

# A novel way of visualizing causal uncertainty

UQSay #87

Pamphile T., Roy

*Consulting Manao GmbH, Vienna, Austria*

Mariia, Kozlova

*LUT University, Lappeenranta, Finland*

Andrea, Saltelli

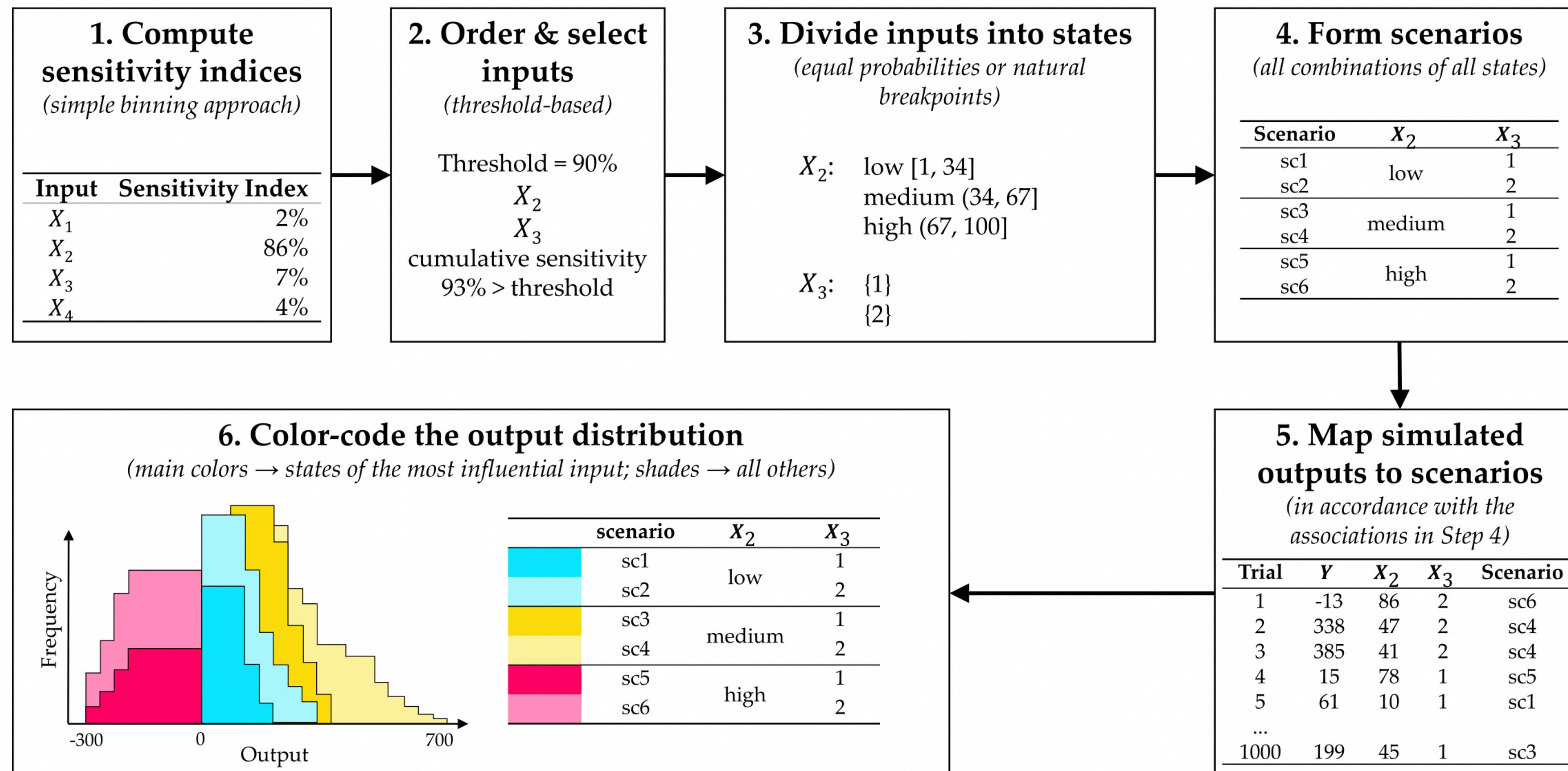
*UPF Barcelona School of Management, Spain*

Julian, Scott, Yeomans

*Schulich School of Business, York*

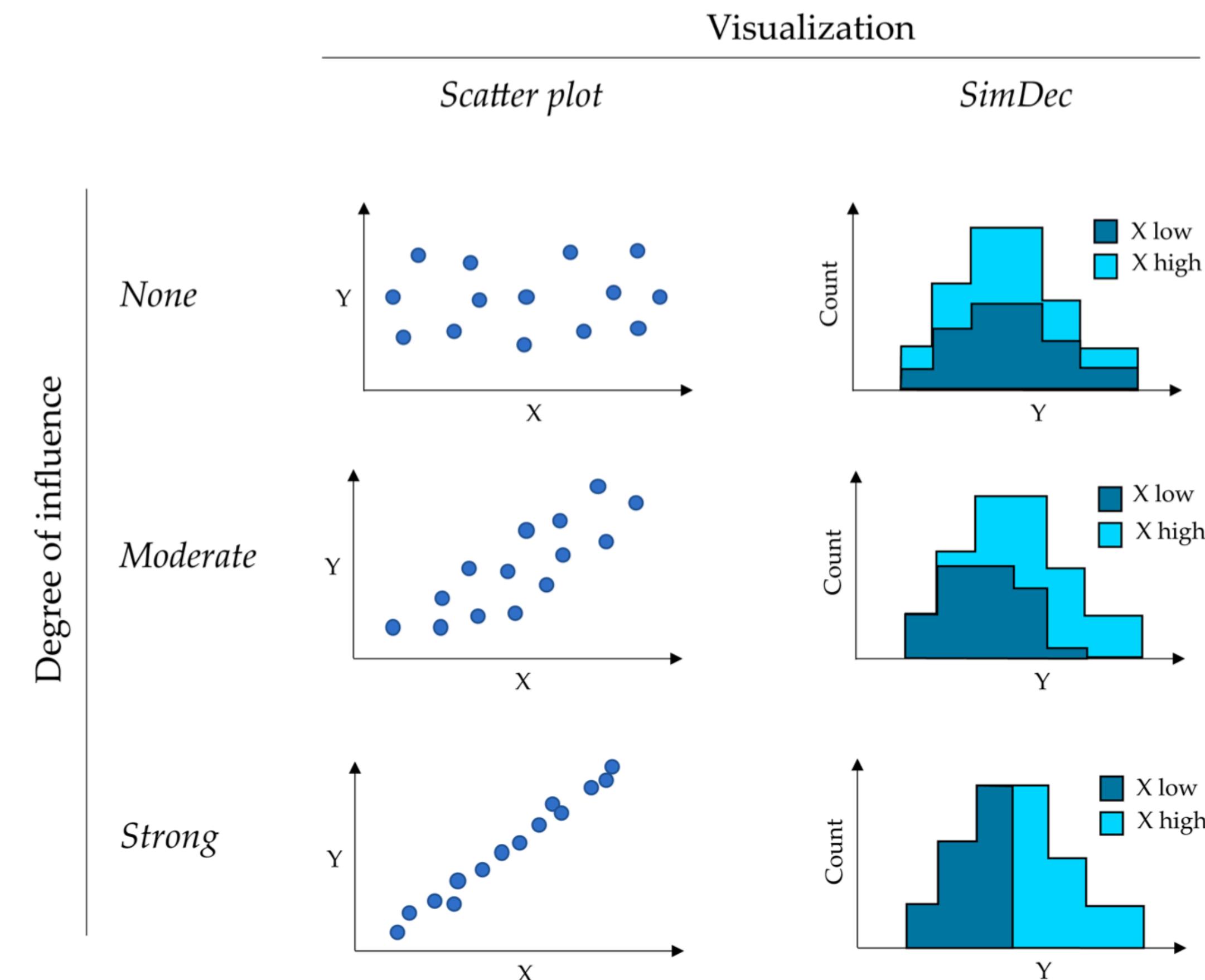


# What is SimDec?



**Fig. 2.** Modified algorithm for *simulation decomposition* with quantitative analysis illustrated on the tutorial model (Eq. (6)).

# How to read SimDec?



**Figure 2.4** Schematic visualization of different degrees of influence of an input variable on a model output in two different visualization types. (colour image is accessible via the link)

# How to read SimDec?

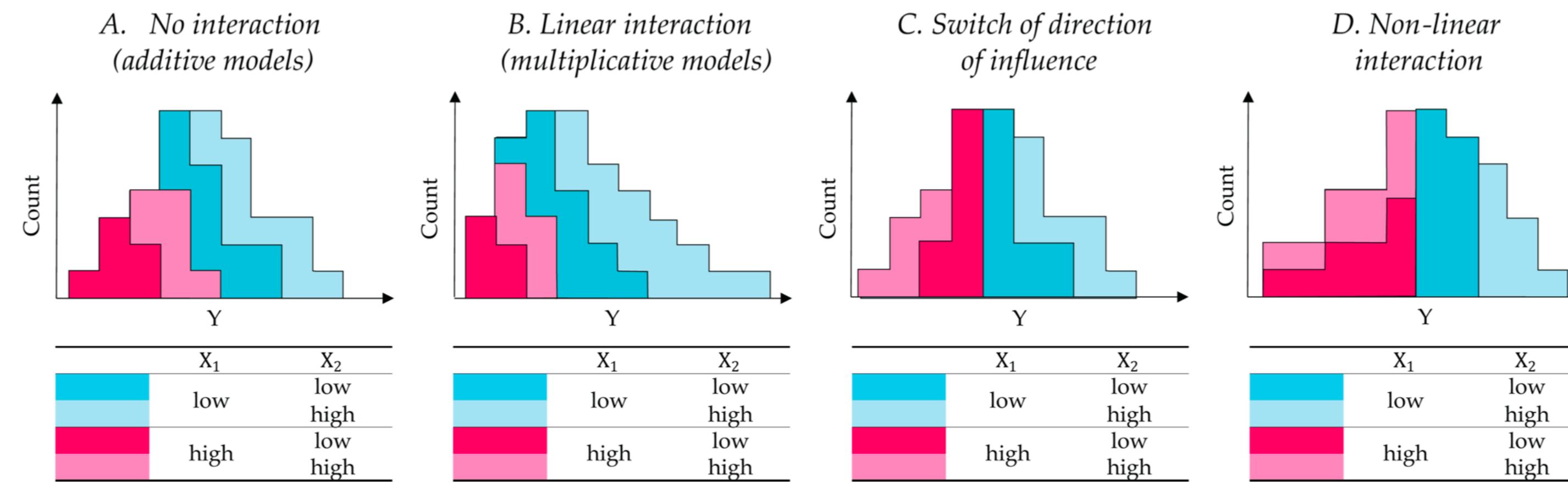


Figure 2.5 Schematic visualization of different types of interactions with SimDec. (colour image is accessible via the link)

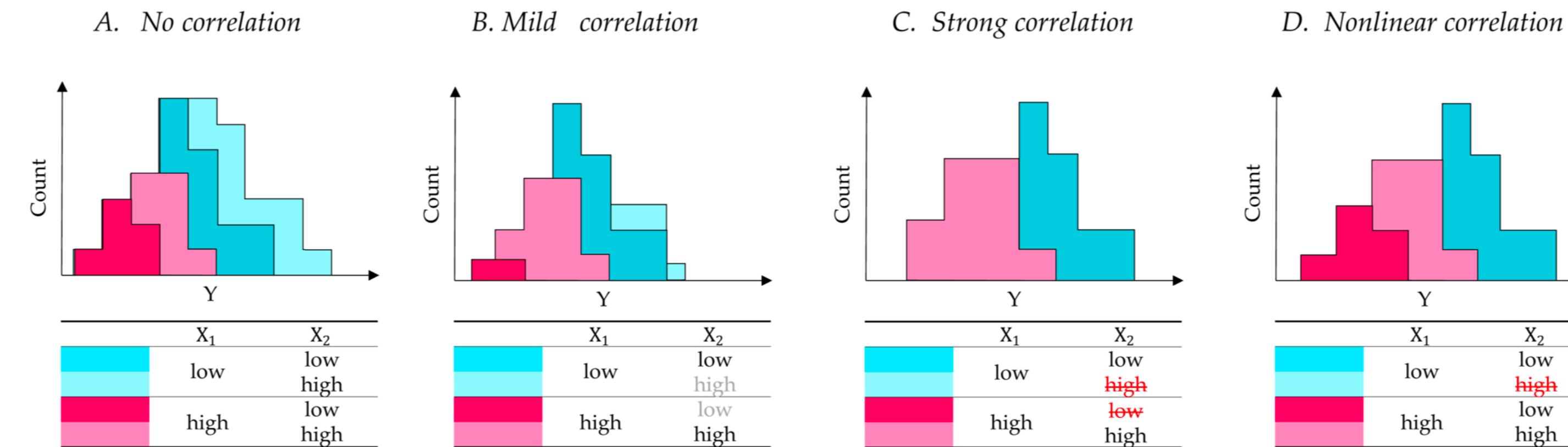
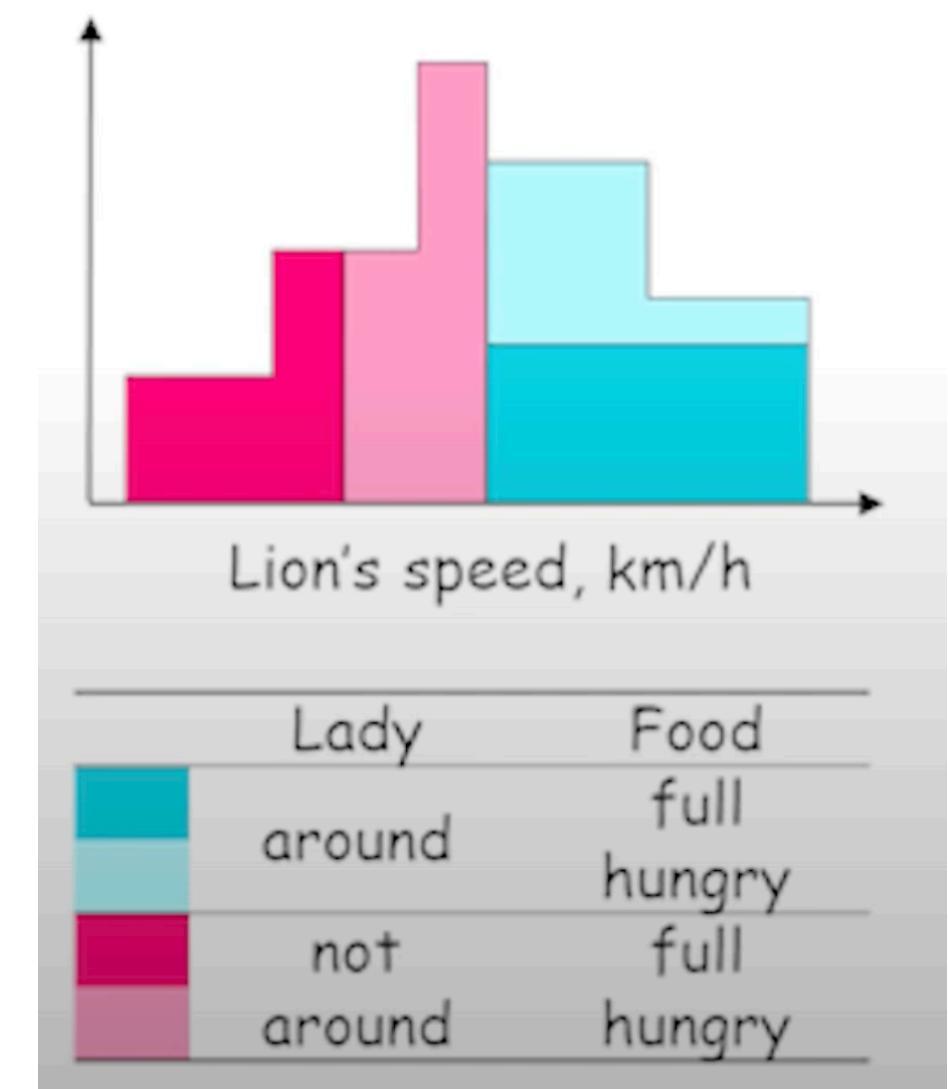
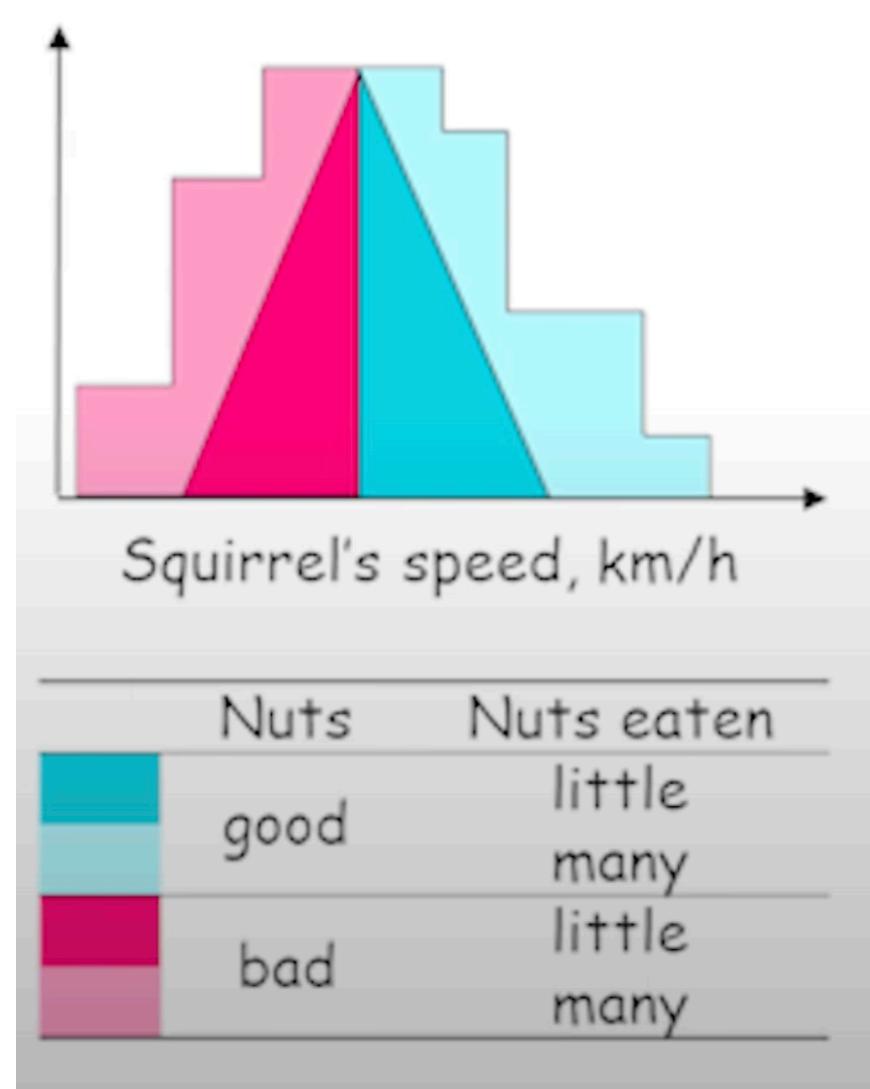
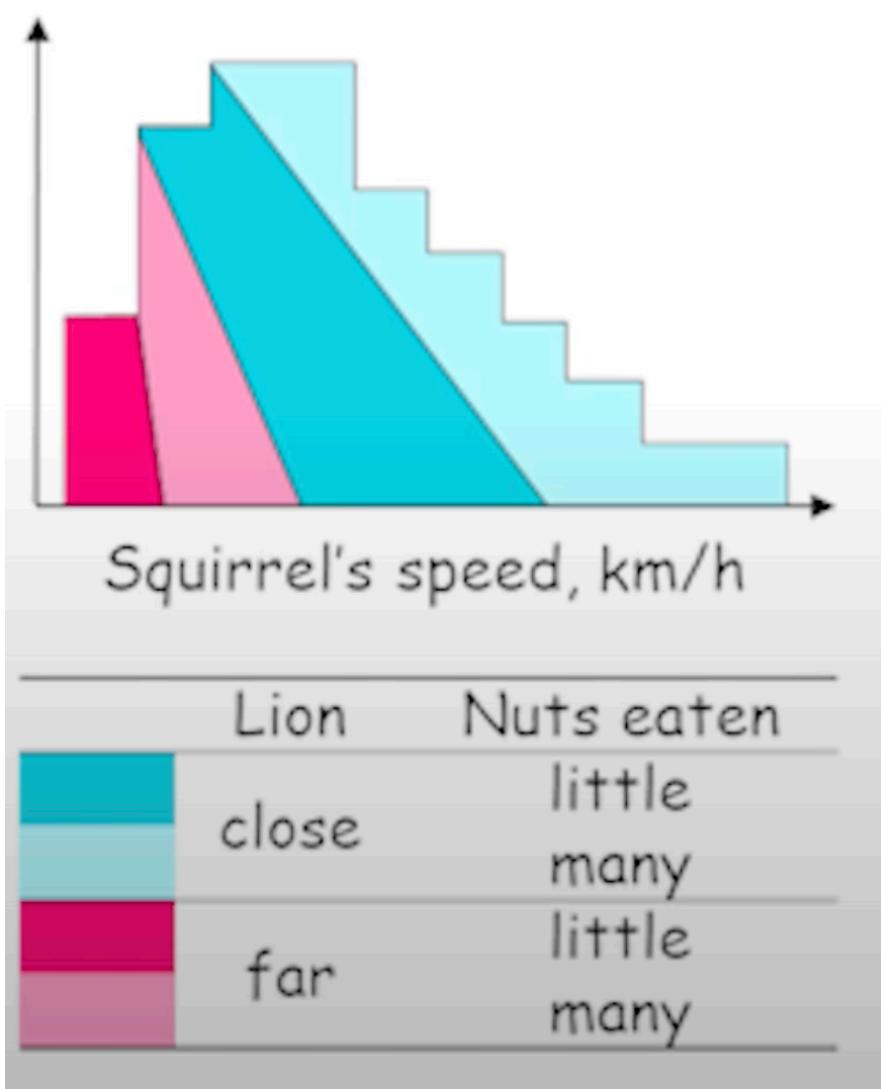
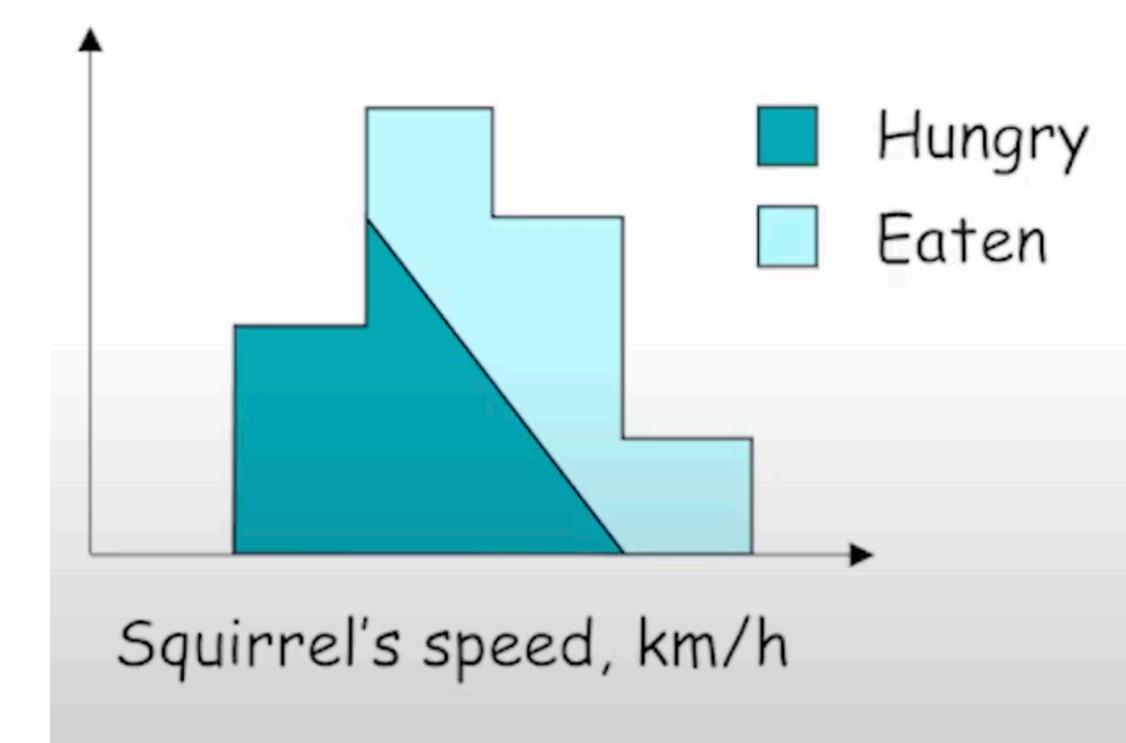
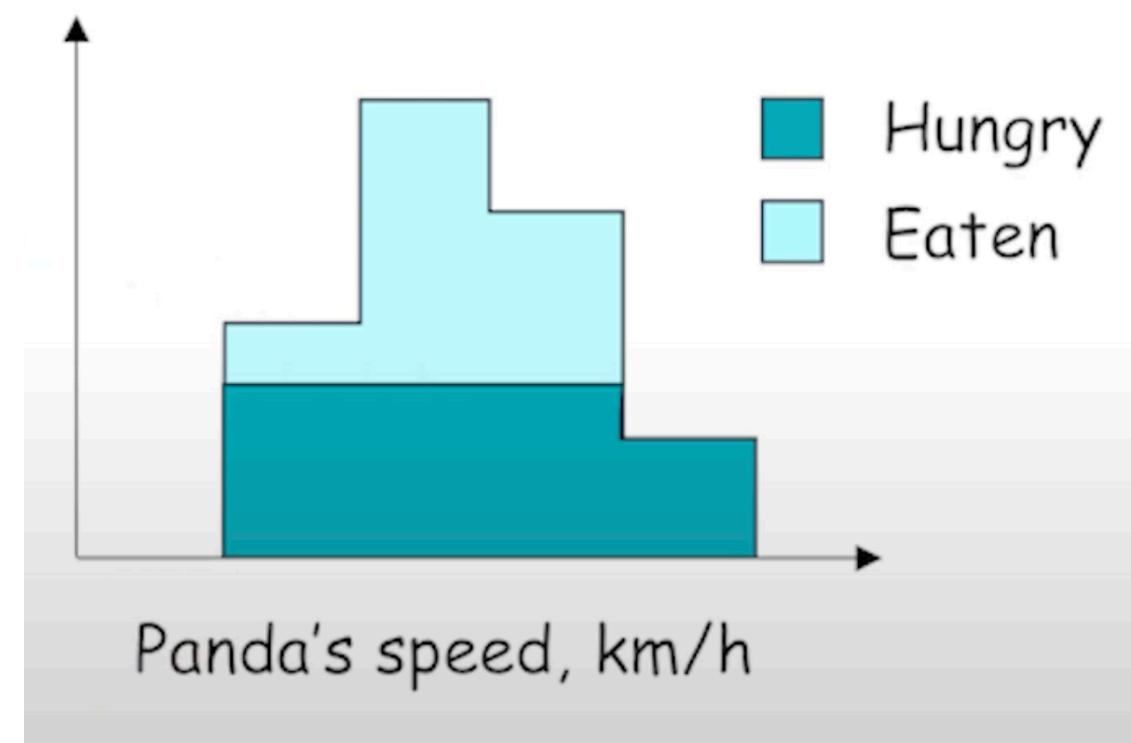


Figure 2.6 Schematic visualization of different cases of correlations with SimDec. (colour image is accessible via the link)

# Some simple examples

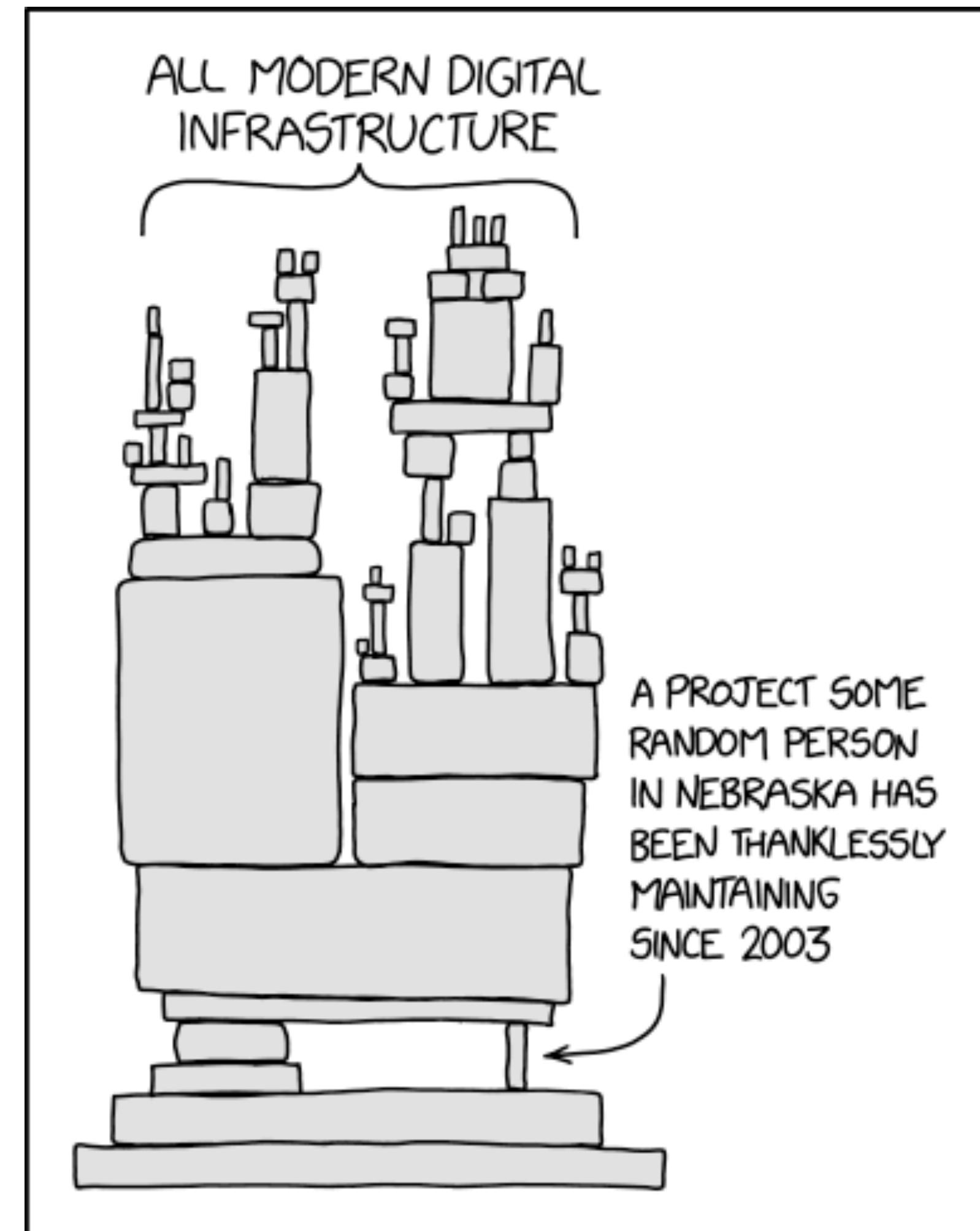


# Ok now **How** do I do this?

- >>> Method knowledge
- >>> Stacked histograms and other implementation details
- >>> Did you make it domain agnostic now?

**What about a dashboard to help?**

# What does Open-Source mean?



# What does Open-Source mean?

>>> Source code is available

**But wait, there is more!**

>>> Community

>>> Open Development

>>> Accountability

# Still, Why? I have *Secrets*

- >>> Reproducible science
- >>> New collaborations
- >>> Code Quality
- >>> Help from random people like me 😅

# SimDec's dev Team



Mariia Kozlova  
LUT University, Finland  
Idea Germinator 🌱



Julian Scott Yeomans  
York University, Canada  
Ninja Professor 🎩



Pamphile Roy  
Consulting Manao GmbH, Austria  
Tahitian Pythonista 🌴



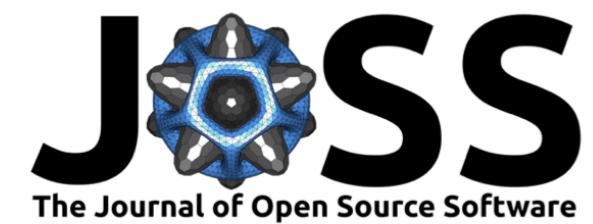
Robert J. Moss  
Stanford University, US  
Julia package developer



Abid Alam  
Queens University, Canada  
R package developer

# Open science: our Publications

>>> <https://www.simdec.fi/publications>



The Journal of Open Source Software

## Simulation Decomposition in Python

Pamphile T. Roy  <sup>1</sup> and Mariia Kozlova  <sup>2</sup>

<sup>1</sup> Consulting Manao GmbH, Vienna, Austria <sup>2</sup> LUT Business School, LUT University, Lappeenranta, Finland ¶ Corresponding author

DOI: [10.21105/joss.06713](https://doi.org/10.21105/joss.06713)

### Software

- [Review](#) 
- [Repository](#) 
- [Archive](#) 

---

Editor: [Chris Vernon](#)  

Reviewers:

- [@JoshuaOsborneDATA](#)
- [@matt-graham](#)

### Summary

Uncertainties are everywhere. Whether you are developing a new Artificial Intelligence (AI) system, running complex simulations or making an experiment in a lab, uncertainties influence the system. Therefore, an approach is needed to understand how these uncertainties impact the system's performance.

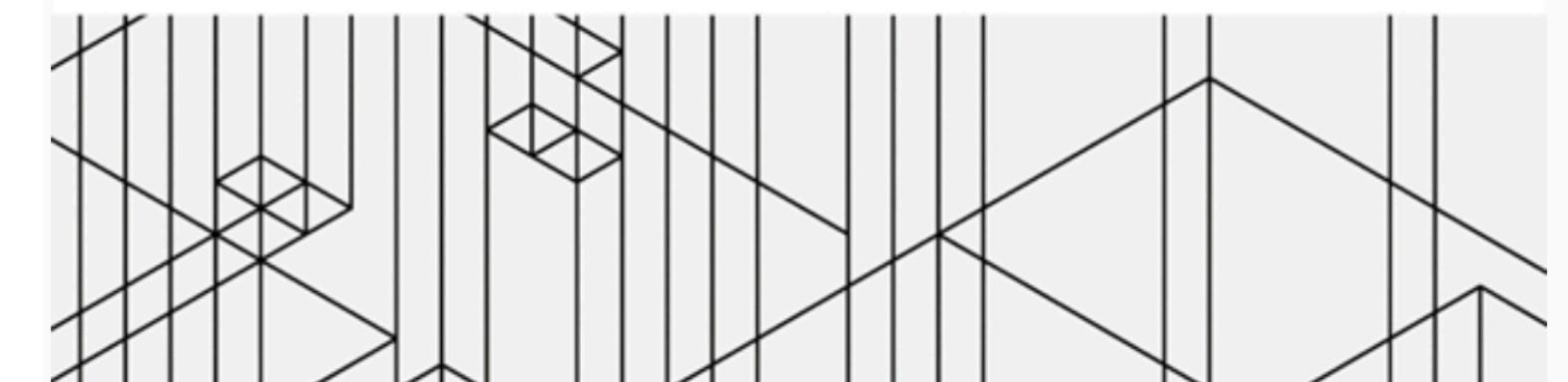
SimDec offers a novel visual way to understand the intricate role that uncertainties play. A clear Python Application Programming Interface (API) and a no-code interactive web dashboard make uncertainty analysis with SimDec accessible to everyone.



## SENSITIVITY ANALYSIS FOR BUSINESS, TECHNOLOGY, AND POLICYMAKING

MADE EASY WITH SIMULATION  
DECOMPOSITION (SIMDEC)

Edited by  
Mariia Kozlova and Julian Scott Yeomans

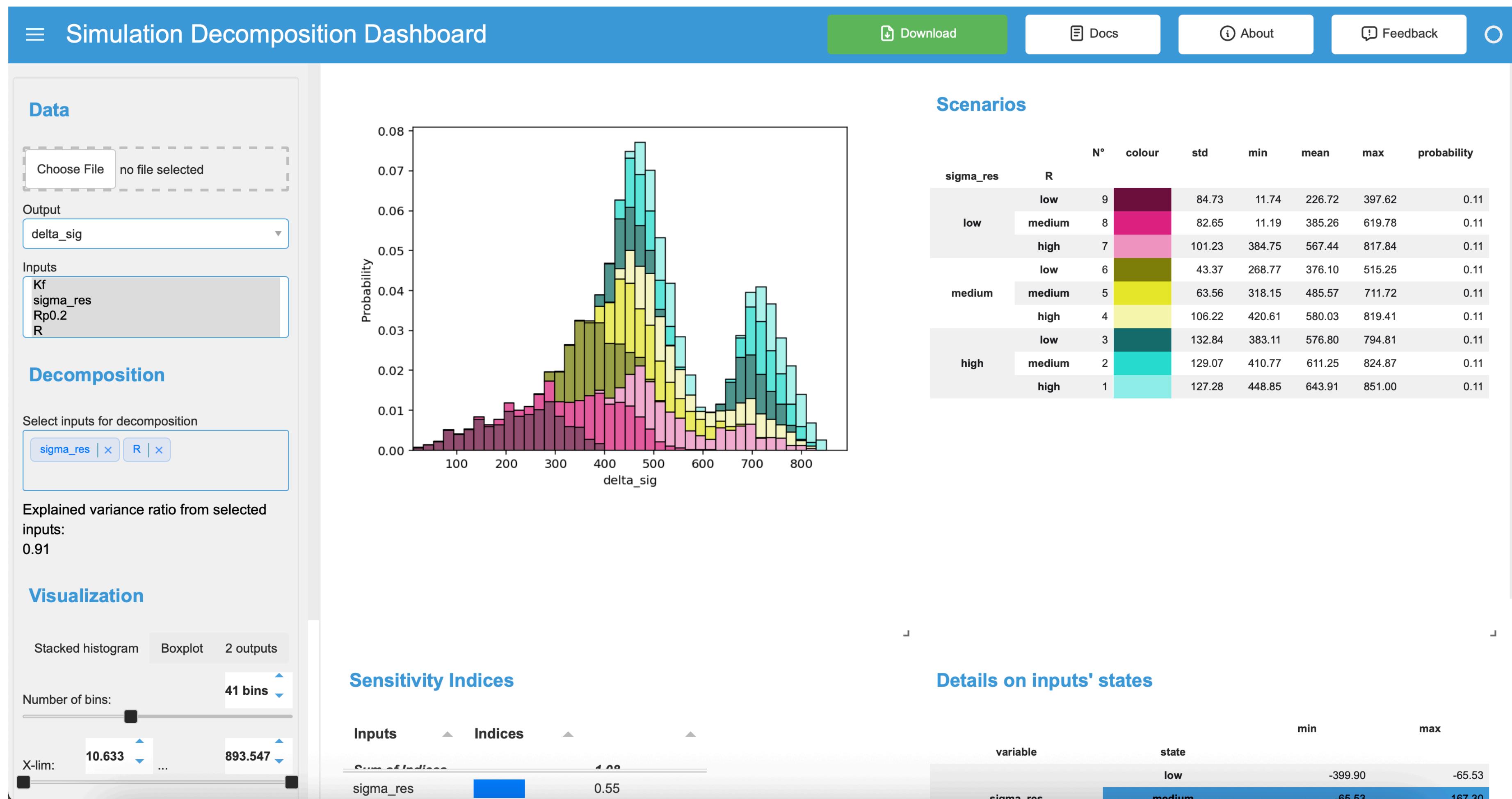


# Python the new R or Matlab or ...

- >>> Python continues to be one of the fastest growing language
- >>> Most developers/researchers doing machine learning and AI are using Python
- >>> More than 50% of developers using C-alike are not interested in continuing to do so
- >>> Python is fast enough... really. And if not there are solutions (bindings for Cython, Pythran, Numba, or even Rust)

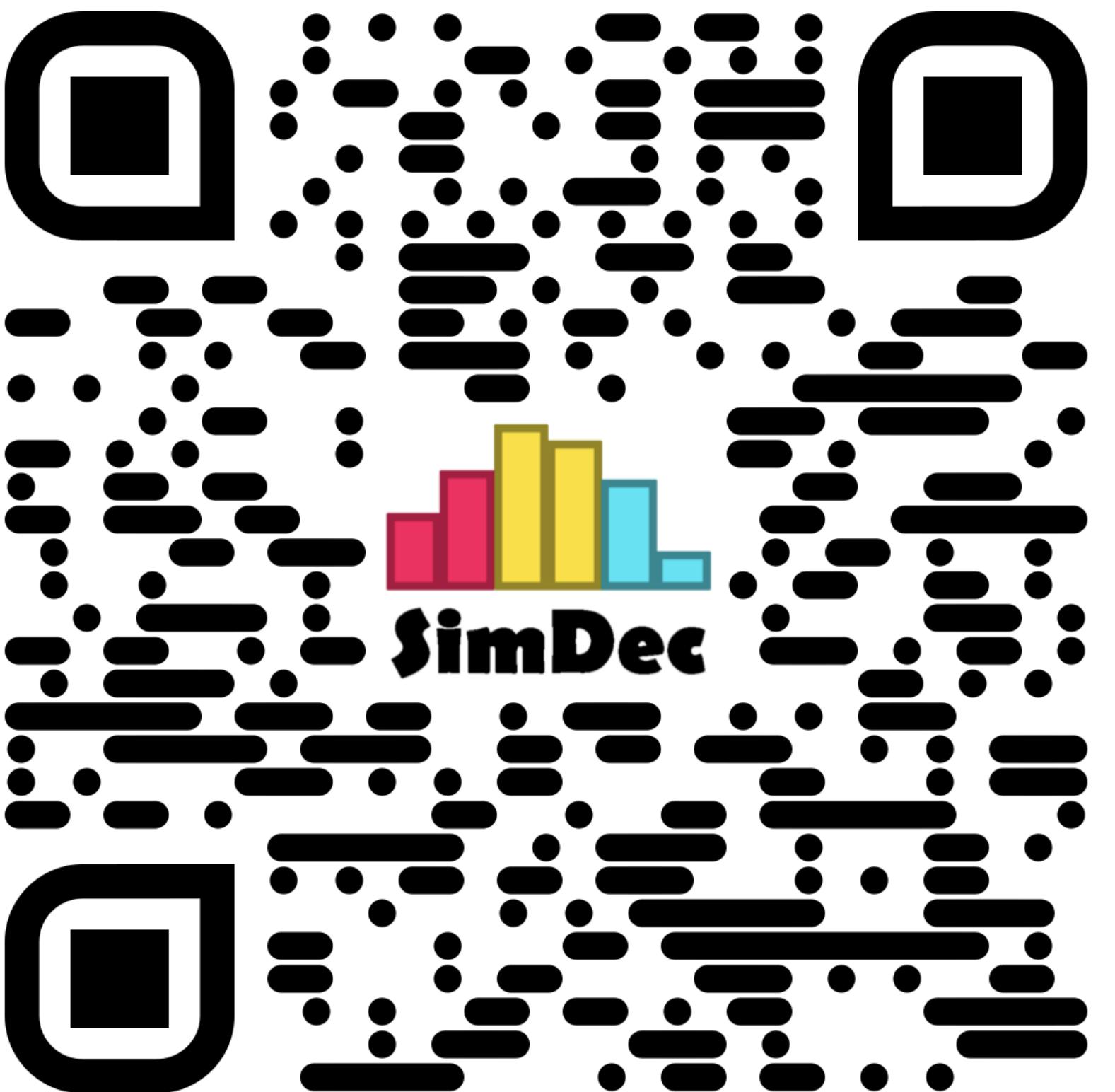
# Demo!

<https://simdec.io/>



# SimDec

## Simulation Decomposition

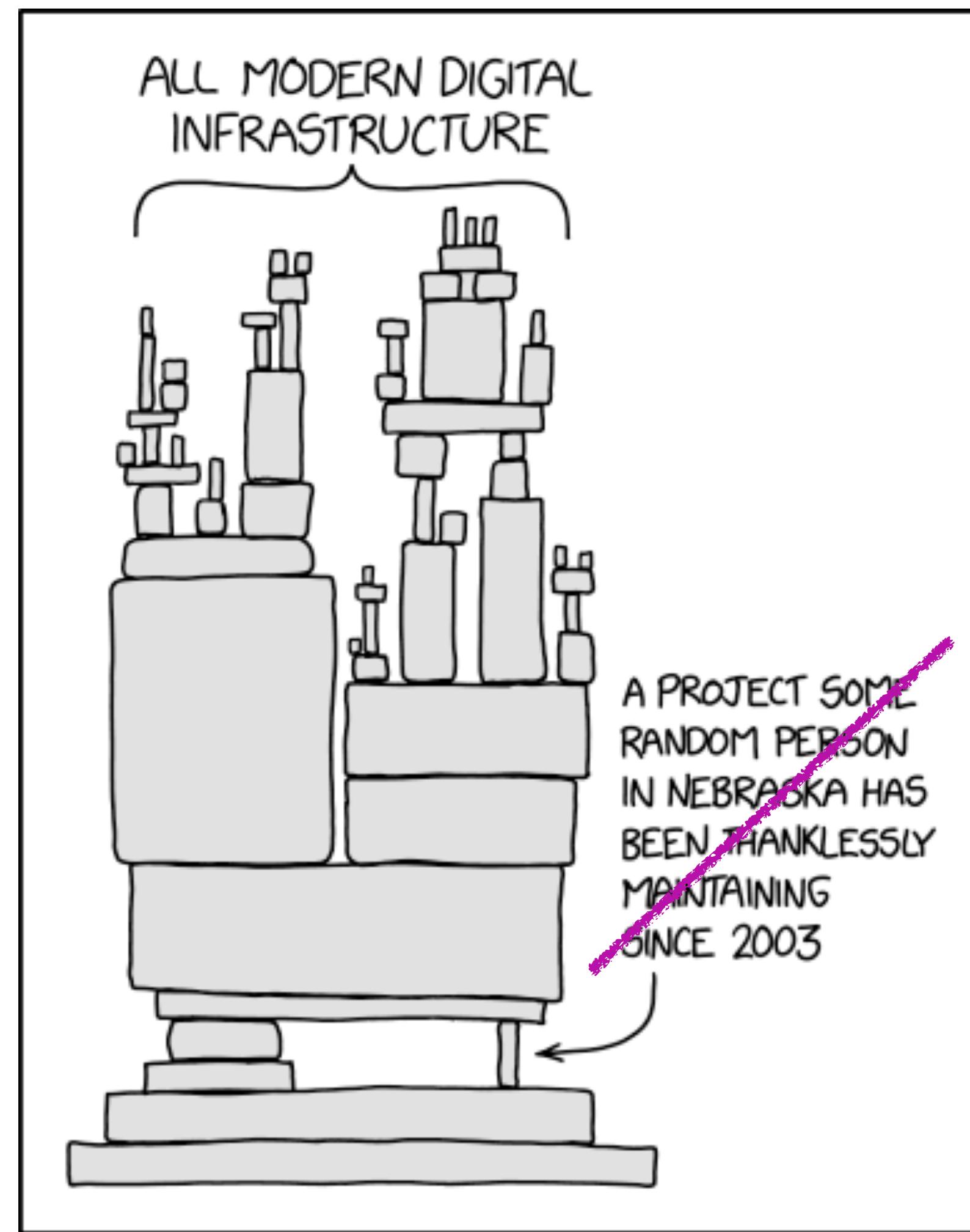


# Scientific Python

Community | developed  
| owned



# What does Open-Source mean?

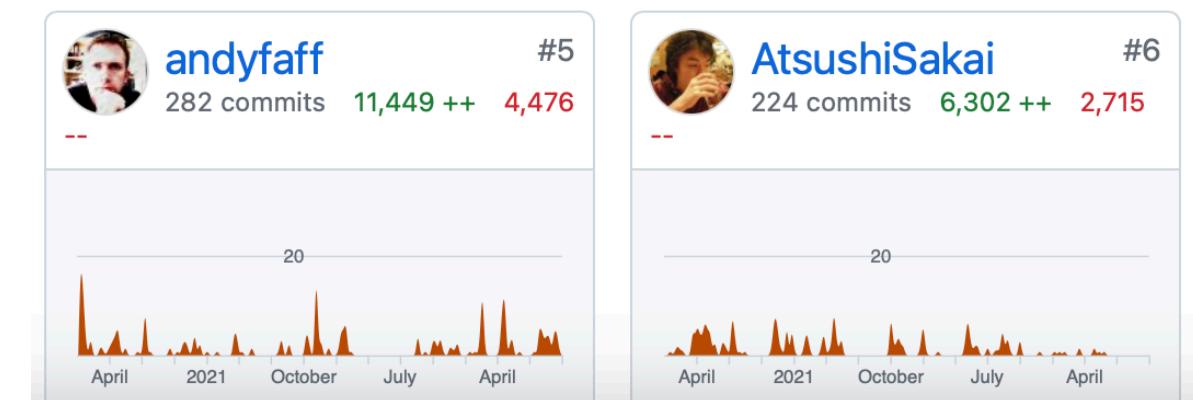
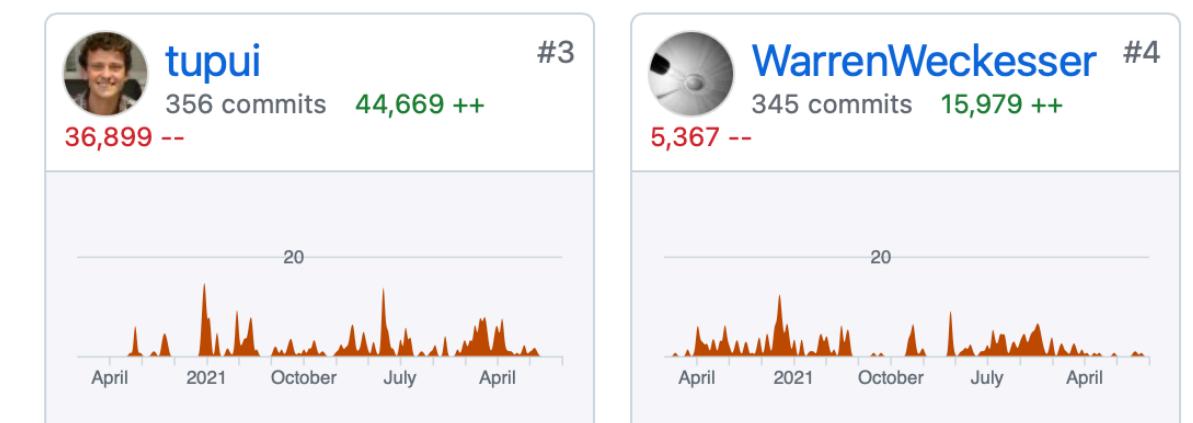
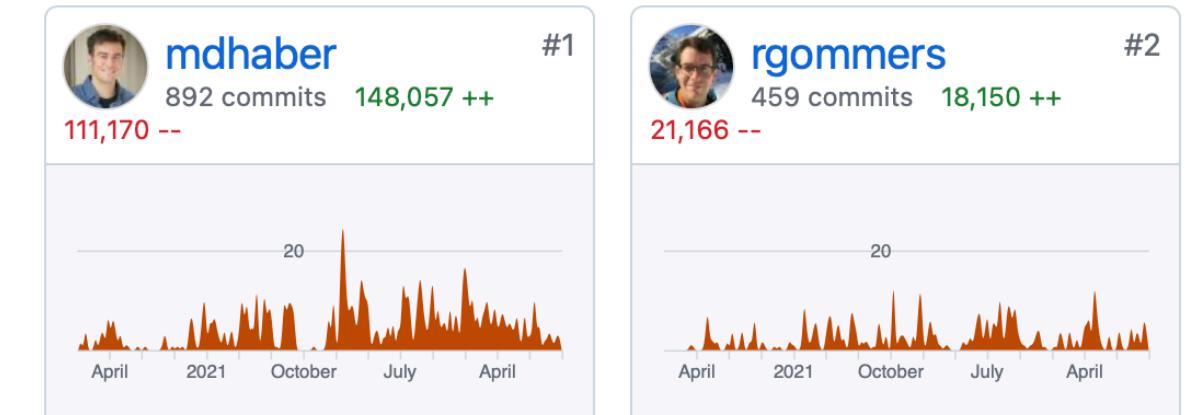
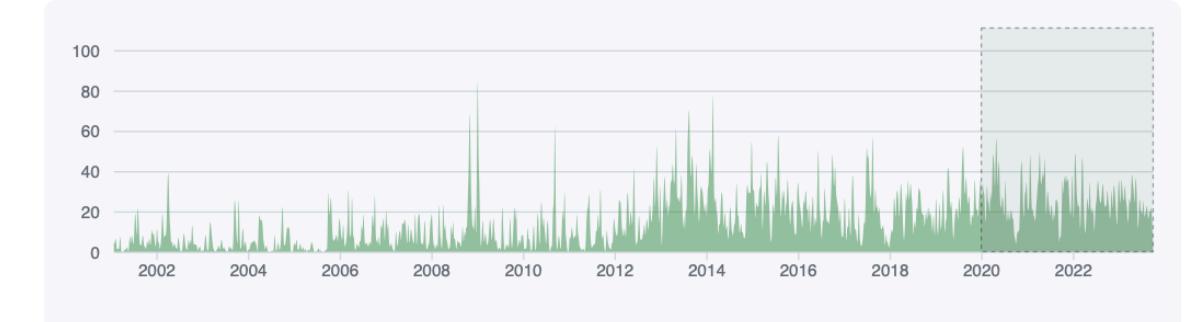


## Open-Source Community!

Jan 1, 2020 – Oct 2, 2023

Contributions: Commits ▾

Contributions to main, excluding merge commits and bot accounts



# Join the community

Ideas, issues, PR, reviews, discussions, issue management: *every contribution matters...* Join us!

<https://simdec.fi/>

Thank You!