



# Crowd Insights Monitor

TADA Ethics workshop Report 18 December 2020

# The world's first open source Crowd Monitor

The Crowd Insights Monitor is an algorithm to count the size, density, direction, speed of crowds in public space. This open source software is freely available for any municipal innovator who is interested in using existing city cameras to collect, store, process and share real-time data of crowds in public space(s). This is arguably the world's first end to end Open Source machine learning platform for Crowd Counting. The algorithms used have been independently verified to outperform commercial systems. Government workers can create datasets from camera streams, train neural networks and deploy the trained networks to cameras.

# Project Team:

The Crowd Insights Monitor is designed by Tapp and built by Life Electronic in partnership with Amsterdam CTO (City Technology Office), CMSA (Crowd Monitor System Amsterdam) and the Marineterrein Amsterdam Living Lab and Tada



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AI Research Intern - UvA

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Data Scientist & AI  
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Eelco Thielier  
CMSA Coordinator /  
Manager

Jorn van Dijk  
Advisor Traffic management

Boen Groothof  
Project manager Mobility  
CTO Office

# The Tada values

The city of Amsterdam has embraced the Tada manifesto. The outcomes of the workshop can be used to:

The six values of Tada are leading in the discussions around the values of the **Crowd Insights Monitor**.

All parties involved uphold these values and make sure that any action concerning the project is reflected upon and measured against these values.

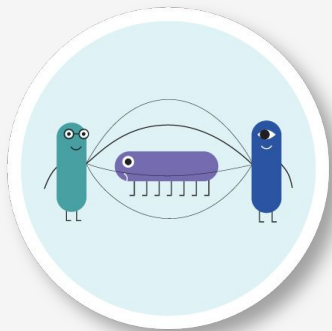
In order to make sure that these values can be leading the project in the right direction and inform the members of the rights actions, we held an online workshop on **9 December 2020** to discuss the current state of the project. We also formulated possible actions that improve how well the project scores against these values.

- inform future actions of team members
- inform the public of the current state of the project.
- a shared reference for dialogue between teams, stakeholders and the general public
- as a method to document value-led progress

# Control

Data and technology should contribute to the freedom of citizens. Data are meant to serve the people. To be used as seen fit by people to benefit their lives,

to gather information, develop knowledge and find room to organise themselves. People stay in control over their data.



## There is no control in the project because:

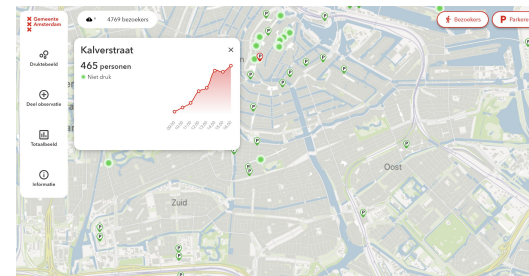
- Public doesn't know how large area of view is
- Don't know exactly what area is being monitored
- NO opt-in/ opt-out

## There is control in the project because:

- Public app shows the data
- Stickers are available under each camera
- Camera's only run during an event

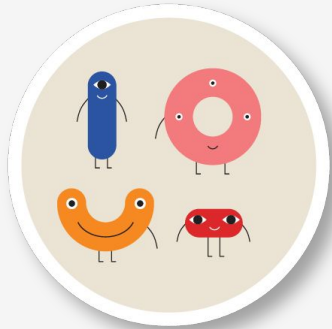
## We are going to:

- Billboard Heatmap visualisation at Bijlmer station
- We need to publish a public web app accessible to visitors / residents.
- Will add CMSA to system



# Inclusive

Our digital city is inclusive. We take into account the differences between individuals and groups, without losing sight of equality.



## The project is not inclusive because:

- Baby's are hard to spot 🙈
- Digibeten might not know how to get to the website
- Headless people are excluded

## The project is inclusive because:

- It monitors either everyone or nobody
- It's not about the individual
- We prepared a video explainer why Public Eye
- It was a co-created with citizens & city
- Web-App is open to anyone
- VU & NEMo organized a public symposium on crowd monitor Arena
- City was involved in training and improving AI
- We trained and improved AI to include amsterdammers

We are going to:

# Open & Transparent

What types of data are collected? For what purpose? And what are the outcomes and results? We are transparent about this.



## The project is not open and transparent because:

- There isn't much information alerting people of monitoring in Boulevard
- Public doesn't know which areas are monitored, and which ones aren't.
- We can't share DIA (Data Impact Assessment)
- Source code is not published yet.

## The project is open and transparent because:

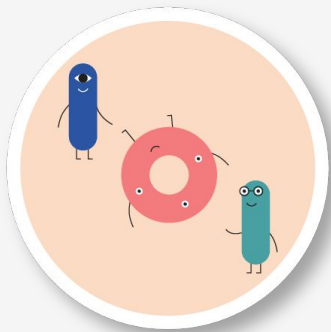
- Boen's Dashboard
- algorithm register
- awareness campaigns
- Privacy statement & Privacyverklaring staat online
- Video promo on Amsterdam Website
- Privacy Stickers placed below stickers
- Press releases (eg. Interviews)
- Lots of PR moments with national papers
- Registered on amsterdam.nl/privacy & CMSA Sensoren pages
- Processing of video streams on our own dedicated server
- Presentations to other stakeholders, ASC, (eg. VNG) Katalyst workshop with bewoners & werkers

## We are going to:

- Open data up to 3rd parties via an API
- Soft launch of dashboard

# From Everyone for Everyone

Data that the city, companies and other organizations generate from the city are held in common. Everyone can use them. Everyone can benefit from them. Together we make agreements about this.



**This project is not from everyone for everyone because:**

- Source code is not yet public
- Data is visualized but not published

**This project is from everyone for everyone because:**

- Designed as an Open API publisher (invite only)
- Data is shared with Prorail & JCA
- It was designed to be open source (free) for all other cities

**We are going to:**

- Make visualisations at the boulevard
- let AJAX ticket holder / fans know about the dashboard
- Info screens informing people of drukte
- AJAX showtime, newsletters and other multi-media channels
- We will be publishing the source code to legitimate parties (invite only)



# Tailored To The People

Data and algorithms do not have the final say. Humanity always comes first. We leave room for unpredictability. People have the right to be digitally forgotten, so that there is always an opportunity for a fresh start.

## The project is not tailored to the people because:

- both data and Algo's create TONS of data...
- Some images are kept for training purposes, and encrypt cropped images after training
- turns people into numbers
- Does not take the experience into account but only numbers

## The project is tailored to the people because:

- no automated decisions purely based on data
- No tracking of individuals
- Tailored to 1.5m situation
- Our AI can't personally identify people (remain anonymous)
- People do not leave the system, they are just numbers (total count, speed, density, direction, distances)
- explainer on what types of data is collected

## We are going to:

- Thresholds need to be defined based on local human experience (pre & post covid)
- More evaluation to be done on the data science and future applications
- Build a edge solution so no images of people will be stored off-site
- Disclaimer on how images (heads) are being cropped out,
- 1) images are stored 2) images are annotated ← yes, people are stored but can reduce risk by decreasing time / risk to minimum, eg 1wk
- **New Security Measures:**
- Time of tagging (eg. 1wk?) - [here we have images with heads] - Time of tagging! - [Here we have anonymized images]
- We need ISO standards!
- New user groups, roles / Privileges
- Images are encrypted
- Automatic deletion / self destruction mechanism
- We only use a small (0.000034%) percent of data, rest can be deleted
- Minimize active training datasets
- Let's categorize project as "Research"

# Legitimate & Monitored

Citizens and users have control over the design of our digitalcity. The government, civil society organizations and companies facilitate this. They monitor the development and the social consequences.



## The project is not legitimate and monitored because:

- Governance of current and future codebases could be disputed
- Onbespied door Amsterdam bewegen! Law says no one can't spy on people...
- Discrepancies between public opinion of data collection and visualization practice (?)
- Hard to remove fears of "Big Brother" with these types monitoring solutions
- Hard to get balance between safety / security and privacy

## The project is legitimate and monitored because:

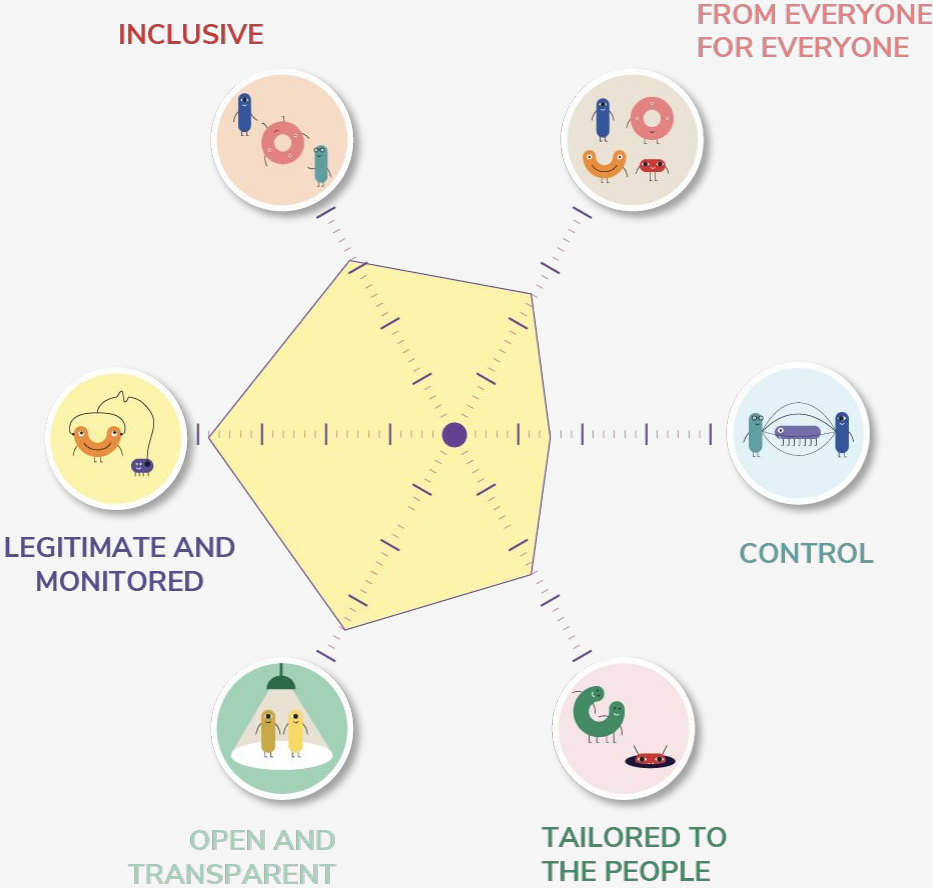
- Insights for event operational managers
- we are moving from an invasive technology(cctv monitoring) to an non-invasive technology 2020
- Privacy by design built into data sets
- Annually evaluation (market comparison, technological developments, new laws)
- assignment was approved by the Gemeente (CPA & DPA, AVG & TADA)
- can act / respond immediately to facilitate crowds

## We are going to:

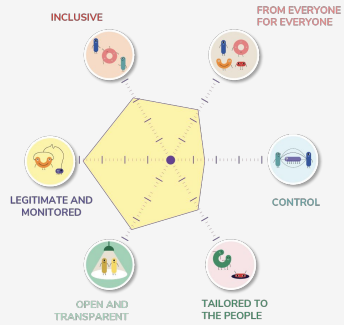
- Russian Twitter bots to manipulate public opinion 🤖
- Get public opinion on dashboard / smart signs
- Improved Ownership & Governance (eg. proraail commission)



# Evaluation



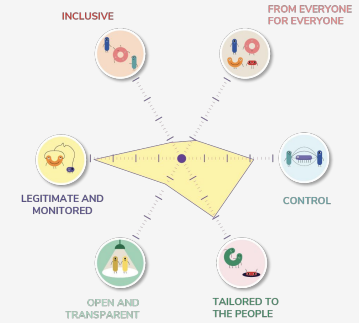
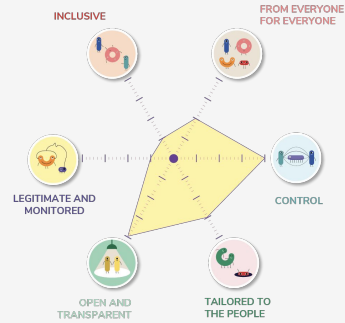
# Comparison?



Crowd Insights Monitor  
Evaluation 9.12.2020

**CMSA**  
Crowd Monitoring System Amsterdam

✕ Gemeente  
✕ Amsterdam  
✕



Projects 2021

Watch Timelapse Video of workshop here:

<https://vimeo.com/492460337>

# Next Steps

In case you have more questions about Tada and this workshop, you can contact us here: [Tom@tapp.nl](mailto:Tom@tapp.nl) or [douwe@tada.city](mailto:douwe@tada.city)

Continue online?

Join the Tada linkedIn group

<https://www.linkedin.com/groups/12155217/> And follow us on Twitter:  
[@tada\\_city](https://twitter.com/tada_city)

**Links:**

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