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TIB

Sacherschließung in der wissenschaftlichen Kommunikation neu definiert: Möglichkeiten im Informationszeitalter

Markus Stocker, Irina Sens, Sören Auer

Leibniz
Gemeinschaft

Was wäre wenn ...

- Die globale wissenschaftliche Wissensbasis mehr als ein Dokumentenverzeichnis wäre
- Wissenschaftliche Information und Wissen auch FAIR für Maschinen wäre

Was wäre wenn ...

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- Wissenschaftliche Information und Wissen auch FAIR für Maschinen wäre
- Zur Zeit
  - Auffindbarkeit könnte besser sein
  - Angenommen Open Access ist Zugänglichkeit OK
  - Interoperabilität und Nachnutzung ist für Maschinen unmöglich

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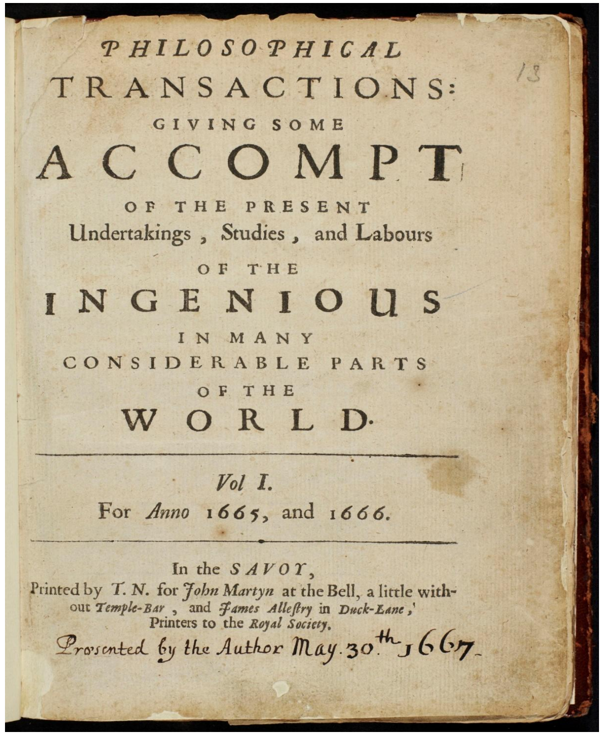
- Zur Zeit
  - Auffindbarkeit könnte besser sein
  - Angenommen Open Access ist Zugänglichkeit OK
  - Interoperabilität und Nachnutzung ist für Maschinen unmöglich
- Die Infrastruktur der wissenschaftlichen Kommunikation steckt im letzten Jahrhundert
- Es gab zwar eine Digitalisierung (engl. *digitization*) der Dokumente die zuvor gedruckt wurden
- Eine “digitale Revolution” (engl. *digitalization*) wie in anderen Bereichen ist aber ausgeblieben

Digitalisierung der wissenschaftlichen Kommunikation

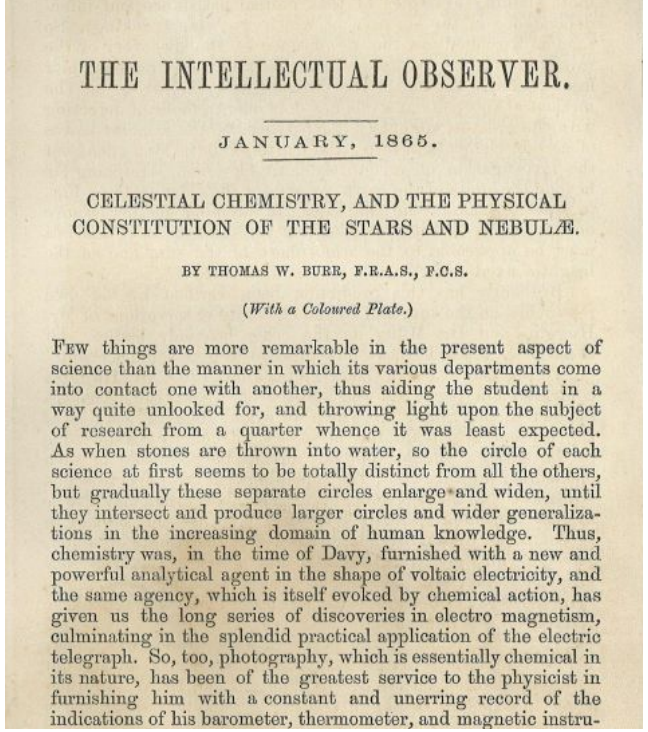


PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.

Vol I.
For Anno 1665, and 1666.

In the SAVOY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane, Printers to the Royal Society.

Presented by the Author May. 30th 1667.



THE INTELLECTUAL OBSERVER.

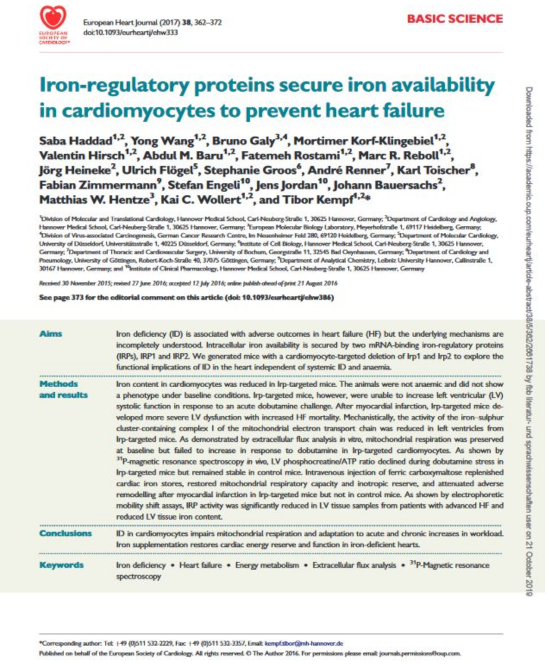
JANUARY, 1865.

CELESTIAL CHEMISTRY, AND THE PHYSICAL CONSTITUTION OF THE STARS AND NEBULÆ.

BY THOMAS W. BURR, F.R.A.S., F.C.S.

(With a Coloured Plate.)

Few things are more remarkable in the present aspect of science than the manner in which its various departments come into contact one with another, thus aiding the student in a way quite unlooked for, and throwing light upon the subject of research from a quarter whence it was least expected. As when stones are thrown into water, so the circle of each science at first seems to be totally distinct from all the others, but gradually these separate circles enlarge and widen, until they intersect and produce larger circles and wider generalizations in the increasing domain of human knowledge. Thus, chemistry was, in the time of Davy, furnished with a new and powerful analytical agent in the shape of voltaic electricity, and the same agency, which is itself evoked by chemical action, has given us the long series of discoveries in electro magnetism, culminating in the splendid practical application of the electric telegraph. So, too, photography, which is essentially chemical in its nature, has been of the greatest service to the physicist in furnishing him with a constant and unerring record of the indications of his barometer, thermometer, and magnetic instru-



European Heart Journal (2017) 38, 362–372
doi:10.1093/eurheartj/ehw333

BASIC SCIENCE

Iron-regulatory proteins secure iron availability in cardiomyocytes to prevent heart failure

Saba Haddad[1,2], Yong Wang[1,2], Bruno Galy[3,4], Mortimer Korf-Klingebiel[1,2], Valentin Hirsch[1,2], Abdul M. Baru[1,2], Fatemeh Rostami[1,2], Marc R. Reboll[1,2], Jörg Heineke[2], Ulrich Flögel[5], Stephanie Groos[6], André Renner[7], Karl Toischer[8], Fabian Zimmermann[9], Stefan Engeli[10], Jens Jordan[10], Johann Bauersachs[2], Matthias W. Hentze[3], Kai C. Wollert[1,2], and Tibor Kempf[1,2]*

[1]Division of Molecular and Translational Cardiology, Hannover Medical School, Carl-Neuberg-Straße 1, 30625 Hannover, Germany; [2]Department of Cardiology and Angiology, Hannover Medical School, Carl-Neuberg-Straße 1, 30625 Hannover, Germany; [3]European Molecular Biology Laboratory, Meyerhofstraße 1, 69117 Heidelberg, Germany; [4]Division of Virus-associated Carcinogenesis, German Cancer Research Centre, Im Neuenheimer Feld 280, 69120 Heidelberg, Germany; [5]Department of Molecular Cardiology, University of Düsseldorf, Universitätsstraße 1, 40225 Düsseldorf, Germany; [6]Institute of Cell Biology, Hannover Medical School, Carl-Neuberg-Straße 1, 30625 Hannover, Germany; [7]Department of Thoracic and Cardiovascular Surgery, University of Bochum, Georgstraße 11, 32545 Bad Oeynhausen, Germany; [8]Department of Cardiology and Pneumology, University of Göttingen, Robert-Koch-Straße 40, 37075 Göttingen, Germany; [9]Department of Analytical Chemistry, Leibniz University Hannover, Callinstraße 1, 30167 Hannover, Germany; and [10]Institute of Clinical Pharmacology, Hannover Medical School, Carl-Neuberg-Straße 1, 30625 Hannover, Germany

Received 30 November 2015; revised 27 June 2016; accepted 12 July 2016; online publish-ahead-of-print 21 August 2016

See page 373 for the editorial comment on this article (doi: 10.1093/eurheartj/ehw386)

Aims Iron deficiency (ID) is associated with adverse outcomes in heart failure (HF) but the underlying mechanisms are incompletely understood. Intracellular iron availability is secured by two mRNA-binding iron-regulatory proteins (IRPs), IRP1 and IRP2. We generated mice with a cardiomyocyte-targeted deletion of Irp1 and Irp2 to explore the functional implications of ID in the heart independent of systemic ID and anaemia.

Methods and results Iron content in cardiomyocytes was reduced in Irp-targeted mice. The animals were not anaemic and did not show a phenotype under baseline conditions. Irp-targeted mice, however, were unable to increase left ventricular (LV) systolic function in response to an acute dobutamine challenge. After myocardial infarction, Irp-targeted mice developed more severe LV dysfunction with increased HF mortality. Mechanistically, the activity of the iron–sulphur cluster-containing complex I of the mitochondrial electron transport chain was reduced in left ventricles from Irp-targeted mice. As demonstrated by extracellular flux analysis *in vitro*, mitochondrial respiration was preserved at baseline but failed to increase in response to dobutamine in Irp-targeted cardiomyocytes. As shown by ^{31}P-magnetic resonance spectroscopy *in vivo*, LV phosphocreatine/ATP ratio declined during dobutamine stress in Irp-targeted mice but remained stable in control mice. Intravenous injection of ferric carboxymaltose replenished cardiac iron stores, restored mitochondrial respiratory capacity and inotropic reserve, and attenuated adverse remodelling after myocardial infarction in Irp-targeted mice but not in control mice. As shown by electrophoretic mobility shift assays, IRP activity was significantly reduced in LV tissue samples from patients with advanced HF and reduced LV tissue iron content.

Conclusions ID in cardiomyocytes impairs mitochondrial respiration and adaptation to acute and chronic increases in workload. Iron supplementation restores cardiac energy reserve and function in iron-deficient hearts.

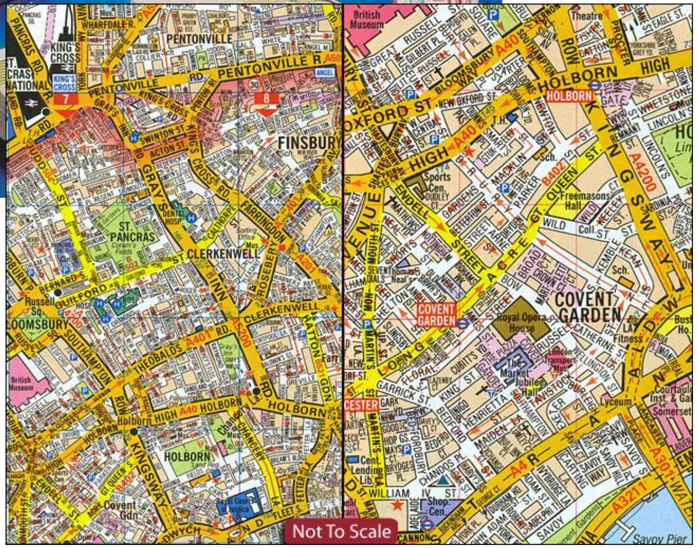
Keywords Iron deficiency • Heart failure • Energy metabolism • Extracellular flux analysis • ^{31}P-Magnetic resonance spectroscopy

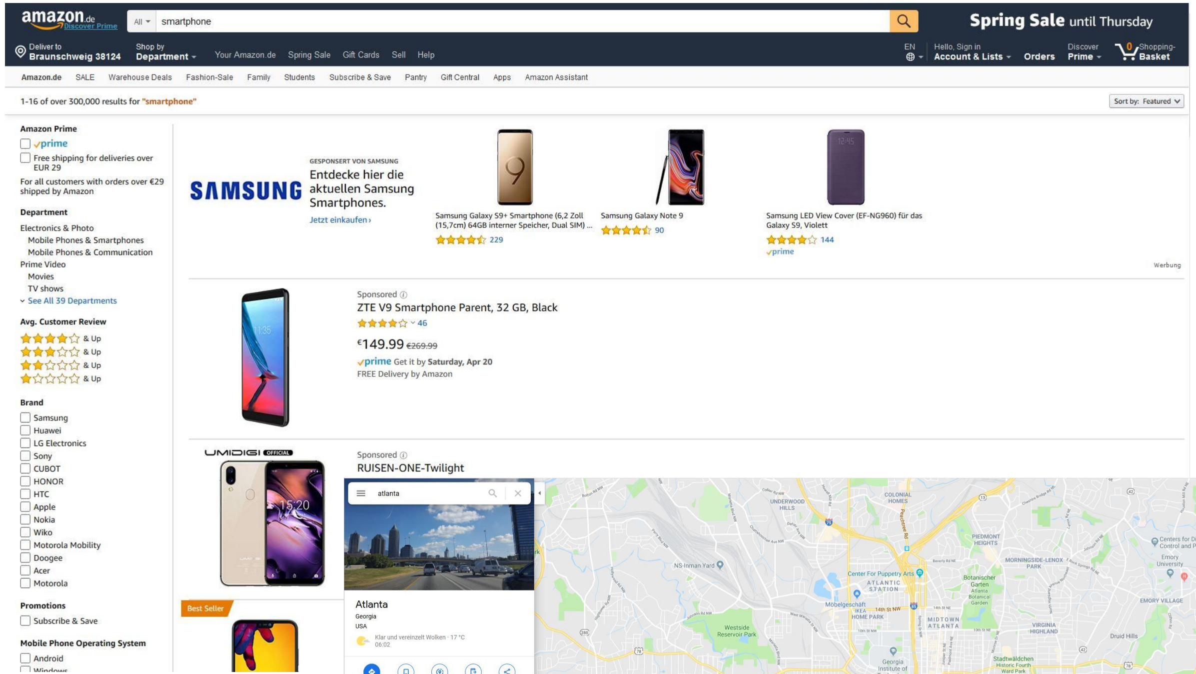
*Corresponding author: Tel: +49 (0)511 532-2229, Fax: +49 (0)511 532-3357, Email: kempf.tibor@mh-hannover.de

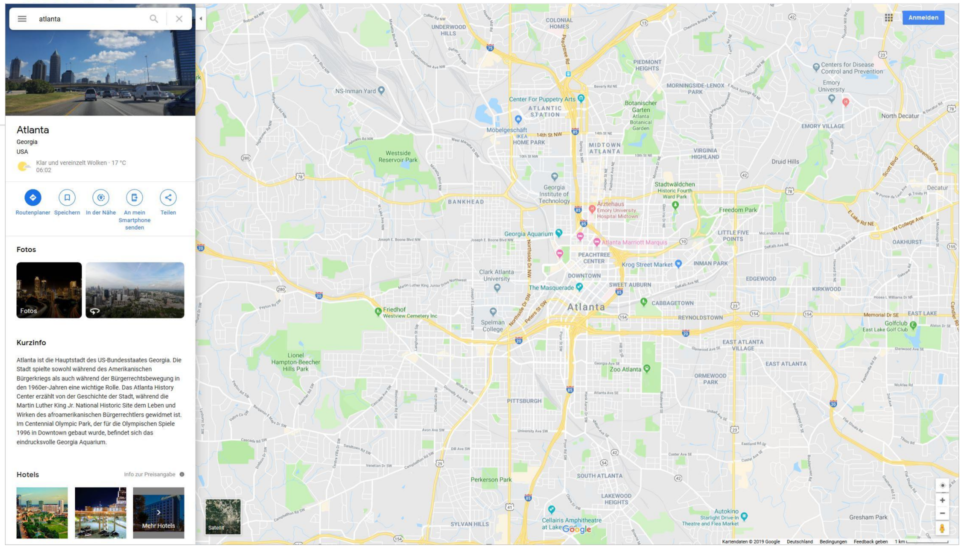
http://doi.org/10.1093/eurheartj/ehw333

… über fast vier Jahrhunderte

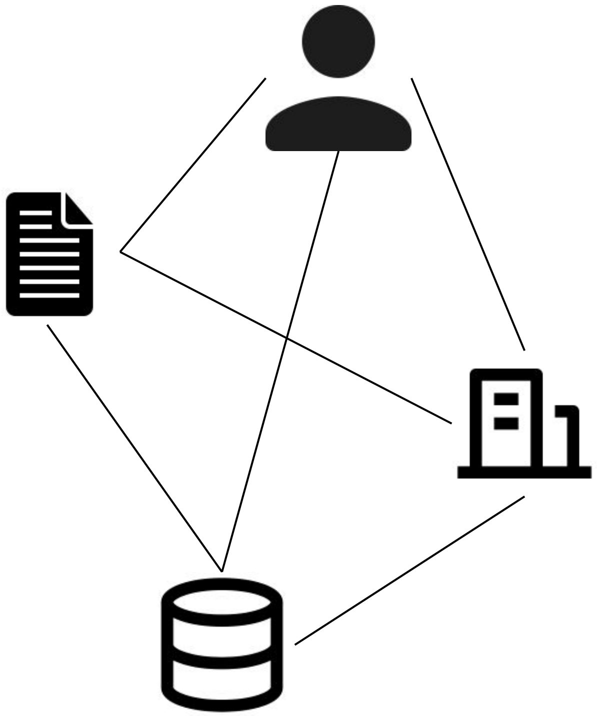
Digitalisierung an anderer Stelle







Ganz so schlimm ist es nicht



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Open Research Knowledge Graph

TIB

- Infrastruktur um wissenschaftliches Wissen welches in der Literatur kommuniziert wird maschinenlesbar zu akquirieren, kuratieren, veröffentlichen und prozessieren
- “Tiefe Sacherschließung”: Nicht nur bibliographische Metadaten und mehr als Schlagwörter
- Multimodal mit Crowdsourcing, Text Mining, “semantische” Infrastruktur, usw.
- Wenn Wissen generiert wird, Beitrag geschrieben, eingereicht, veröffentlicht, gelesen wird, usw.

Open Research Knowledge Graph

Web

http://orkg.org

- Projektseite: https://projects.tib.eu/orkg/
- API Dokumentation: https://www.orkg.org/orkg/doc/api/
- Software: https://gitlab.com/TIBHannover/orkg
- Twitter: https://twitter.com/orkg_org
- Skype: https://join.skype.com/giNqo7JBpvtw
- Mailing list: https://groups.google.com/forum/#!forum/orkg

Scholarly Knowledge. Structured.

TIB

Situational Knowledge Representation for Traffic Observed by a Pavement Vibration Sensor Network

Markus Stocker, Mauno Rönkkö, and Mikko Kolehmainen

***Abstract*—Information systems that build on sensor networks often process data produced by measuring physical properties. These data can serve in the acquisition of knowledge for real-world situations that are of interest to information services and, ultimately, to people. Such systems face a common challenge, namely the considerable gap between the data produced by measurement and the abstract terminology used to describe real-world situations. We present and discuss the architecture of a software system that utilizes sensor data, digital signal processing, machine learning, and knowledge representation and reasoning to acquire, represent, and infer knowledge about real-world situations observable by a sensor network. We demonstrate the application of the system to vehicle detection and classification by measurement of road pavement vibration. Thus, real-world situations involve vehicles and information for their type, speed, and driving direction.**

***Index Terms*—Knowledge acquisition, knowledge representation, machine learning, sensor data, sensor networks, traffic monitoring.**

I. Introduction

WE propose a software system architecture and implementation for the continuous and automated representation of knowledge for real-world situations observable by a sensor network. In this paper, we demonstrate the application of the software system to intelligent transportation systems. Thus, real-world situations involve vehicles and information for their type, speed, and driving direction.

According to Finkelstein [1], "measurement is the process of empirical, objective, assignment of numbers to properties of objects or events of the real world in such a way as to describe them." A sensor is a device that performs measurement, in that it transforms the signal of a physical property (e.g., heat) into numbers or, more generally, into data [2]. Sensor measurement is, hence, the process of recurrent application of such transformation for certain temporal and spatial locations. The result of sensor measurement is sensor data. Sensor data represent the change of the signal over time.

Despite recent advancements in sensor data management, processing, and query [2]–[4], as well as semantic description of sensors and data [5]–[7], making sense of sensor data is an ongoing challenge [8]–[10] because of the difference in the degree to which sensor data represents information about a signal and information about, or related to, a physical property [11]. In other words, it is a challenge because of the considerable gap between data produced by measurement and abstract terminology [12] used by people to describe (the properties of) real-world objects or events.

We are interested in *situations* involving real-world objects that affect a physical property, for which a signal is measured by means of sensors. In this paper, vehicles are the real-world objects and road pavement vibration is the physical property. We present the architecture of a software system that utilizes digital signal processing, machine learning, and knowledge representation and reasoning to acquire, represent, and infer knowledge about real-world situations involving vehicles. The system aims at reducing the gap between road pavement vibration measurement data and abstract terminology used to describe real-world situations involving vehicles.

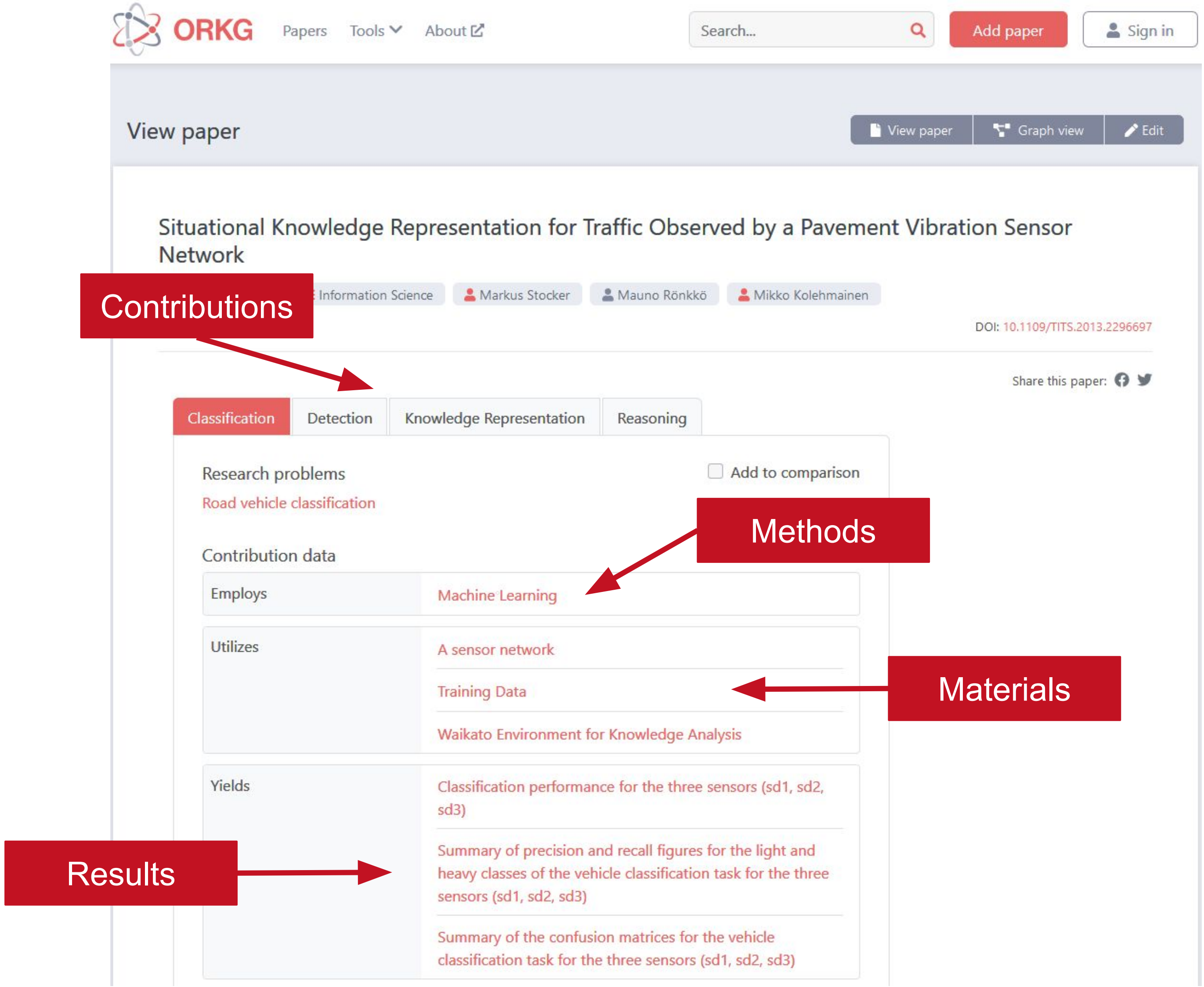
Digital signal processing techniques are iteratively applied to a sliding window over sensor data to enhance the vibration signal and to transform sensor data (time domain) into patterns (frequency domain). Machine learning is used to classify patterns. We employ multilayer perceptron (MLP) feedforward artificial neural networks [13]. Techniques in knowledge representation are utilized to formally represent domain concepts, instances, and relations. A concept of interest to our domain is the vibration sensor. The (installed) sensors are represented as instances of this concept. An instance may have a number of relations, e.g., to a spatial location. We represent sensors and observations using the Semantic Sensor Network Ontology (SSNO) [14].[1] SSNO is an "ontology for describing the capabilities of sensors, the act of sensing and the resulting observations" [15]. We employ the Situation Theory Ontology[2] (STO) [16] to represent knowledge about real-world situations, which are acquired from observations. The STO captures the key aspects of the situation theory developed by Barwise and Perry [17] and extended by Devlin [18]. The theory relates to the work on situation awareness by Endsley [19], [20] as it encompasses most of the concepts discussed in [16]. Both the SSNO and the STO serve as upper ontologies from which we extend to accommodate domain knowledge. The hybrid use of the SSNO and the STO allows for a multilevel abstraction of sensor measurement data and the use of appropriate terminology and formalization at each level.

Manuscript received April 12, 2013; revised August 16, 2013 and November 20, 2013; accepted December 22, 2013. Date of publication February 4, 2014; date of current version August 1, 2014. The infrastructure to access and collect vibration and camera data, as well as the data, are part of research funded by Tekes, the Finnish Funding Agency for Technology and Innovation (funding decision number 40075/09). The Associate Editor for this paper was P. Grisleri.

The authors are with the Department of Environmental Science, University of Eastern Finland, 70211 Kuopio, Finland (e-mail: markus.stocker@uef.fi; mauno.ronkko@uef.fi; mikko.kolehmainen@uef.fi).

Digital Object Identifier 10.1109/TITS.2013.2296697

[1] http://purl.oclc.org/NET/ssnx/ssn
[2] http://vistology.com/ont/2008/STO/STO.owl



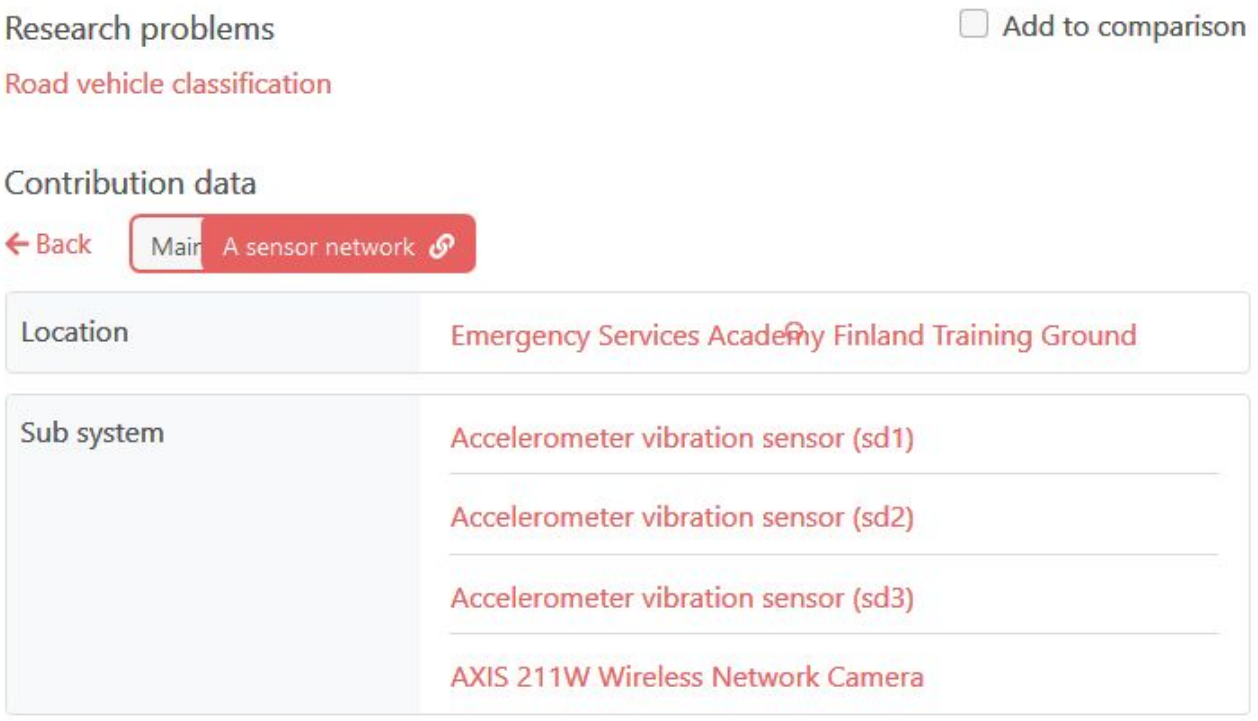
II. Materials and Methods

Here, we first present the materials used in this paper, namely the sensor network, the retrieved data, and software. We then detail the methods utilized to process sensor data, as well as to acquire, represent, and infer knowledge.

A. Materials

Road pavement vibration was measured using three CEF C3M01 accelerometer vibration sensors developed by Control Express Finland (CEF) Oy[3] for condition monitoring and machinery maintenance. (CEF C3M01 sensors are currently manufactured by Webrosensor Oy[4] as WBS CM301.) The sensor network was installed at the training site of the Finnish Emergency Services College, Kuopio, Finland. The site is used for emergency response training in simulated situations involving, for instance, vehicles or buildings that are on fire. The area can be accessed by vehicle, and its paved light traveled roads are for different types of vehicles, such as ambulances and fire trucks. The three accelerometer vibration sensors were part of a wider sensor network that consisted of chemical sensors, weather stations, acoustic sensors, and surveillance cameras. The sensor network was installed and maintained for a Finnish research project that aimed at the development of systems for the monitoring of an operational environment.

The accelerometer vibration sensors—hereafter referred to as sensing devices sd_1, sd_2, and sd_3—were installed with a relative distance of approximately 45 m at the right side (with respect to the surveillance camera, described later) along one of the roads at the training site. Each sensor was mounted on a metal bar that penetrated approximately 1 m into the ground, roughly 0.5 m below the paved road surface. The sensors measured ground vibration, including vibration induced by vehicles. We visually monitored the road using an AXIS 211W Wireless Network Camera with an Outdoor Antenna Kit AXIS 211W [21]. The camera was positioned on top of a viewpoint tower located nearby the road and directed toward the monitored road section.



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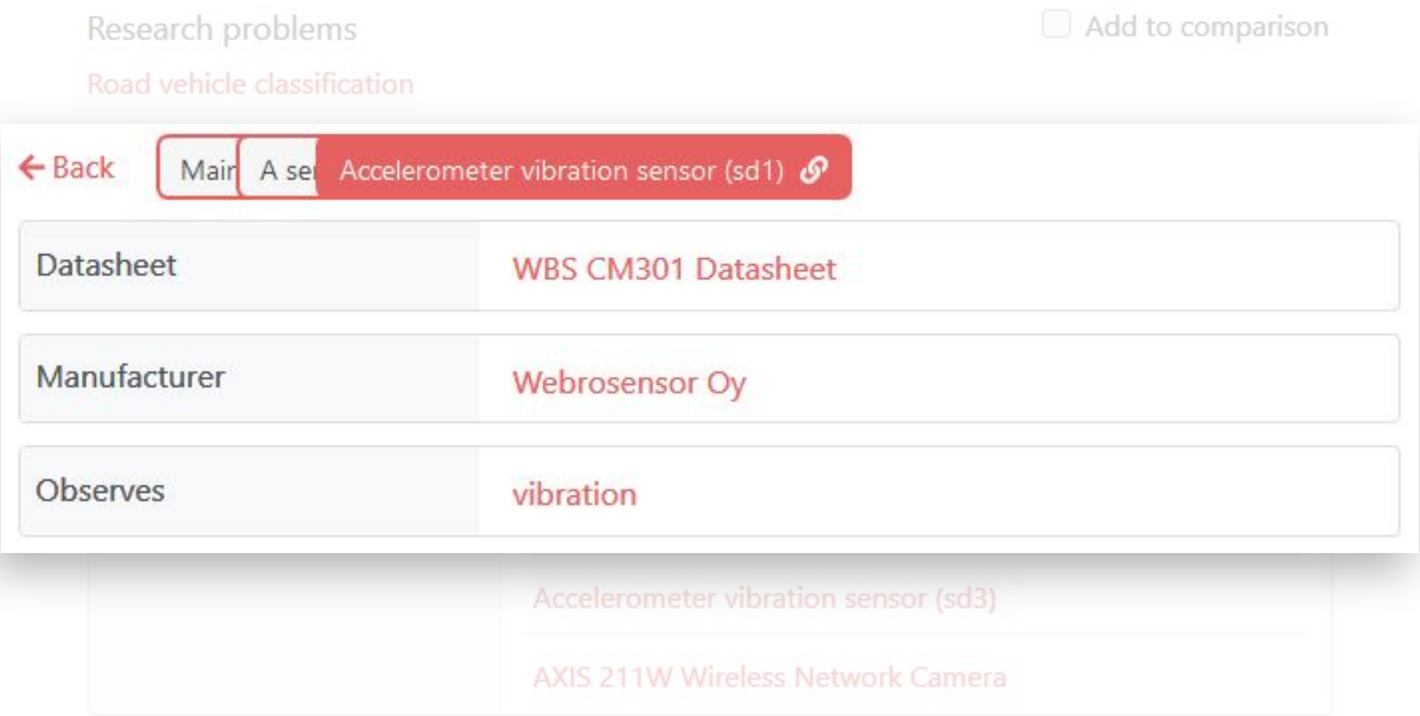
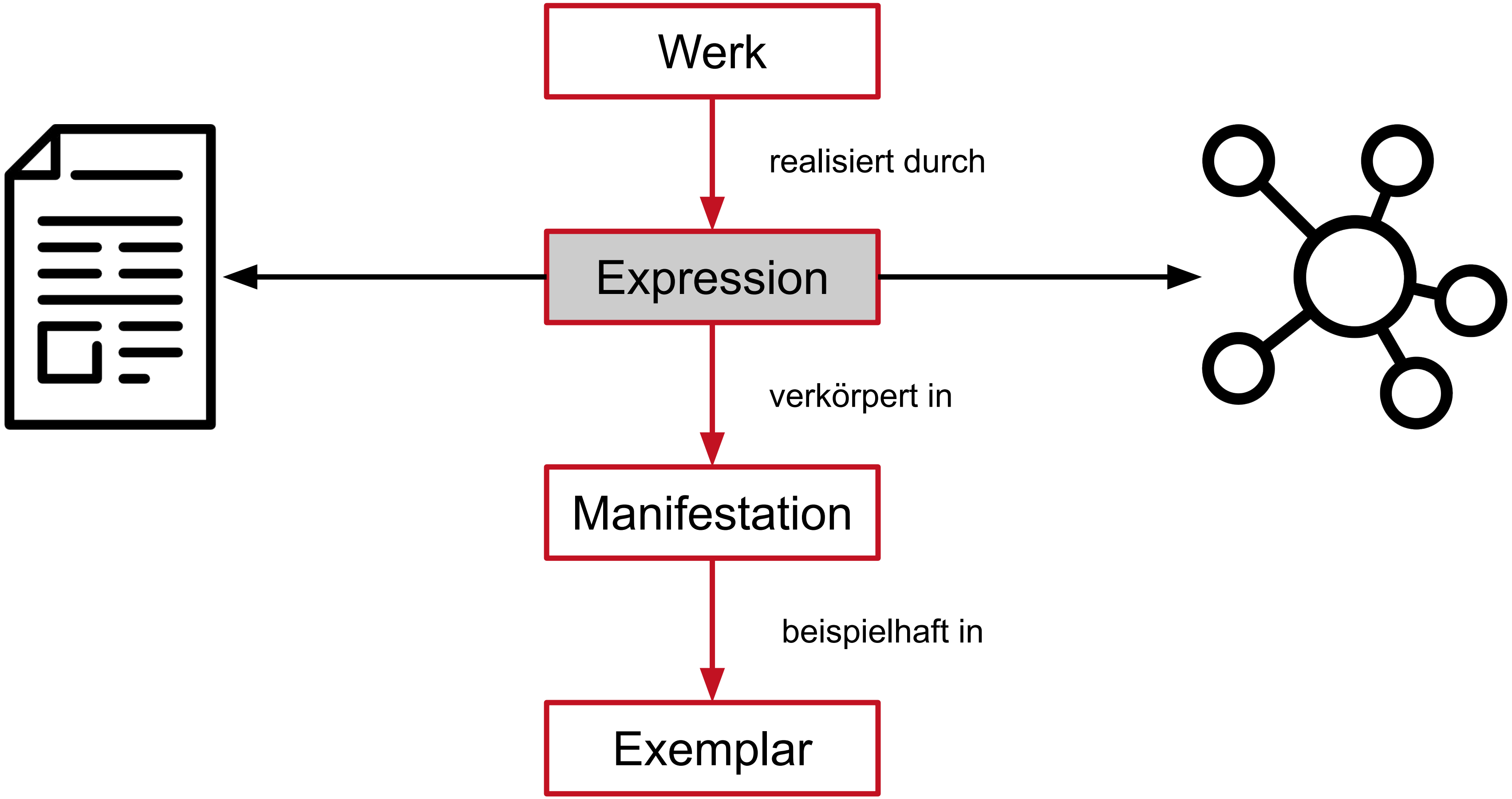


TABLE III

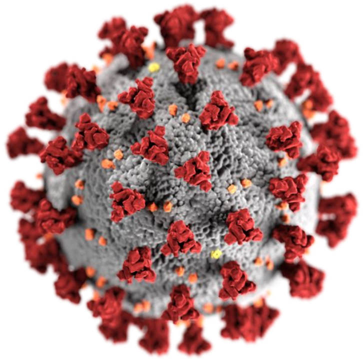
SUMMARY OF PRECISION (P) AND RECALL (R) FIGURES FOR THE CLASSES (C) `no-vehicle` (NV) AND `vehicle` (V) OF THE VEHICLE DETECTION (VD) TASK AND THE CLASSES `light` (L) AND `heavy` (H) OF THE VEHICLE CLASSIFICATION (VC) TASK FOR THE THREE SENSING DEVICES (SD)

	C	SD	P	R
VD	NV	sd_1	0.967	0.933
		sd_2	0.971	0.943
		sd_3	0.953	0.97
	V	sd_1	0.768	0.874
		sd_2	0.928	0.963
		sd_3	0.962	0.94
VC	H	sd_1	0.83	0.83
		sd_2	0.721	0.778
		sd_3	0.842	0.774
	L	sd_1	0.8	0.8
		sd_2	0.788	0.732
		sd_3	0.816	0.873

Aus Sicht Functional Requirements for Bibliographic Records



Beispiel
COVID-19 Reproduktionszahl



CDC/ Alissa Eckert, MS; Dan Higgins, MAM
https://phil.cdc.gov/Details.aspx?pid=23312

Quantitative Biology > Populations and Evolution

[Submitted on 20 Mar 2020]

The early phase of the COVID-19 outbreak in Lombardy, Italy

Cereda D, Tirani M, Rovida F, Demicheli V, Ajelli M, Poletti P, Trentini F, Guzzetta G, Marziano V, Barone A, Magoni M, Deandrea S, Diurno G, Lombardo M, Faccini M, Pan A, Bruno R, Pariani E, Grasselli G, Piatti A, Gramegna M, Baldanti F, Melegaro A, Merler S

In the night of February 20, 2020, the first case of novel coronavirus disease (COVID-19) was confirmed in the Lombardy Region, Italy. In the week that followed, Lombardy experienced a very rapid increase in the number of cases. We analyzed the first 5,830 laboratory-confirmed cases to provide the first epidemiological characterization of a COVID-19 outbreak in a Western Country. Epidemiological data were collected through standardized interviews of confirmed cases and their close contacts. We collected demographic backgrounds, dates of symptom onset, clinical features, respiratory tract specimen results, hospitalization, contact tracing. We provide estimates of the reproduction number and serial interval. The epidemic in Italy started much earlier than February 20, 2020. At the time of detection of the first COVID-19 case, the epidemic had already spread in most municipalities of Southern-Lombardy. The median age for of cases is 69 years (range, 1 month to 101 years). 47% of positive subjects were hospitalized. Among these, 18% required intensive care. The mean serial interval is estimated to be 6.6 days (95% CI, 0.7 to 19). We estimate the basic reproduction number at 3.1 (95% CI, 2.9 to 3.2). We estimated a decreasing trend in the net reproduction number starting around February 20, 2020. We did not observe significantly different viral loads in nasal swabs between symptomatic and asymptomatic. The transmission potential of COVID-19 is very high and the number of critical cases may become largely unsustainable for the healthcare system in a very short-time horizon. We observed a slight decrease of the reproduction number, possibly connected with an increased population awareness and early effect of interventions. Aggressive containment strategies are required to control COVID-19 spread and catastrophic outcomes for the healthcare system.

Subjects: **Populations and Evolution (q-bio.PE)**
Cite as: arXiv:2003.09320 **[q-bio.PE]**
(or arXiv:2003.09320v1 **[q-bio.PE]** for this version)

Bibliographic data

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Submission history

From: Alessia Melegaro [view email]
[v1] Fri, 20 Mar 2020 15:17:36 UTC (988 KB)

Results

The epidemic in Italy started much earlier than February 20, 2020. At the time of detection of the first COVID-19 case, the epidemic had already spread in most municipalities of Southern-Lombardy. The median age for of cases is 69 years (range, 1 month to 101 years). 47% of positive subjects were hospitalized. Among these, 18% required intensive care. The mean serial interval is estimated to be 6.6 days (95% CI, 0.7 to 19). We estimate the basic reproduction number at 3.1 (95% CI, 2.9 to 3.2). We estimated a decreasing trend in the net reproduction number starting around February 20, 2020. We did not observe significantly different viral loads in nasal swabs between symptomatic and asymptomatic.

Here we provide an analysis of the first 5,830 laboratory-confirmed cases reported in Lombardy, with date of symptoms onset over the period from January 14 to March 8, 2020. Epidemiological analyses of the confirmed cases and their background demographic and exposure characteristics are presented here as well as the transmission dynamics of the infection within the Region. Also, the virological analysis on a subsample of the reported cases is included to provide preliminary assessment of the level of the viral load among symptomatic and asymptomatic cases.

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The early phase of the COVID-19 outbreak in Lombardy, Italy

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Published in: *arXiv.org*

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Contribution 1

Research problems

Add to comparison

COVID-19 reproductive number

Contribution data

95% Confidence interval	2.9-3.2
Location	Lombardy, Italy
R0 estimates (average)	3.1
Study date	2020-01-14/2020-03-08

Was wird ermöglicht

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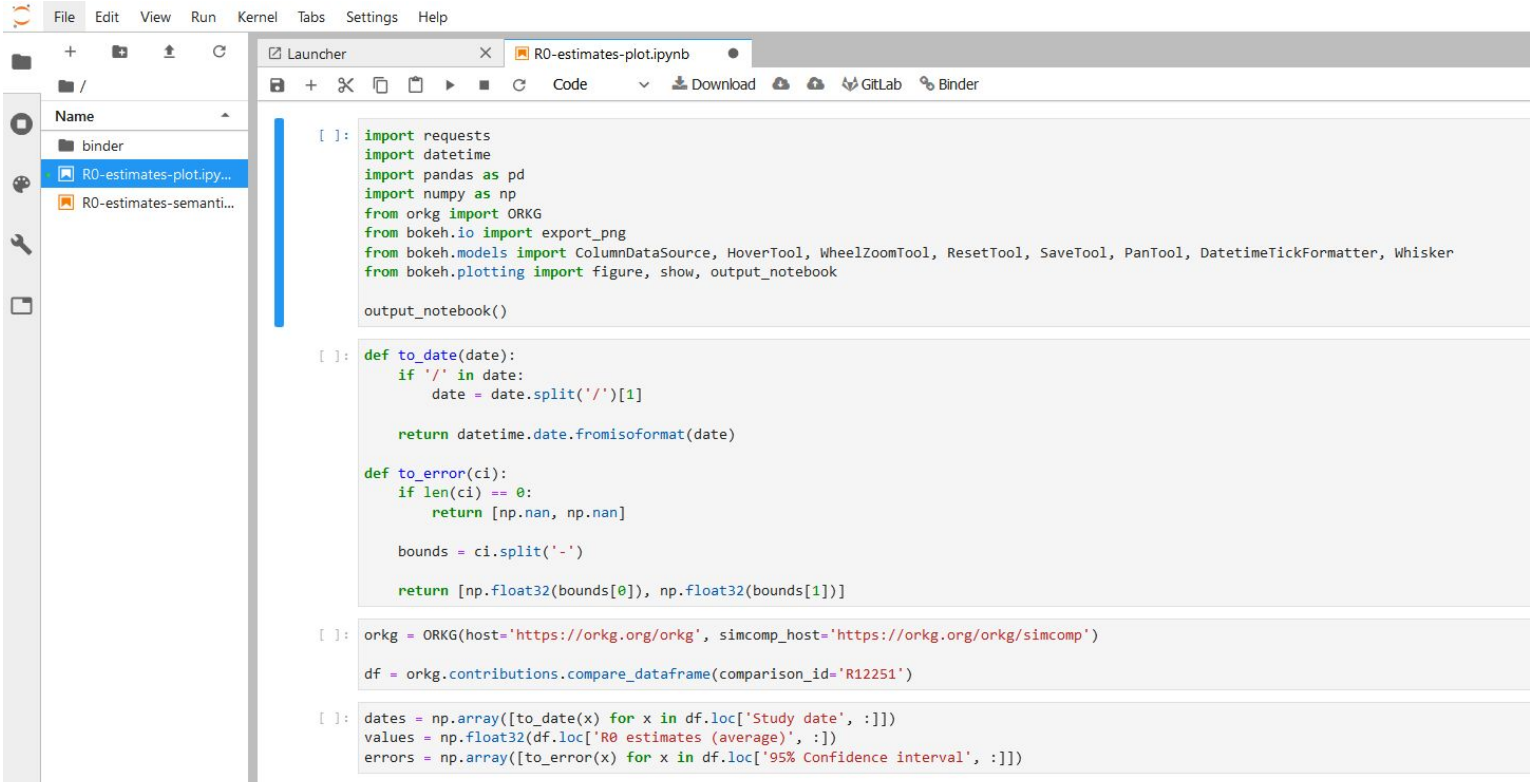
Reproductive number estimates 2019-nCoV

Comparison of the published reproductive number estimates for 2019-nCoV

Reference: *10.1093/jtm/taaa021*

Use ***Shift*** + ***Mouse Wheel*** for horizontal scrolling in the table.

Properties	Transmission interval estimates suggest pre-symptomatic spread of COVID-19 Contribution 1 - 2020	Transmission interval estimates suggest pre-symptomatic spread of COVID-19 Contribution 2 - 2020	Estimation of the epidemic properties of the 2019 novel coronavirus: A mathematical modeling study Contribution 1 - 2020	Esti pro cor mo Con
Has research problem	COVID-19 reproductive number	COVID-19 reproductive number	COVID-19 reproductive number	
Location	Singapore	Tianjin, China	Wuhan City, China	
Study date	2020-01-19/2020-02-26	2020-01-21/2020-02-27	2020-01-10/2020-01-23	2
R0 estimates (average)	1.97	1.87	4.38	
95% confidence interval	1.45-2.48	1.65-2.09	3.63-5.13	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R0-estimates-plot.ipynb
Code
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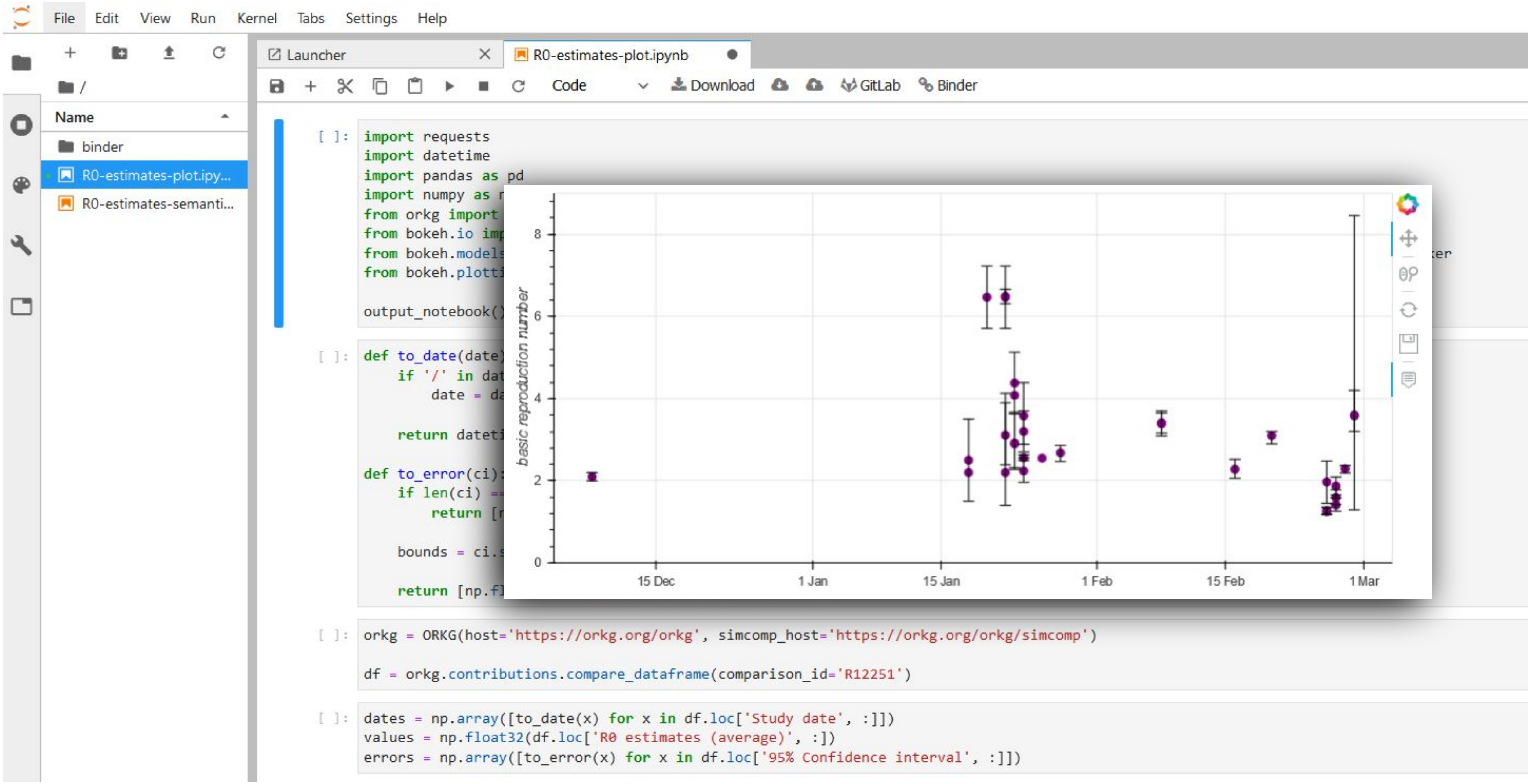
binder
R0-estimates-plot.ipy...
R0-estimates-semanti...
[ ]:
import requests
import datetime
import pandas as pd
import numpy as np
from orkg import ORKG
from bokeh.io import export_png
from bokeh.models import ColumnDataSource, HoverTool, WheelZoomTool, ResetTool, SaveTool, PanTool, DatetimeTickFormatter, Whisker
from bokeh.plotting import figure, show, output_notebook
output_notebook()
[ ]:
def to_date(date):
if '/' in date:
date = date.split('/')[1]
return datetime.date.fromisoformat(date)
def to_error(ci):
if len(ci) == 0:
return [np.nan, np.nan]
bounds = ci.split('-')
return [np.float32(bounds[0]), np.float32(bounds[1])]
[ ]:
orkg = ORKG(host='https://orkg.org/orkg', simcomp_host='https://orkg.org/orkg/simcomp')
df = orkg.contributions.compare_dataframe(comparison_id='R12251')
[ ]:
dates = np.array([to_date(x) for x in df.loc['Study date', :]])
values = np.float32(df.loc['R0 estimates (average)', :])
errors = np.array([to_error(x) for x in df.loc['95% Confidence interval', :]])


File
Edit
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Kernel
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Settings
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binder
R0-estimates-plot.ipy...
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[ ]:
import requests
import datetime
import pandas as pd
import numpy as n
from orkg import
from bokeh.io imp
from bokeh.models
from bokeh.plotti
output_notebook()
[ ]:
def to_date(date)
if '/' in dat
date = da
return dateti
def to_error(ci):
if len(ci) ==
return [n
bounds = ci.s
return [np.fl
ker
basic reproduction number
0
2
4
6
8
15 Dec
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15 Jan
1 Feb
15 Feb
1 Mar
[ ]:
orkg = ORKG(host='https://orkg.org/orkg', simcomp_host='https://orkg.org/orkg/simcomp')
df = orkg.contributions.compare_dataframe(comparison_id='R12251')
[ ]:
dates = np.array([to_date(x) for x in df.loc['Study date', :]])
values = np.float32(df.loc['R0 estimates (average)', :])
errors = np.array([to_error(x) for x in df.loc['95% Confidence interval', :]])

Schlussbemerkungen

- Ein wissenschaftliches Werk muss nicht zwingend als Artikel realisiert werden
- Man kann Inhalte auch so realisieren, dass diese eher maschinen lesbar sind
- Somit besser verarbeitbar und letztlich FAIRer für Maschinen aber auch Menschen
- Um die erläuterten Ansätze zu skalieren benötigen wir einen “Paradigmenwechsel”