# Algorithm Inventarium (AI+) method~~-athon~~ sprint

**Enric Senabre** - Austrian Academy of Sciences (ÖAW) | CRI Paris
**Matthew Battles** - metaLAB (at) Harvard
**Eveline Wandl-Vogt** - Austrian Academy of Sciences (ÖAW) |
Ars Electronica Research Institute “knowledge for humanity” (k4h)

@esenabre, @MatthewBattles, @caissarl #k4h #explorations4u

AI+ @ EASST @ Prague 20.08.2020

# Towards an algorithmic society (for all)...

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"Algorithmic grading" (UK):
The Verge: Fuck the Algorithm
Guardian: Ditch the Algorithm

*How can society's* ***awareness and resilience*** *around the* ***operation and impact of algorithms*** *be collaboratively expanded?*

There's still a general lack of knowledge about **how algorithms surround us and determine everyday life** in many areas, invisibly and secretly operating through our **progressively digitized contexts**.


# How this “sprint” session is planned

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1. Eveline / Enric ↠ Presentations & about AI+ project [5mins]
2. Enric ↠ Examples of algorithm “species” [10mins]
3. **All** ↠ **Open round for other algos around us?** [10+5mins]
4. Matthew ↠ Examples of methodological approaches [10mins]
5. **All** ↠ **Open round for other methods & approaches?** [10+5mins]
6. Eveline / Enric / Matthew + All ↠ Wrap up and next steps [5mins]

- Matthew ↠ Live whiteboard DJ (except if last minute tech issues :)
- Enric / Eveline: Etherpad notes (please open in parallel for session)

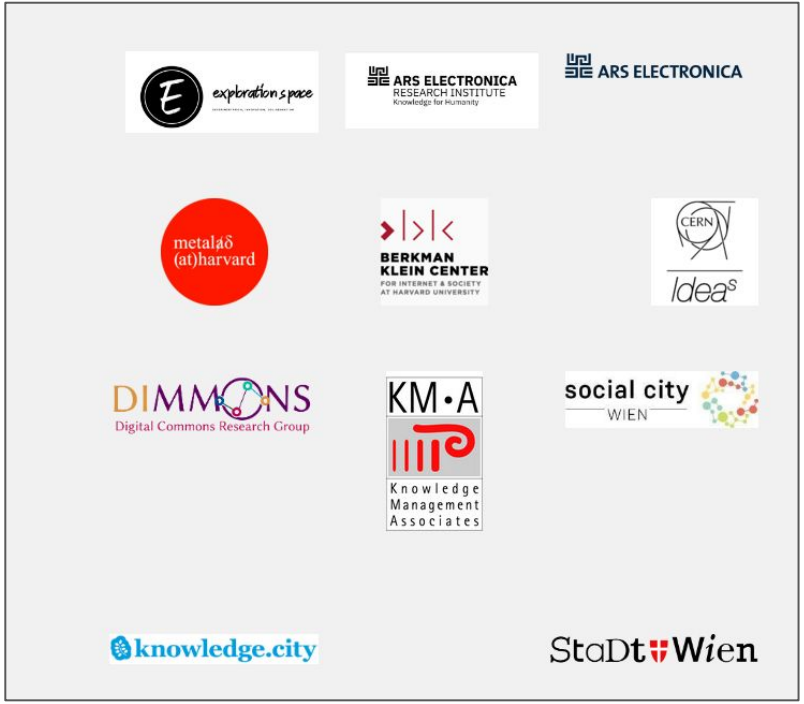
# Algorithm Inventarium (AI+) project

Funded by City of Vienna grant scheme “Digital Humanism / **Digitaler Humanismus**”.

April 2020: granted 12 months seed funding for piloting project with academic partners, associations, artists and civil society, also involved in close interaction with the city of Vienna.

Further contributing partners in our network:

- Ars Electronica research institute “auditory cultures”, Ars Electronica
- CRI Paris
- Gesellschaft für Digitale Ethik
- NamSor
- Knowledge for Development
- **YOU?**



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# Algorithm Inventarium (AI+) objectives

1. Develop and test an open **digital repository of algorithms** (the “inventarium”), classifying them by multiple criteria.
2. Create a **toolkit of materials and protocols for co-creation sessions** (“inventarium sprints”) for the collaborative identification and discussion of algorithms operating within the city context.
3. Promote **artistic recreations and experimentation** with algorithms in various cultural contexts: visual arts, narratives, performances, digital media, etc.
4. Promote the **speculative formulation of new possible algorithms**, based on the knowledge base generated.
5. Initiate a pool of open research datasets and observations for derivative work in **academic publications and educational resources**.
6. Articulate the process from a solid theoretical framework of **humanity-centered design**, dialoguing with diverse knowledge disciplines and communities of practice.

# The algorithm “inventarium” approach

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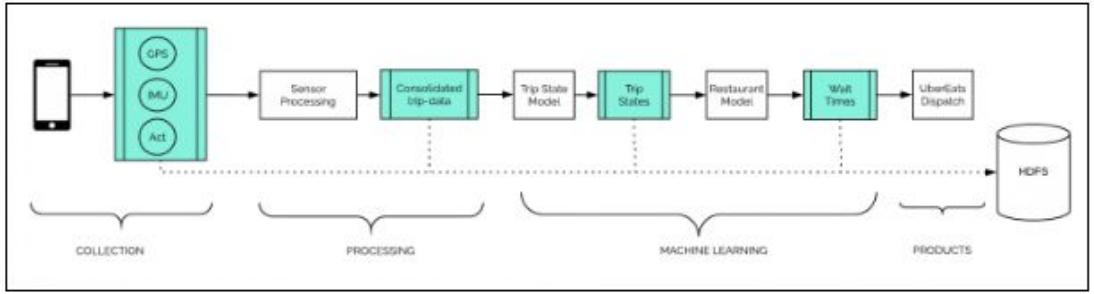
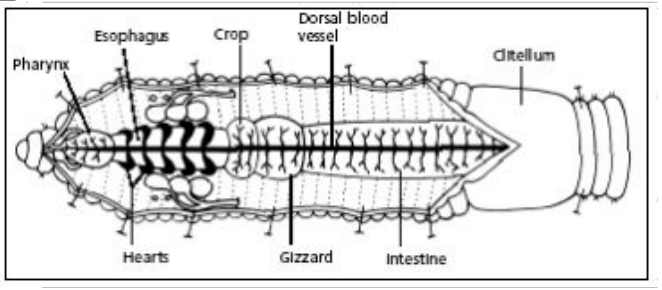
***A transdisciplinary exploration of rules and opportunities around algorithm species***




AI+ main goal: to **locate, dissect, classify and examine algorithms “species”** operating behind apps, platforms and other digital tools, in an effort to articulate **discovery and discussions** beyond the mere mathematical and logical perspectives on algorithms (Seaver, 2017).

Emerging field of action research and policy-making, in projects like Algorithm Watch, OASI (Observatory of algorithms with social impact), Algorithmic Justice League, among others.

* Seaver, N. (2017). Algorithms as culture: Some tactics for the ethnography of algorithmic systems. *Big Data & Society*, 4(2).

# Main AI+ outcomes so far

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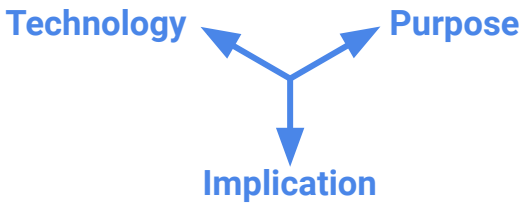
1. Establishment of an operative, **transdisciplinary group with 4 core areas**:
   a. Taxonomy and classification of algos
   b. Co-creation and methodological experiments
   c. Documentation, observation and (meta)research
   d. Project collaborations and scaling up

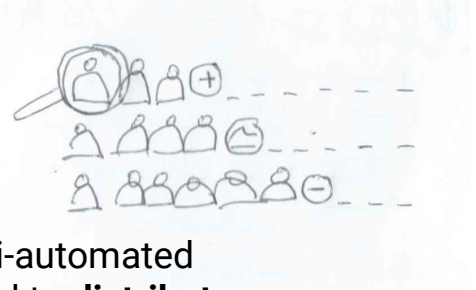
2. **Triple taxonomy** for describing algorithm especies & systems (Garcia Tello, CERN):
   **a. Purpose axis (intention)**
   **b. Technology axis (data used)**
   **c. Implication axis (consequences)**




3. Detailed **pre-classification** of algorithm species (soon on the AI+ wiki):
   a. Job seeking profiler (Austria)
   b. Consumption recommender (e-shopping)
   c. Google page-ranker (web search)
   d. Activation atlas (deep learning)
   e. Platform (des)monetizator (Youtube)
   f. Self-driver assistant (private car)
   g. On-demand delivery' (platform work manager)

4. State of the art of **co-creation and interactions** around algorithmic culture:
   a. Anatomy of an AI System
   b. Bushwick Analytica - tegabrain
   c. COVID-19 Reddit Algo-Tracker
   d. James Bridle / Autonomous Trap 001
   e. Rybn | The Great Offshore
   f. Google Maps Hacks
   g. Sounds of Lesvos
   h. The Laughing Room

# Examples of algorithm “species” (1/3)



***Job seeking profiler (Austria)***

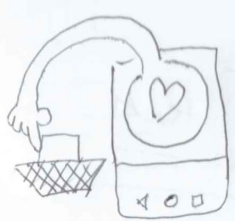
Based on a **statistical model of job seekers' prospects** on the job market in Austria, the system is designed to **classify job seekers into three categories**: (A) High prospects in the short term; (C) Low prospects in the long-term; (B) Mediocre prospects (meaning job seekers not part of groups A or C). Depending on the category a particular job seeker falls under, they will be offered **differing support in (re-)entering the labor marke**t.

- **Purpose axis (intention):** This semi-automated classification is explicitly introduced to **distribute scarce resources in the active labor market** program in an efficient way, i.e., considering the predicted difference of **how fast and how sustainable** job seekers can be reintegrated into the labor market.

- **Technology axis (data used):** The system uses data referring to the individual job seeker's **employment history**. Also data from the labor market based on e.g., **gender, age, citizenship, and health conditions**.

- **Implication axis (consequences):** Use of **sensitive information** can lead to **discrimination, misinterpretation and stigmatization**, as well as its potential for reinforcing and amplifying **inequality on the labor market**. In particular, the inclusion of gender as a variable has raised public concerns about **gender discrimination**.

# Examples of algorithm “species” (2/3)



***Consumption recommender (shopping)***

Recommend system of new products or services to consumers **based on ratings of other products** (e.g., a new gadget suggestion based on previously acquired gadgets). Some algorithms implement content-based methods that **leverage consumer preference and product attribute data**, others use c**ollaborative filtering** methods that build on **comparisons to peer users**.

- **Purpose axis (intention):** To assist consumers in filtering information and improving overall **decision quality when buying services and goods**, widespread in online commerce. Better recommendations require more detailed **data about the user and product** is available.
- **Technology axis (data used):** The user data collected may include information about the **users’ identity**, demographic profile, behavioral data, purchase history, rating history, and more. Such information can be **very privacy-sensitive**. For example, the demographic profile refers to **demographic characteristics** of the customer.
- **Implication axis (consequences): Users are often unaware** of what data is stored and how it is used. Consumers display **overdependence on algorithmic recommendations** in a manner that may both reduce their own welfare and **propagate biases system-wide**.

# Examples of algorithm “species” (3/3)

***On-demand delivery’ (platform work manager)***

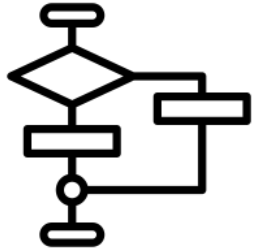
On-demand delivery platforms such as Deliveroo, Glovo and Uber Eats make use of algorithmic management in order to **distribute tasks among platform couriers**. Although most of the information regarding these algorithms is just accessible by platforms, it is known that some of the **variables that are used to decide task distribution among platform couriers are: rating history, location, etc**.

- **Purpose axis (intention):** To **distribute customers orders** among platform couriers, based on different types of data recorded from platform couriers activity. Designed with the main purpose of **increasing final customer satisfaction** while **incentivising platform workers** to continue working with the platform.

- **Technology axis (data used):** Algorithms based on variables such as the **amount of time** that the platform courier has used the platform, the **number of deliveries** done, whether working in **peak hours** and, the **consumer score** given to the platform courier service, etc.

- **Implication axis (consequences):** The design of the algorithmic system has different implications on **platform couriers’ working conditions**, unaware of data being used. **Platform workers’ needs and opinions** surrogate to customers’ and other stakeholders willingness.

# More examples of algorithm “species”??




1. **Purpose axis (intention)?**
2. **Technology axis (data used)?**
3. **Implication axis (consequences)?**

All: Etherpad (section #1)

# Methodological approaches for algos

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## Algorithms as culture: Some tactics for the ethnography of alg

Nick Seaver

First Published November 9, 2017 | Research Article | Check for updates
https://doi-org.ezp-prod1.hul.harvard.edu/10.1177/2053951717738104

Article information

### Abstract

This article responds to recent debates in critical algorithm studies abou
"algorithm." Where some have suggested that critical scholars should al
common definition in professional computer science, I argue that we sh
"multiples"—unstable objects that are enacted through the varied practic
them, including the practices of "outsider" researchers. This approach b
Elizabeth Goodman, and Annemarie Mol. Different ways of enacting alg
while occluding others: computer scientists enact algorithms as concept
implementation details, while calls for accountability enact algorithms as close
propose that critical researchers might seek to enact algorithms ethnographic
heterogeneous and diffuse sociotechnical systems, rather than rigidly constra

SAGE Recommends

Sort by Relevance

What is this?

**Ethnography**

Sara Delamont
**In:** *The BERA/SAGE Handbook of Educational Research: Two Volume Set* (2017)

BOOK CHAPTER SAGE knowledge

**Ethnographic Methods: Ethnography: Theory and Methods**

Alma Gottlieb
**In:** *A Handbook for Social Science Field Research: Essays & Bibliographic Sources on Research Design and Methods* (2006)

BOOK CHAPTER SAGE researchmethods

**Ethnographies of Online Communities and Social Media: Modes, Varieties, Affordances**

Christine Hine
**In:** *The SAGE Handbook of Online Research Methods* (2017)

# Examples of “algo-catching” methods (1/3)

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# VISUALIZATION (2/3)

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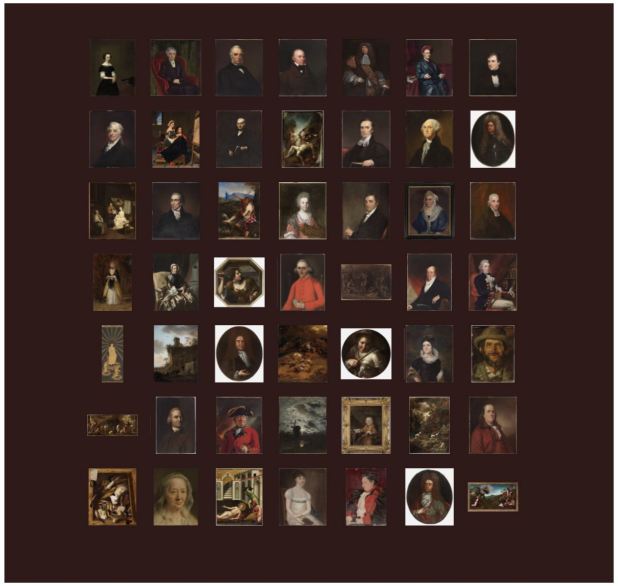

***Portrait of an Old Woman***

**Artist:** Christian Seybold

**Century:** 18th century

**Dominant sentiment:** calm (84% confidence)

**Gender:** female (91% confidence)

Lins Derry

*Second Look*

https://metalabharvard.github.io/projects/curatorial-aigents/secondlook/

# EXPRESSIVE USE (3/3)

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Matthew Battles
*Earth Measurer*

https://brk.mn/EarthMeasurerMB

```
# data I/O
data = open('/Users/mbattles/Documents/dogtest/Geometridae.txt', 'r').read() # should be simple plain text
file
chars = list(set(data))
data_size, vocab_size = len(data), len(chars)
print 'data has %d characters, %d unique.' % (data_size, vocab_size)
char_to_ix = { ch:i for i,ch in enumerate(chars) }
ix_to_char = { i:ch for i,ch in enumerate(chars) }
```

---

```
# hyperparameters
hidden_size = 100 # size of hidden layer of neurons
seq_length = 25 # number of steps to unroll the RNN for
learning_rate = 1e-1
```

---

```
x = np.zeros((vocab_size, 1))
x[seed_ix] = 1
ixes = []
for t in xrange(n):
  h = np.tanh(np.dot(Wxh, x) + np.dot(Whh, h) + bh)
  y = np.dot(Why, h) + by
  p = np.exp(y) / np.sum(np.exp(y))
  ix = np.random.choice(range(vocab_size), p=p.ravel())
  x = np.zeros((vocab_size, 1))
  x[ix] = 1
  ixes.append(ix)
return ixes
```

# More ideas for “algo-catching” methods?

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**More info / Similar methods**

1. …
2. …
3. …

All: Etherpad (section #2)

# Wrap up and next steps

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next interactions (virtual):

- Ars Electronica Festival 2020
  “garden of knowledge for humanity” 11 September 2020 5pm CEST

- AoIR October 2020

**digitialhumanism@oeaw.ac.at**

- **[+] Contribute to the inventarium wiki [coming soon!]**
- **[+] Join our Slack channel**
- **[+] Be part of our Zenodo community**
- **[+] Add to Zotero references**

# Thank you!

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