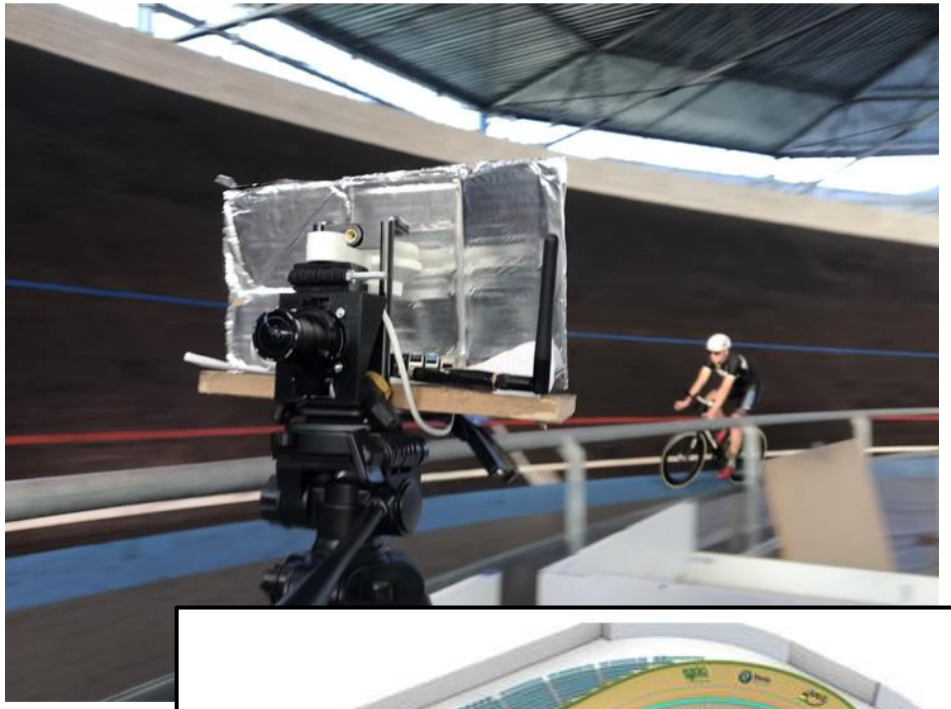
Frame processing
Video enrichment + sensor statistics

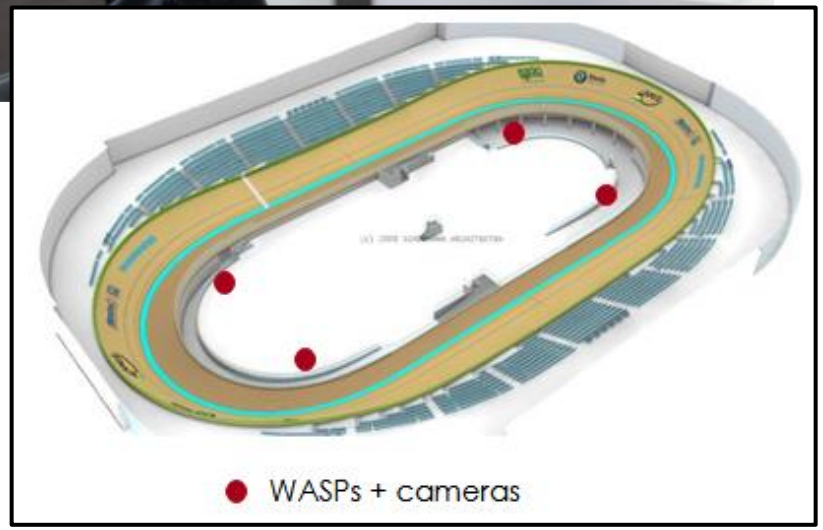
Individualized clipping

Output
Video API + streaming platform

PERSONALIZED CLIPS

- Clip boundaries defined by sensors
- Flexible buffer operations
  - Extend or shorten at start or end of clip
  - Based on camera orientation
  - Configured size guaranteed by the optimizer
- Supports offline recording and capturing

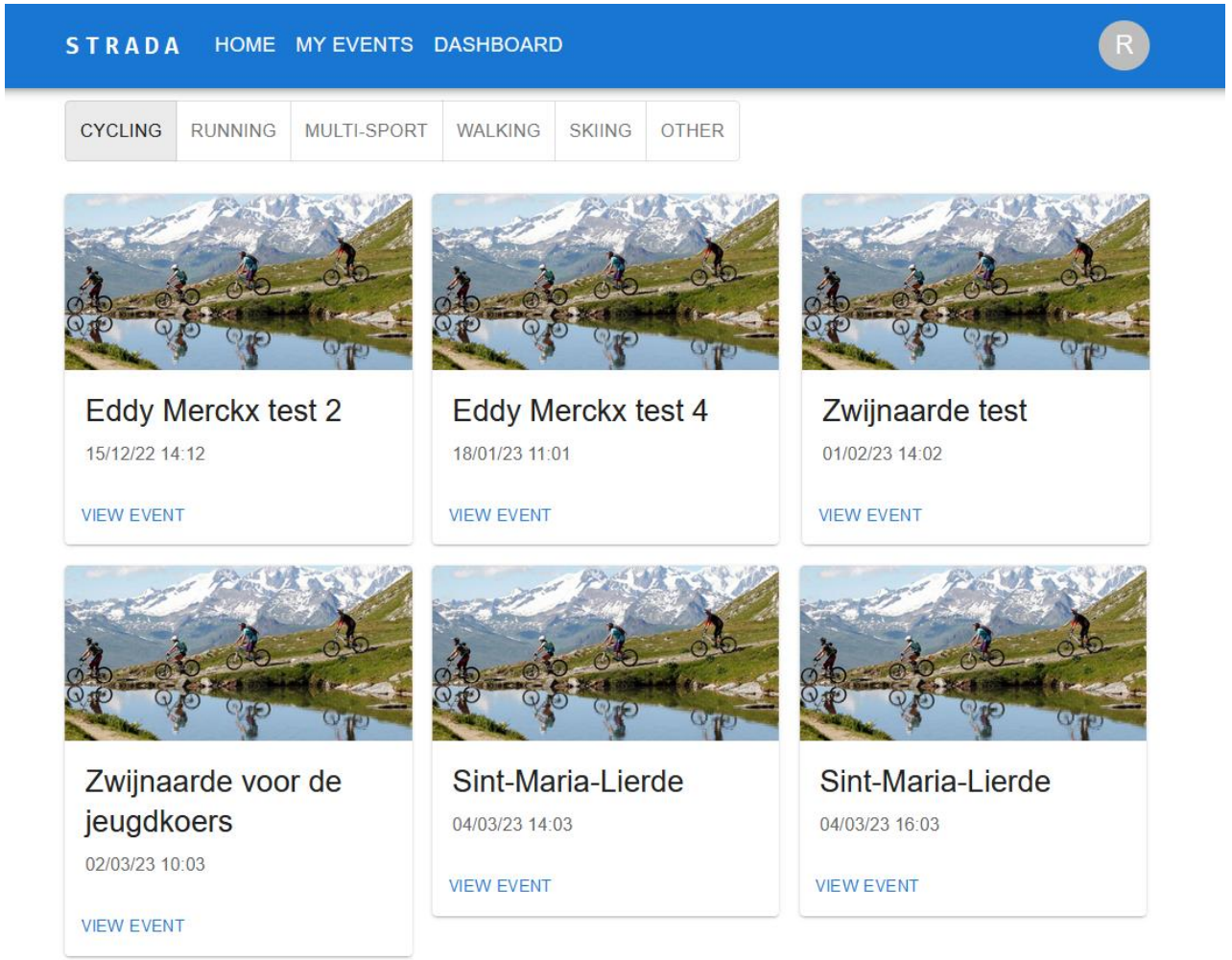




Strengths of STRADA: *realtime, multi-person, data-driven, GDPR-proof & low-cost*

Online streaming platform

https://strada.sportsdatascience.be/



STRADA HOME MY EVENTS DASHBOARD R

Sint-Maria-Lierde

U17

STARTED AT 04/03/23 14:03

ENDED ON 04/03/23 15:03

Streaming clips for 304

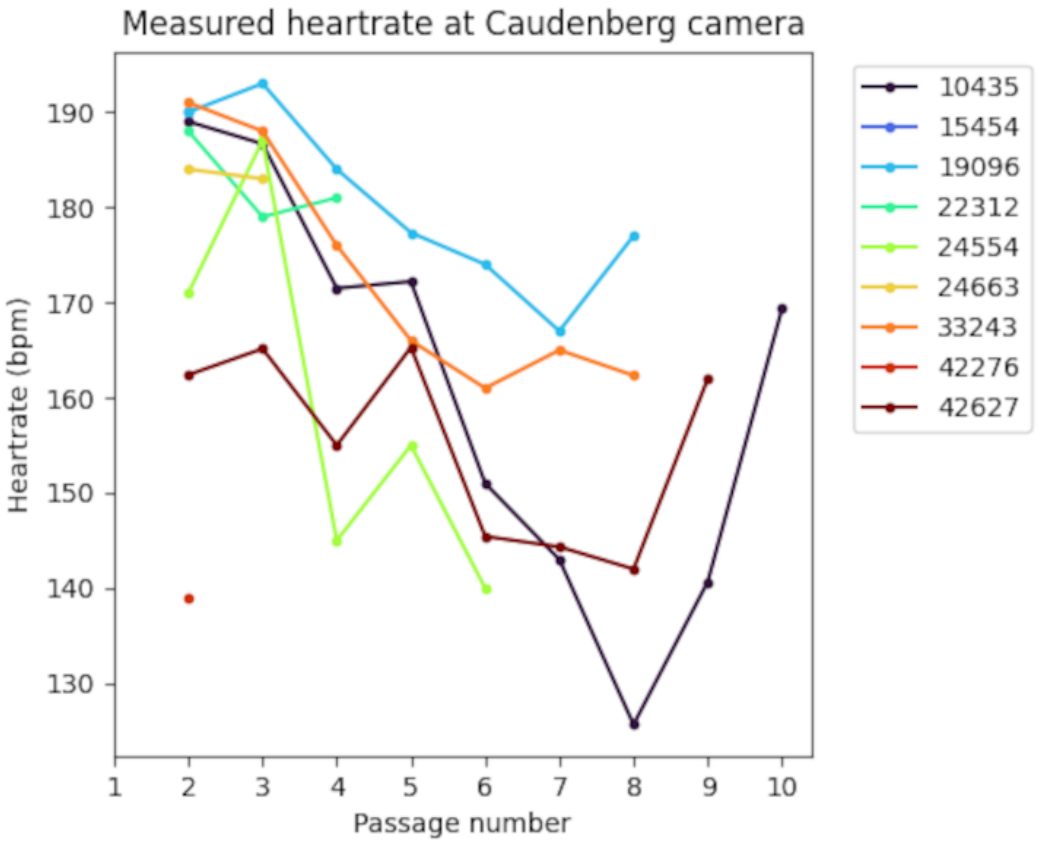
Selected sensor

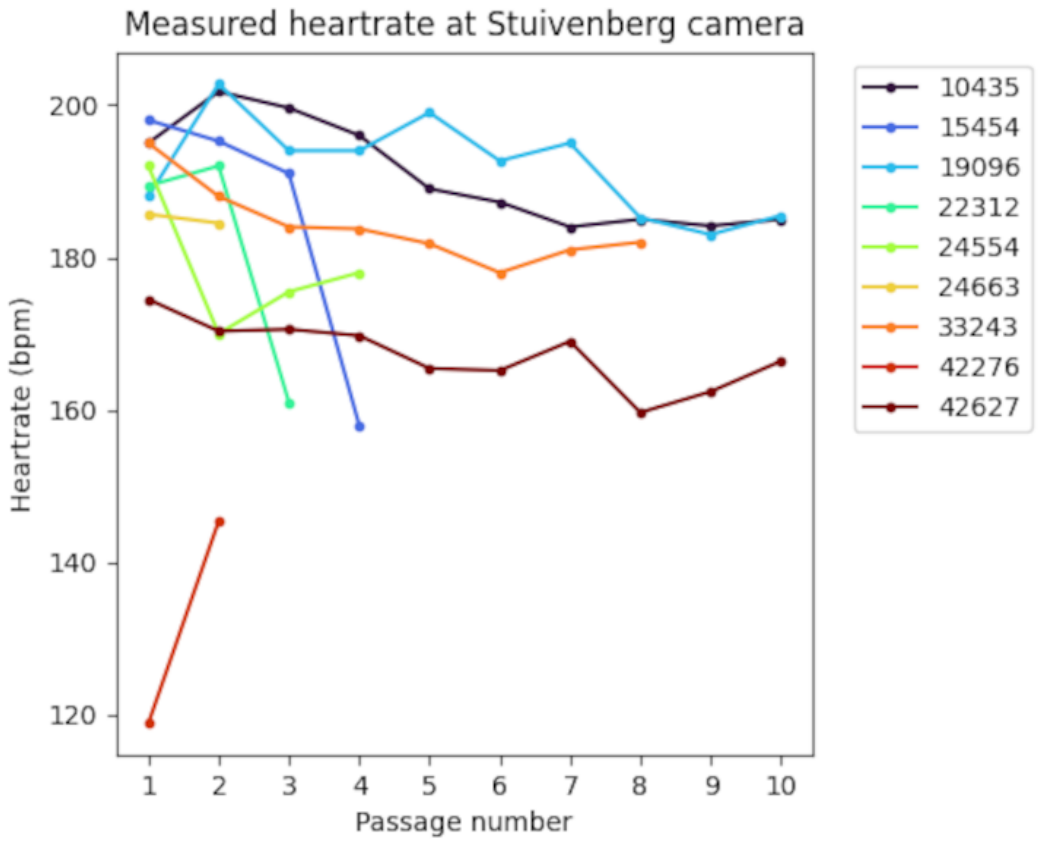
304

Passing Time	Description
14:16:56	Caudenberg
14:20:36	Stuivenberg
14:27:55	Caudenberg
14:31:42	Stuivenberg
14:39:00	Caudenberg

1 row selected 6–10 of 11

SENSOR INSIGHTS





>> Generate clip of the/my most challenging segment

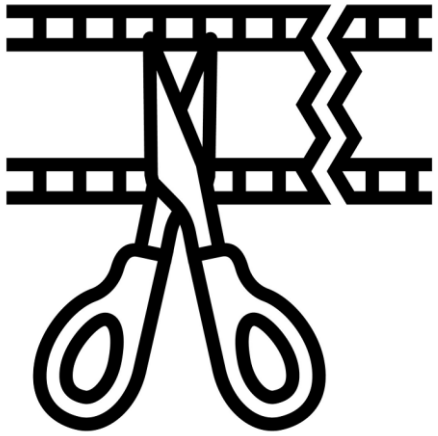
STRADA PROBLEMS

CAMERA BLOCKING

SENSOR BLOCKING

SOLUTION: BETTER POSITIONING OF STRADA POLES

STRADA PROBLEMS



LIERDE STATS

40.668 sensor values
> 250 riders
441 sensors
(224 HR, 159 power, 64 cadence)
different sensor types/manufacturers

DYNAMIC CLIP TIMINGS

SENSOR OVERLOADING

SOLUTION: CONTEXT-DEPENDENT ADAPTATIONS

FURTHER DEPLOYMENTS

- Use cases in different sports: track cycling, ice skating, ski and snowboard, athletics, …
- Testing during competition (mass running events / granfondos)
- STRADA on STRAVA segments (permanent)

CONCLUSIONS

- Hardware facilitates synchronized video and sensor data
- Individualized locality through signal sensing
- Reuse already present sensors
  (no extra hardware burden for riders)
- Realtime sensor reports and fast availability of clips

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QUESTIONS?

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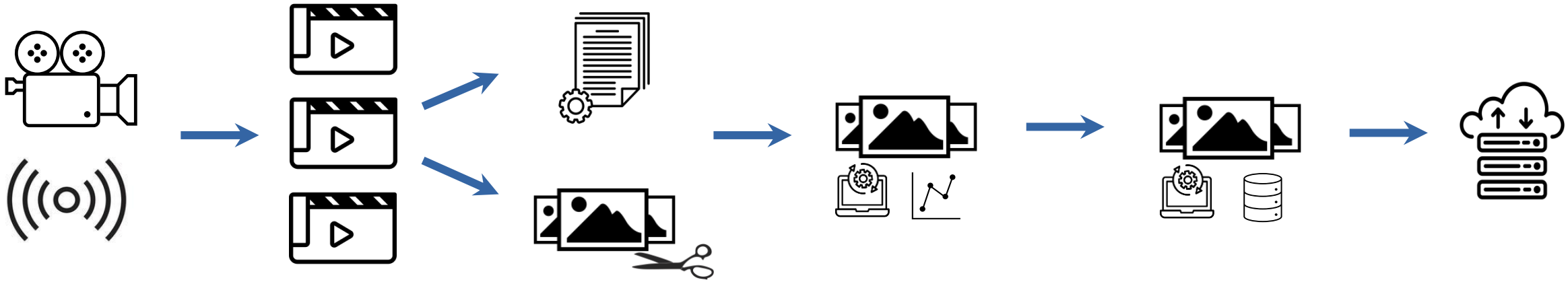
ARCHITECTURE



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