

Social Analytics and Smart Cities

HUSO 2017



Dennis J. Folds, Ph.D.

(retired)

Georgia Institute of Technology

[<dennis.folds@gatech.edu>](mailto:dennis.folds@gatech.edu)

Complementary Spheres of Activity

Smart Cities Research

- u Study of potential application of IT to problems facing cities
- u Development of technology and models
- u Accumulation of facts, data, models, and interpretation of results of studies

Social Analytics Research

- u Uses the products of Computational Social Science to generate the outputs required by a specific application
- u Uses tools and methods from other disciplines as needed.
- u Develops tools and methods for use in future efforts.

Evolution of Smart City Concepts

Engineering Complexity

- u Emphasis on individual application domains like infrastructure mgmt (traffic, energy, water, etc.)
- u Limited integration, pairwise
- u Need for some emergent properties, and some aspects of resilience, is driven by human considerations

MBSE to Support Planning

- u Engineering efforts too complex to be performed with static artifacts
- u Set based design methods
- u Strong need for better representation of human attributes in these models

Needs and Challenges

Conceive of the Smart City as an engineered socio-technical system

- u Behavior of engineered systems
- u Near real time monitoring to provide control loops
- u Tools and methods that fully integrate human considerations with other system considerations

Extension to the societal level

- u Workforce wide impact of sociotechnical systems
- u Safety and health impacts across the population
- u Large scale disasters and societal stressors
- u Engineered resilience in communities

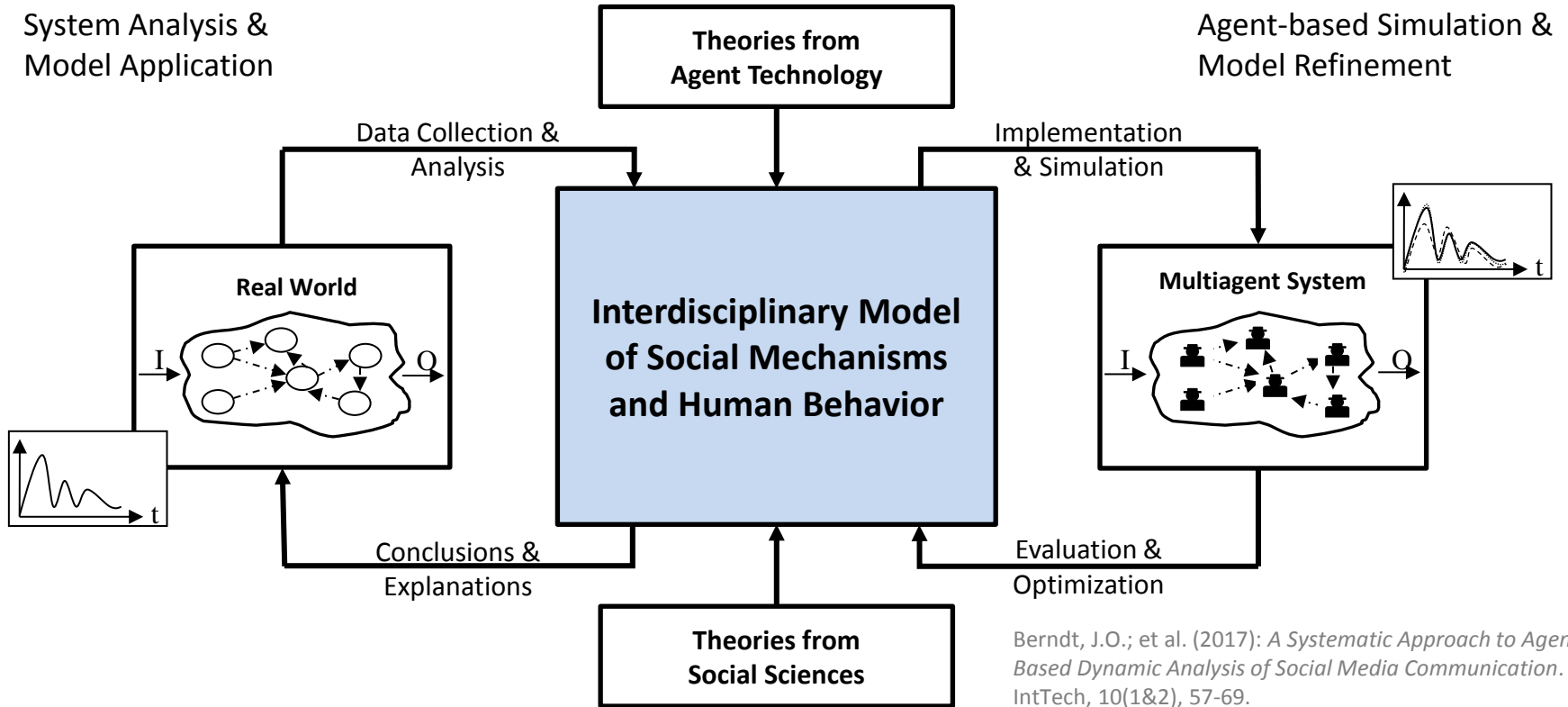
Human and Social Analysis: An Interdisciplinary Endeavor

Learning from each other in Computer Science, Psychology, Sociology, and other disciplines

Jan Ole Berndt

TriLabS @ CIRT, Business Informatics I
Trier University, Germany

Agent-Based Modeling of Social Behavior



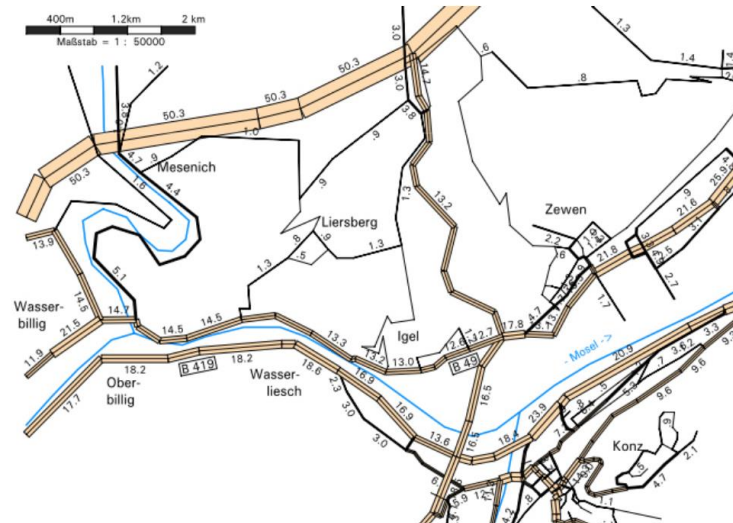
Berndt, J.O.; et al. (2017): *A Systematic Approach to Agent-Based Dynamic Analysis of Social Media Communication*. IntTech, 10(1&2), 57-69.

Commuting between Trier and Luxembourg



- Amount of commuters has tripled during the last 20 years
- More than 160.000 cross-border workers commute to Luxembourg every day
- Bypass “Moselaufstieg” in discussion for “decades”
- *How to estimate the benefits of the bypass?*

Ecker & Timm (2016)

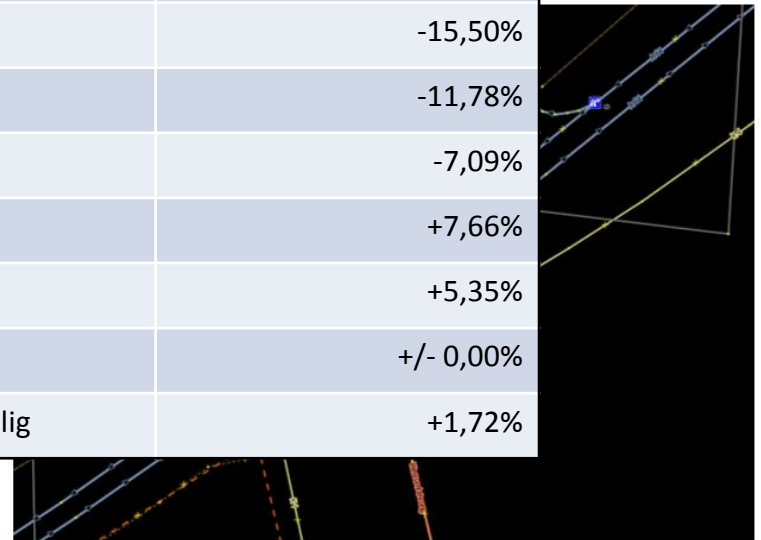
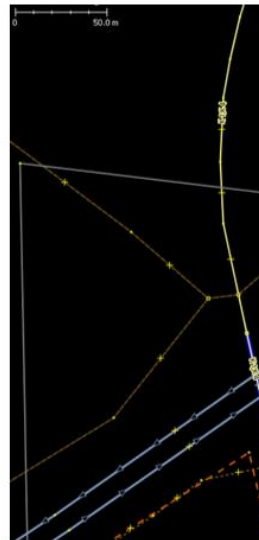


Simulating the Bypass “Moselaufstieg“



Ecker & Timm (2016)

Automatic Traffic Counter	Direction	Increase / Decrease
Grevenmacher (Border) Nr. 29	Grevenmacher	-18,50%
	Germany	-15,50%
Wasserbilligerbrück Nr. 7849	Trier	-11,78%
	Wasserbillig	-7,09%
Sauertalbrücke Nr. 7022	Trier	+7,66%
	Luxembourg	+5,35%
Potaschberg Nr. 1430	Munsbach	+/- 0,00%
	Aire de Wasserbillig	+1,72%



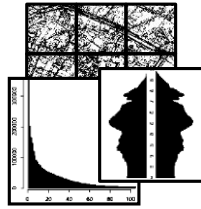
Forecasting of Care Demand



Scenario: Care demand and care support

Statistical Micro-Simulation

- Census data
- OpenStreetMap
- Care statistics
- Demographic statistics



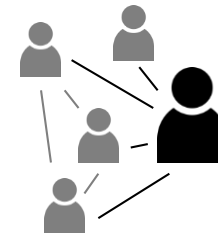
population →
↑
project
↑
apply ←

Population changes

Individual decisions

Agent-based Social Simulation

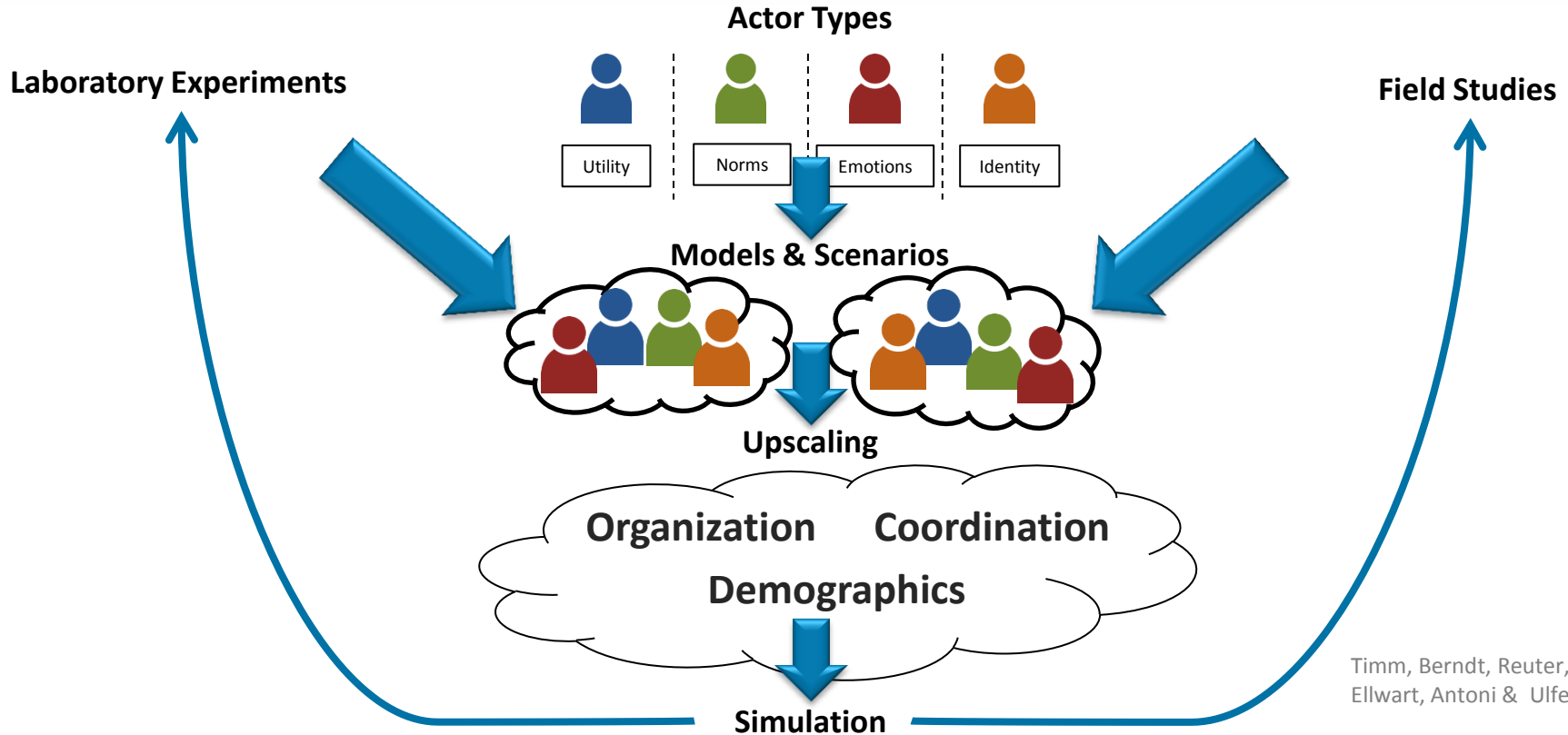
→ update
↓
interact
↓
decide ←



- Agent technology
- Social mechanisms
- Social actor types
- Decision theory

Where do we get valid data from?
How to identify and specify agents and population?

Timm, Münnich,
Krause & Berndt (2017)



Timm, Berndt, Reuter,
Ellwart, Antoni & Ulfert (2017)

IoT and wearable devices as data gatherers for Big Data healthcare

By Bobby Law



Smart Cities, Smart Homes and Ambient Assisted Living

- Smart Cities need to address the needs of aging population - housing, healthcare, community, social, leisure, culture.
- Smart cities need to be aware of the needs of the elderly population supporting independent living.
- Smart Homes need to employ IoT to help personalise healthcare, social services and extend independent living within the elderly person's own home.
- Smart Homes and IoT should apply advanced AI routines to data gathered to provide an analysis of the person's health which can be scrutinised by a health professional.
- Smart Homes and Smart Cities need to integrate to provide a cohesive picture.

Smart Homes and IoT

- Combination of hardware and software.
- Smart house fitted with remote sensors, embedded systems, wireless networks, voice activation, gesture recognition aural cues and wearables.
- Smart house use sensors to monitor elderly person from blood pressure, temperature to falls, movement and sedentary behaviour.
- Data gathered can be used to build a health profile for the elderly person or if needed contact a health professional directly.
- Addition of AI to produce context aware IoT.

Crowdsourcing health data

- Feeding the data gathered back to the cloud for further analysis and creating a bigger picture of changing health care needs.
- Data sourced could help prevent and enable early detection of diseases.
- Data gathered can be analysed for patterns or trends.

[BOANJORN]

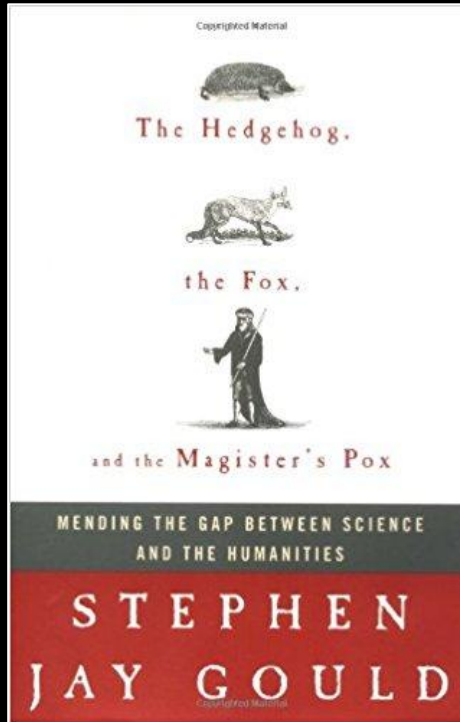
[BOANJORN]

Mobile, a locative media: what are the limits of technology
in relation to user's content and user's experience

[To read the below QR codes, please download the App i-nigma]



[LAURENT > <https://goo.gl/6jyliu>]




Retrieved from https://images-na.ssl-images-amazon.com/images/I/418mLfSyjxL._SX320_BO1,204,203,200_.jpg


Mobile, a locative media: what are the limits of technology in relation to user's content and user's experience © Antonczak, 2017.

YouTube video inside.

Design In Tech Report 2017



John Maeda



<https://designintechreport.wordpress.com/>

1 of 48

SlideShare

Retrieved from <https://designintechreport.wordpress.com/>

Mobile, a locative media: what are the limits of technology in relation to user's content and user's experience © Antonczak, 2017.



Designing the unknown | C-K Theory Presentation

7 years ago | More



CGS Mines ParisTech

+ Follow

Related Videos

Autoplay next video



Designing the unkn...

CGS Mines ParisTech

Retrieved from <https://vimeo.com/11556338>