

Crowd Sensing Bike-Lane Quality

Rijkswaterstaat

Marcel de Rink (ESRI Nederland)

Milou Joosten (RWS)

Marco Aiello (RU Groningen)

Robert Boensma (Twente University)

Margriet Jansz (STW)

Wouter Meulemans (TU Eindhoven)

Hannes Mühleisen (CWI)

Ana Oprescu (UvA)

Ugo Vespiere (Leiden University)

Kaifeng Yang (Leiden University)

Problem description

Crowd sensing bike-lane quality

Improve safety



Problem description

Crowd sensing bike-lane quality

Improve safety



Social media considered harmful

No input while cycling

Minimal effort from cyclist



Road quality

What is road quality?

Damage and obstacles



Smoothness

Weather

Traffic

Air pollution

Lighting

Signaling



Our focus

Non-technical

Stakeholders

User incentives

Privacy

Technical

Data acquisition

Analysis

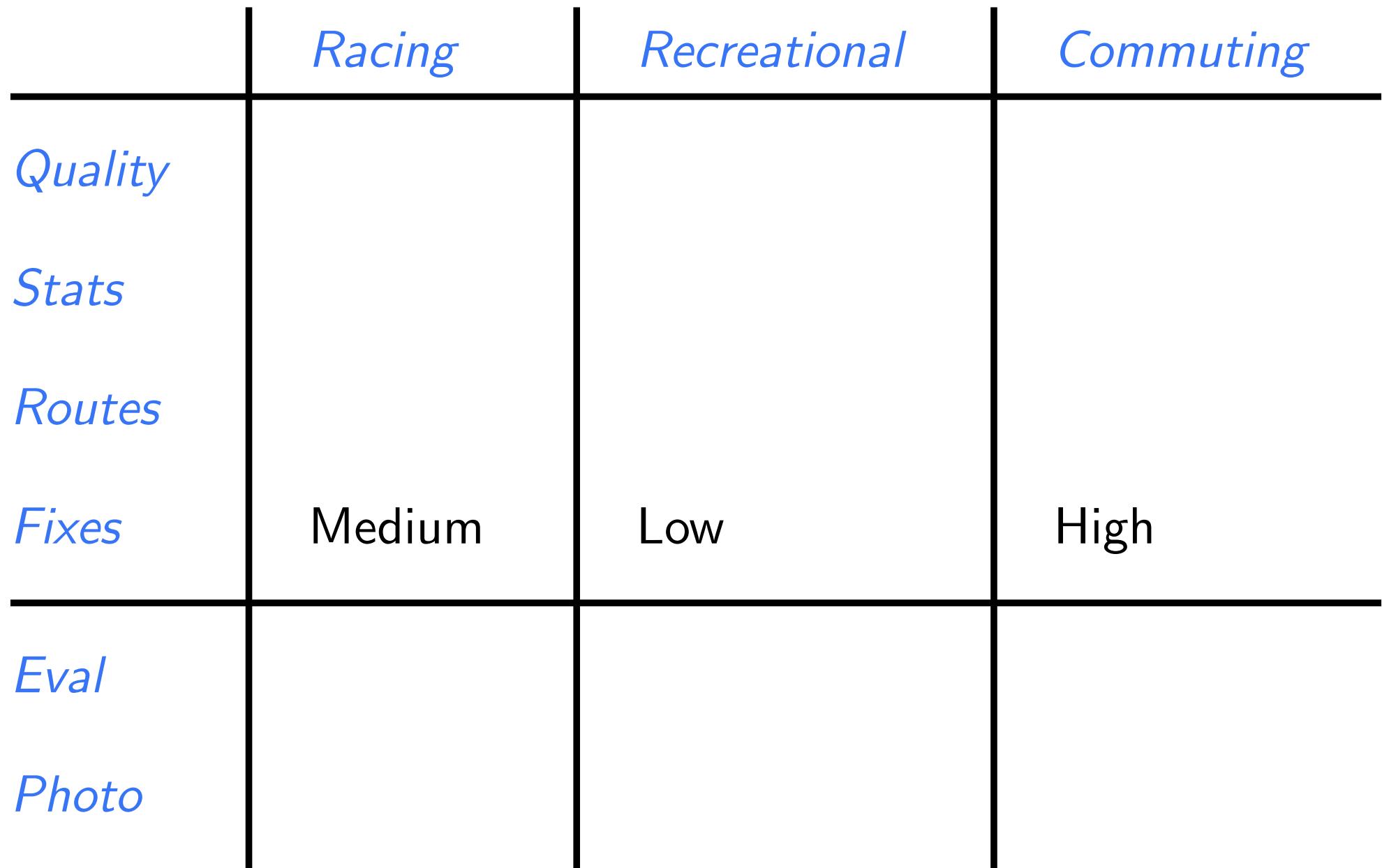
Privacy

Seasonal effects

Stakeholders

<i>Road authorities</i>	RWS, provinces, municipalities
<i>Bike providers</i>	OV-fiets, rental companies
<i>App features</i>	Insurance, tourist offices
<i>Other apps</i>	Fietsersbond & Eneco
	Natuurmonumenten
	Fiets!
	ANWB Fietsen
	...

User profiles



User profiles

	<i>Racing</i>	<i>Recreational</i>	<i>Commuting</i>
<i>Quality</i>	High		
<i>Stats</i>	High		
<i>Routes</i>	High		
<i>Fixes</i>	Medium	Low	High
<i>Eval</i>	High		
<i>Photo</i>	Medium		

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<i>Eval</i>	High	Medium	Low
<i>Photo</i>	Medium	High	Low

Data to quality

Sentiment mining



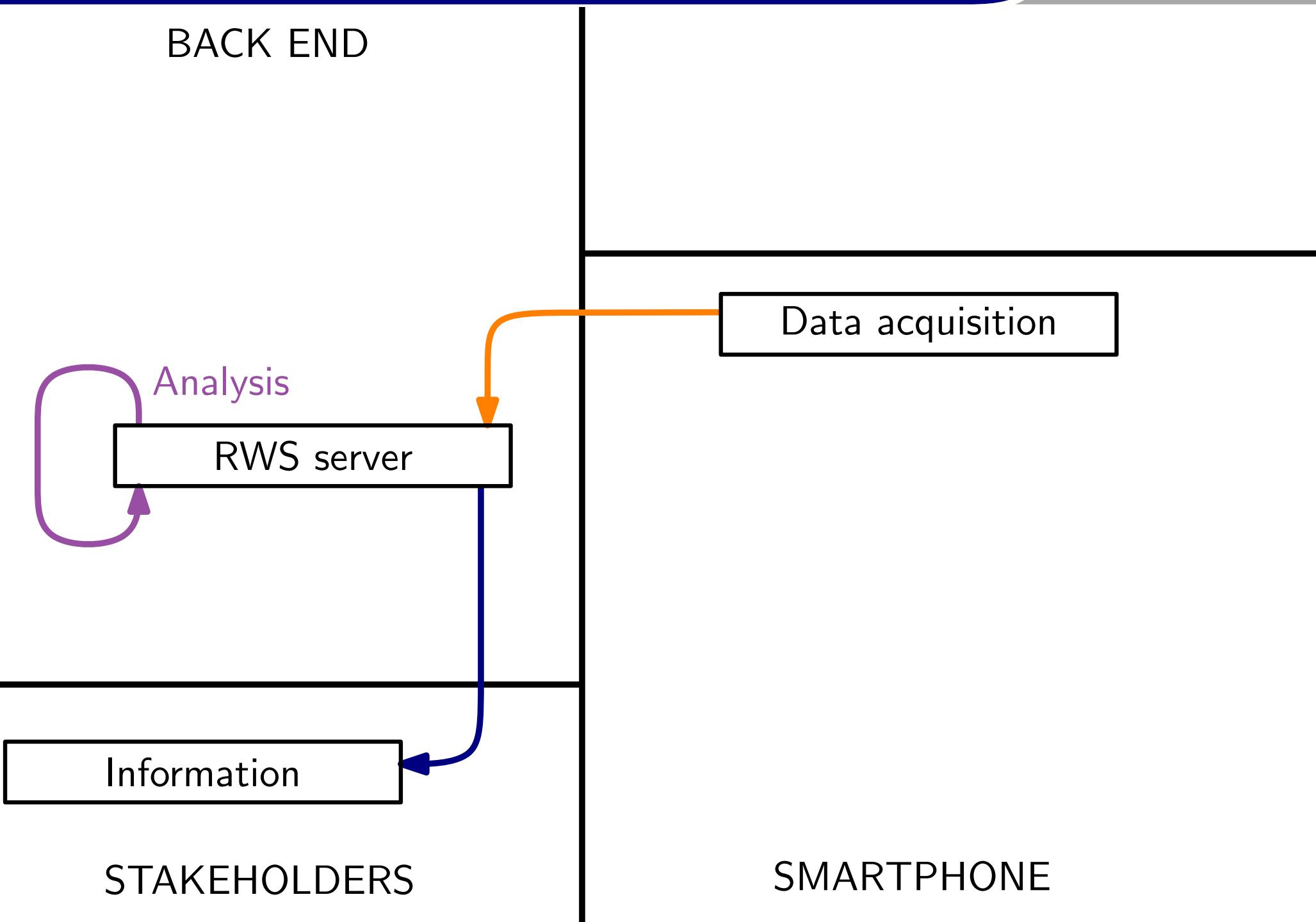
Route evaluation



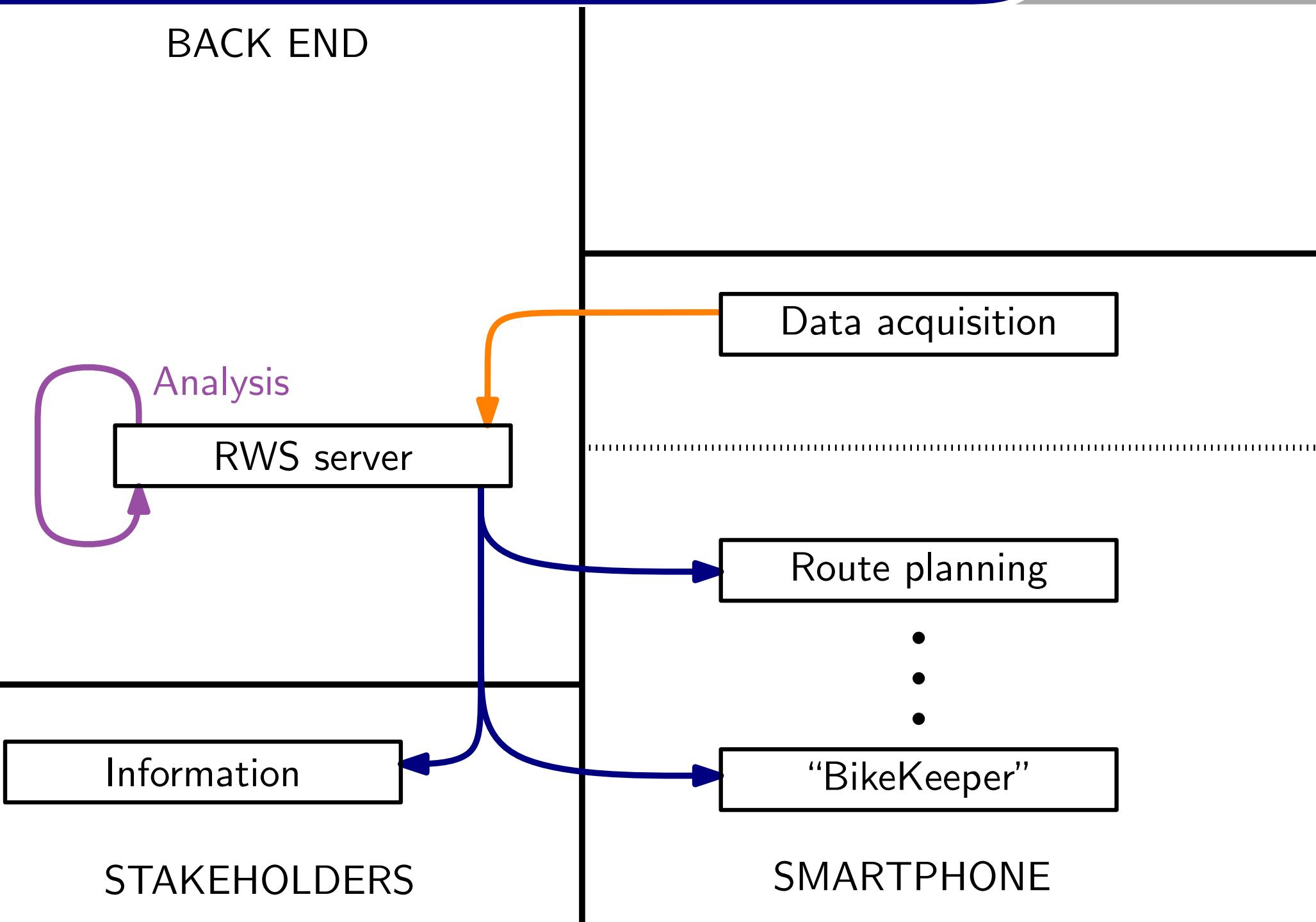
Sensor data



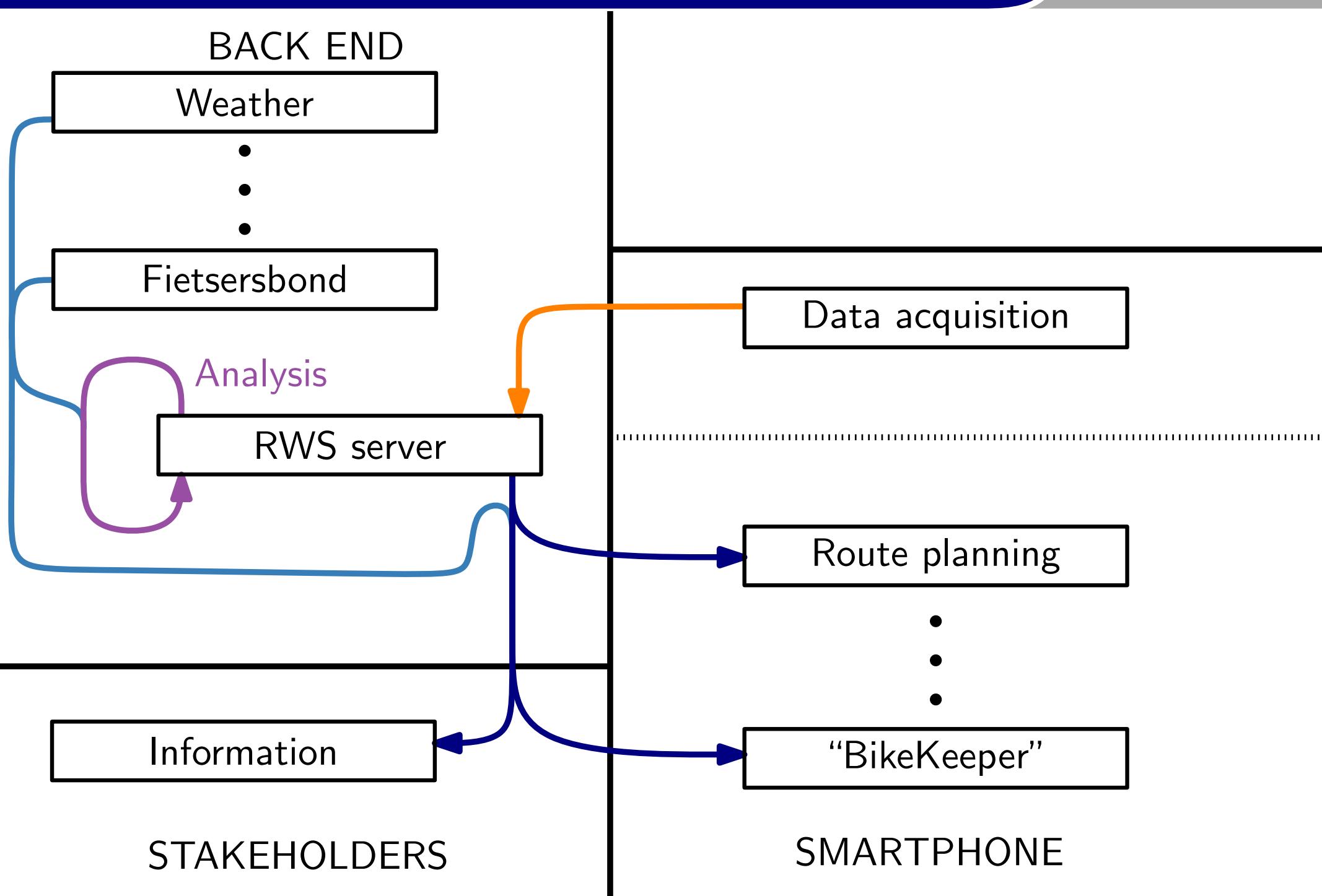
System



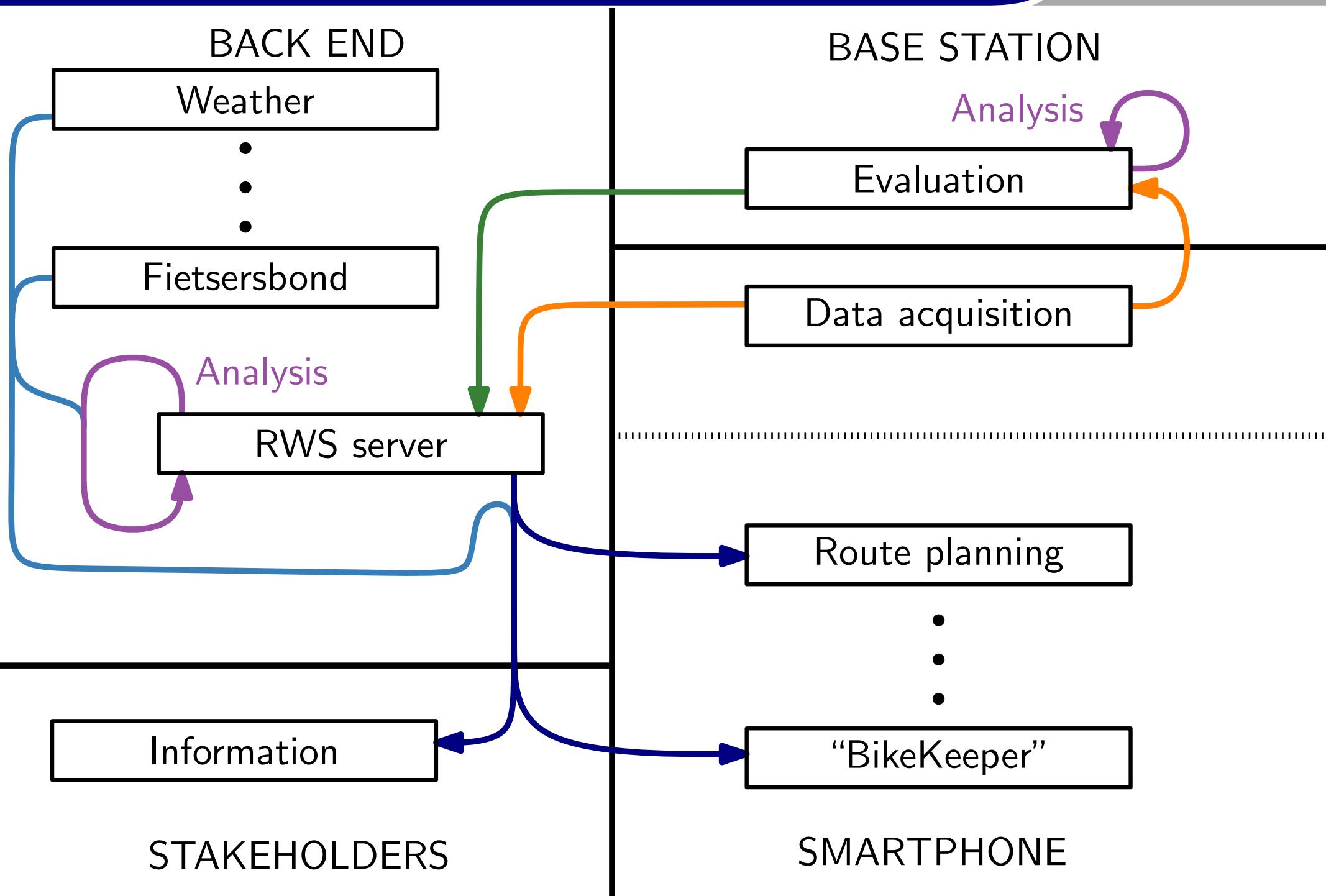
System



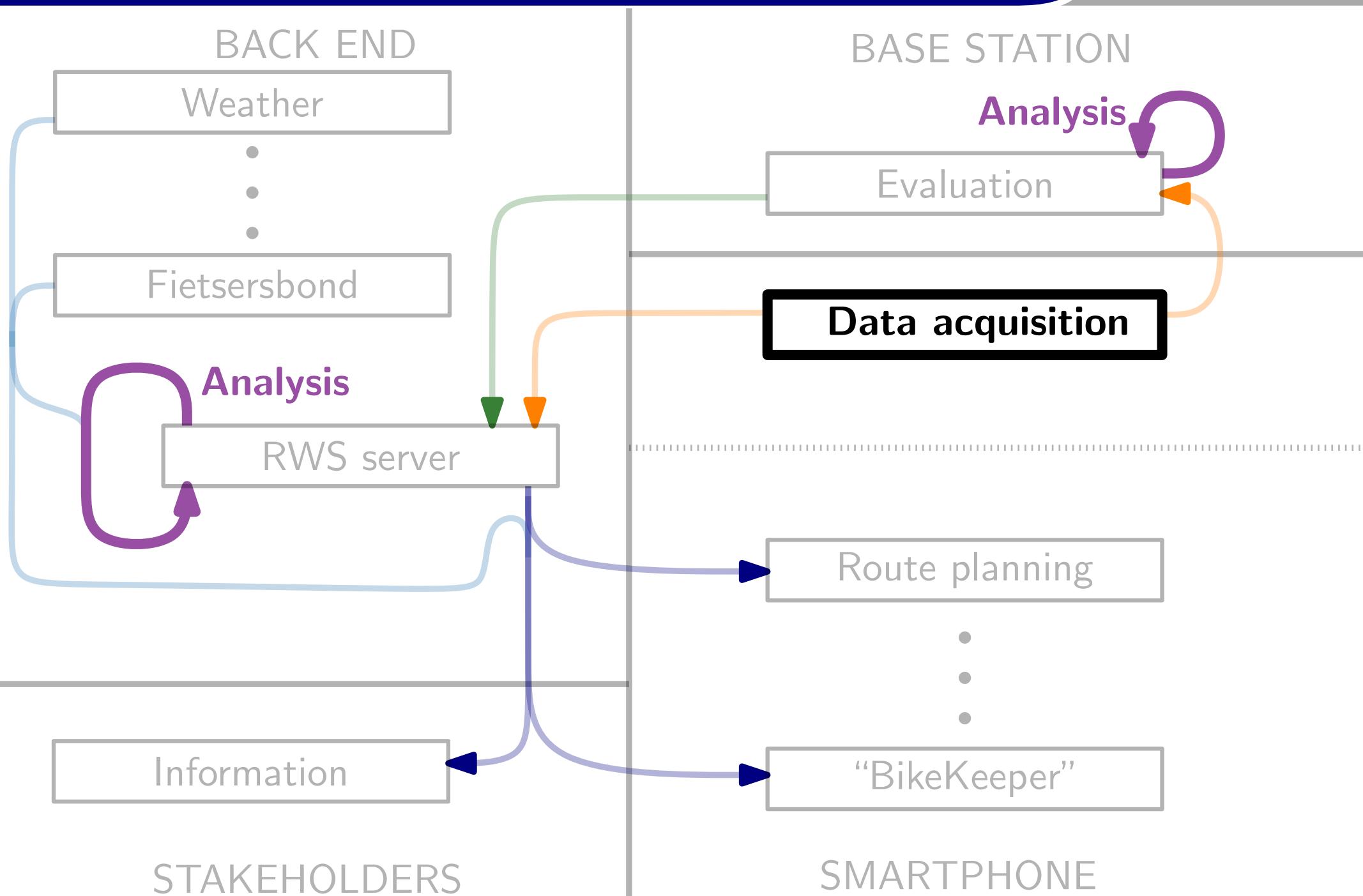
System



System



System



Sensors

GPS

Location, speed, direction

Accelerometer

Smoothness, breaking

Gyroscope

Hazards

Light sensor

Social safety

Magnetometer

Number of cars

Camera

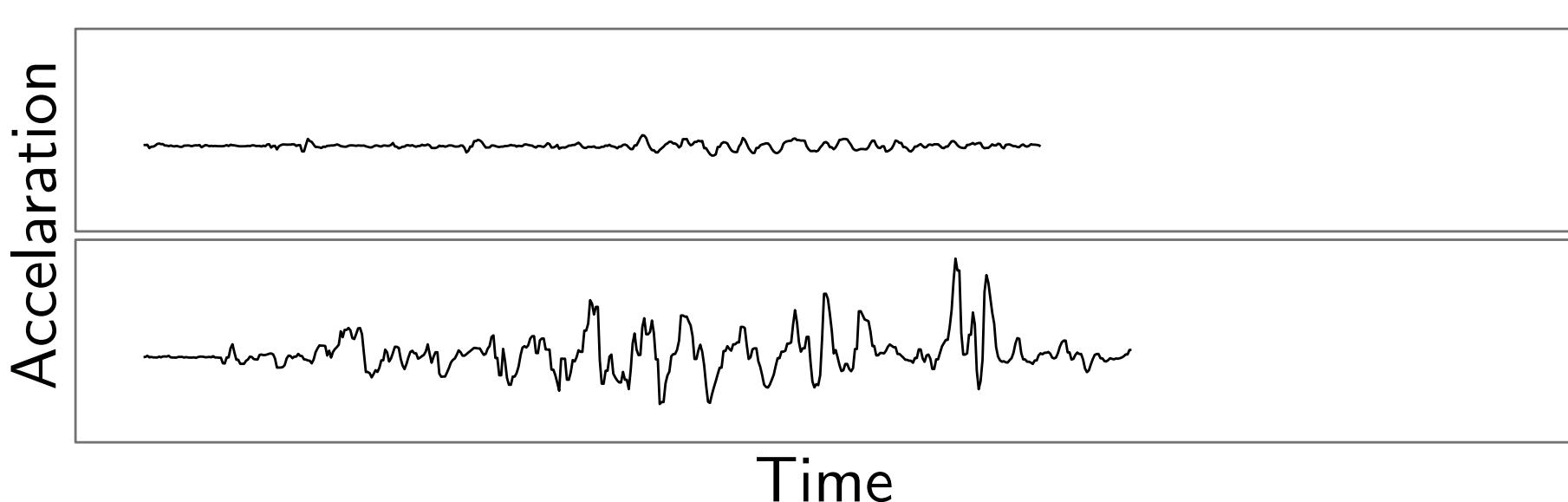
Evidence, detection

Acquisition & analysis

From preliminary data

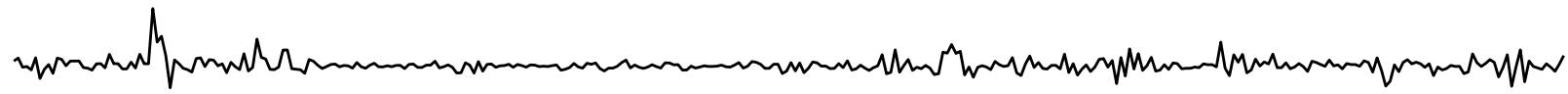
Small effects from bike/cyclist

Where is the phone?



Acquisition & analysis

Acceleration



Acquisition & analysis

Acceleration

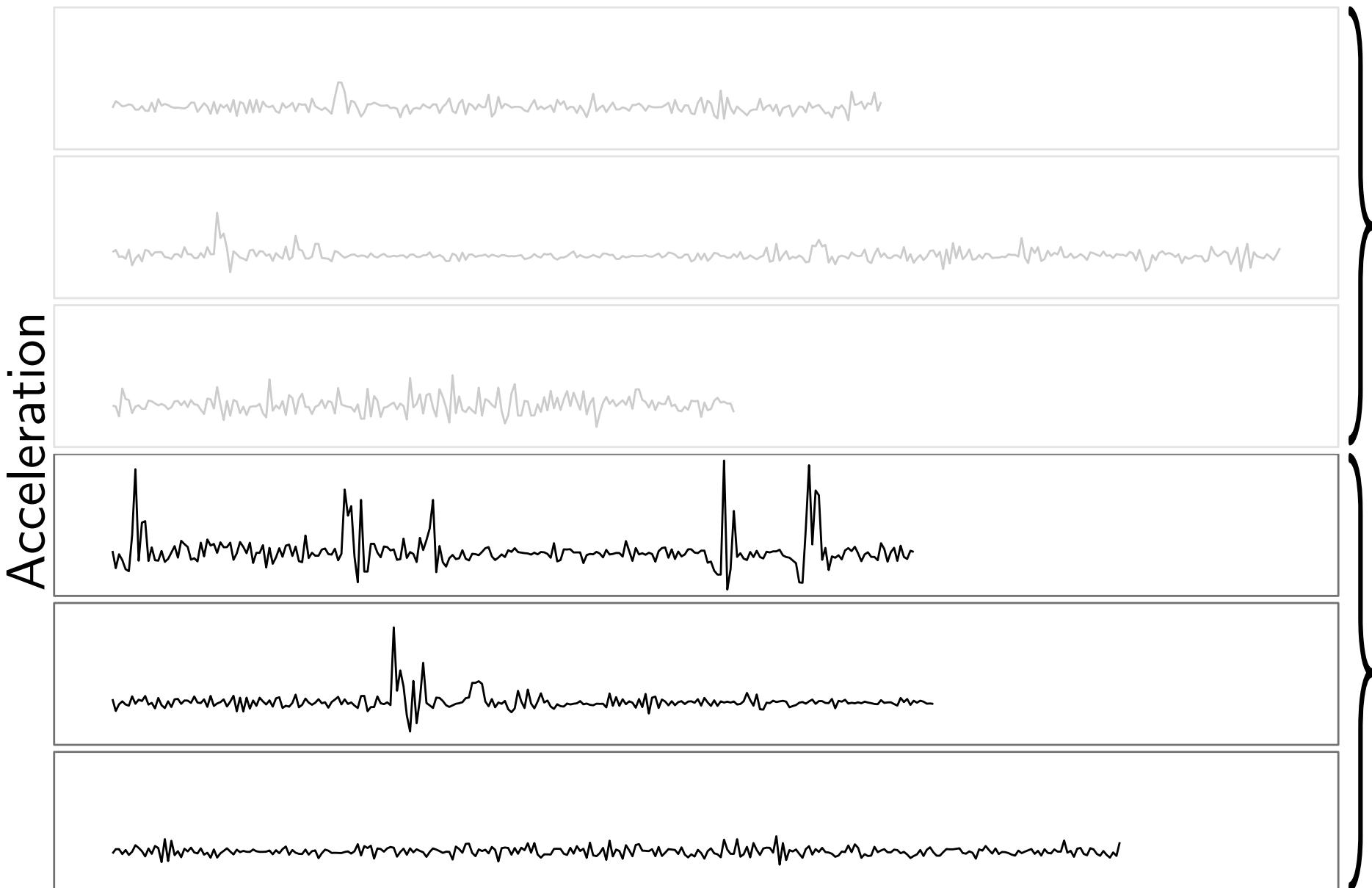


Acquisition & analysis

Acceleration



Acquisition & analysis



On a map



Outlook

Computer vision possibilities

Dialogue with stakeholders

Pilot study

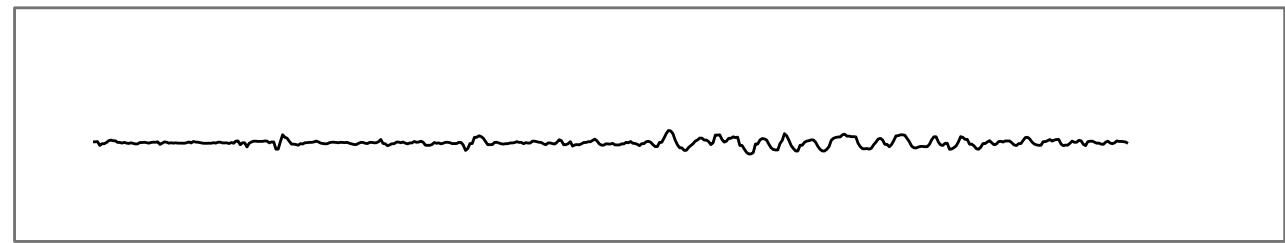
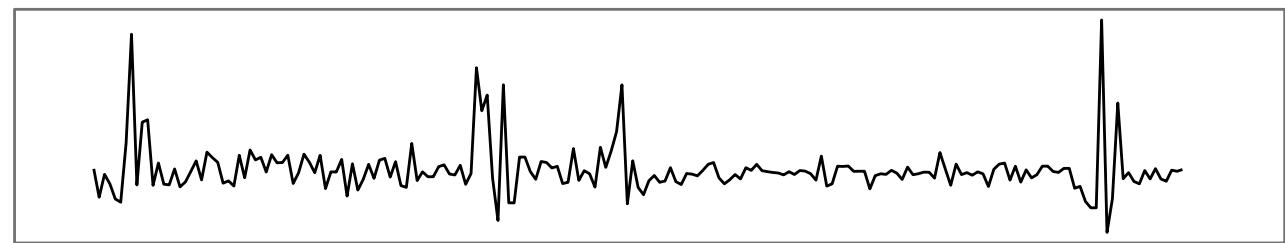
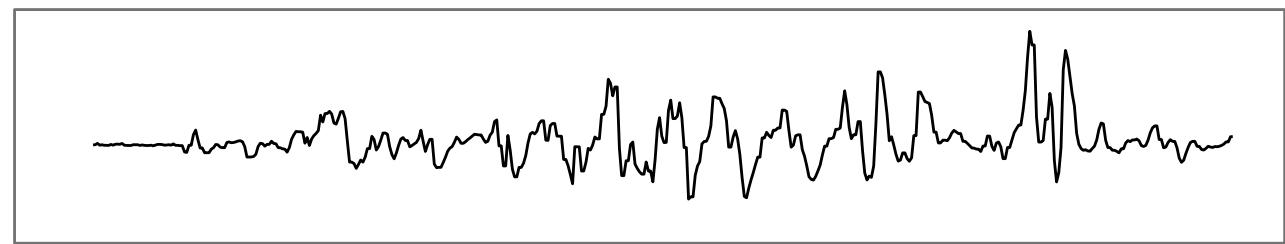


Outlook

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Thank you for your attention!

Want to help?

iPhone: SensorLog

Android: SenseView Sensor

Send logs to *shaken@u0d.de*