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Computer says woman: how a Rotterdam algorithm discriminated against young, single mothers

Research

"I emphasize that there was no discrimination in the use of algorithms in the municipality of Rotterdam," alderman Richard Moti told the city council in 2021. But the "risk estimation model" for detecting welfare fraud did select a specific group of people for welfare benefit checks, Vers Beton, OPEN Rotterdam and Lighthouse Reports discovered.

<u>Saskia Klaassen (https://www.versbeton.nl/personen/saskia-klaassen/)/romy-from-dike/</u>)

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March 6, 2023

(Reading time 16 minutes



Image: Lucia Lenders (https://www.versbeton.nl/personen/lucia-lenders/)

This article in brief:

Rotterdam led the way as a European city in using an algorithm to detect welfare fraud.

In 2021, Lighthouse Reports was given access to the "risk assessment model" used by the municipality of Rotterdam from 2018 to 2021 to select people for a "re-examination of welfare benefits.

By mistake, we were given the data used to train the algorithm in 2020, allowing us to find out what patterns the model learned from.

We discovered several problems with the algorithm. For example, the model learned to make generalizations based on a limited number of people in the data, subjective variables (external grooming) and proxy-

variables (language) used, and the final selection was made based on a poorly performing computational method.

The probability of being invited to a reexamination increased the most if the welfare recipient was female, single, young, a mother and did not speak Dutch well.

There is debate in the EU whether these types of "high-risk algorithms" should be banned altogether because of the damage

Rotterdam's approach affected the legal security of financially dependent residents because they could not verify the reason for reexamination.

The municipality acknowledged that the algorithm "could never remain 100 percent free of bias or the appearance thereof" and called this an undesirable situation. It stopped using the risk assessment model in 2021.

Imane cannot remember the exact date of the letter. It was just after a medical procedure, over two years ago: an invitation for a reexamination by the municipality to see if she was rightly receiving welfare benefits. Actually, Imane was not strong enough to come to the appointment. But she had already had so many hassles about welfare that canceling was not an option.

The interview at the Work & Income Department lasted an hour. She had printed out her bank statements; those of her children had also been requested. Copies of passports, the rental contract, the completed questionnaire about assets abroad - she handed everything to the man in the consulting room. "The man from the municipality talked very loudly, everyone enjoyed it. Should the security guard know what's going on with me?"

Experiment

mane*① is one of the five women we spoke to with Lighthouse Reports about these reexaminations at the municipality of Rotterdam. She belongs to the group with a high score in the 'risk estimation model': she is a single mother of several children and lives on welfare on the poverty line. The model calculates a "risk score": an estimate of how likely it is that a person's welfare benefit will be incorrect. Rotterdam used this algorithm from 2018 to 2021 to detect possible welfare fraud.

Rotterdam is leading the way with the use of so-called *machine learning algorithms*. Not only in the Netherlands, but throughout Europe, our research in more than a hundred European cities showed. These algorithms use artificial intelligence to make predictions. Rotterdam had this algorithm developed in-house. Several European city governments are therefore following the technological developments in this city with interest. However, after a critical report by the Rotterdam Court of Audit (https://rekenkamer.rotterdam.nl/wp-content/uploads/2020/11/R.P.20.06-gekleurde-technologie.pdf), the municipality stopped using the risk estimation model in 2021. Only by then the experiment had already been running for three years.

Risk scores

Vers Beton, OPEN Rotterdam and platform for investigative journalism Lighthouse Reports led an investigation into the "risk estimation model" within a comprehensive international research project on the use of algorithms in welfare payments, also involving Wired, Argos and Follow the Money. Never before has an algorithm been examined on this scale.

The municipality of Rotterdam shared the 2020 model with Lighthouse Reports, making it more transparent than the other European cities to whom Lighthouse Reports knocked on the door for the past two years. What the municipality was not aware of, however, was that it also sent along the training data. This gave us insight not only into the computational model, but also into the data the algorithm used to learn to select people.

We found that women, welfare recipients with children, people who were young or very old, living together, and having financial or addiction problems were more likely to be selected by the algorithm. If an assistance recipient had one or more of the above characteristics, for example, in the case of a single assistance mother with financial problems, then according to the algorithm, the probability that the assistance benefit would be unlawful increased. Characteristics related to mastering the Dutch language, passing the language test or speaking a second language were also influential. The lower the proficiency in Dutch, the higher the risk scores.

The algorithm also included subjective data, such as the ratings of Work & Income customer managers on how well they help welfare recipients find jobs. Or how representative customers are dressed. Unlike demographic data such as age and gender, here there is no way to check whether these subjective impressions are correct.

But they entered the system as "hard data" and were used to draw conclusions about possible fraudsters.

The municipality indicates that the algorithm was regularly adjusted to combat bias. Since we only received data from 2020, we do not know if these results are comparable to those from previous years. We do know that earlier versions of the model used 70 percent of the same variables.

Our search for the women selected by the algorithm led us past community centers and canteens in the Oude Westen, Hillesluis and Afrikaanderwijk neighborhoods. We visited places where welfare mothers gather, usually to have breakfast with their younger children and volunteers. That a number of women are familiar with reexaminations soon becomes clear, but not everyone dares to talk about it. The mothers who did dare to do so tell of having to submit their records to the municipality several times. Whether they were selected by an algorithm, these women do not know. For fear of the Department of Work & Income, they did not give us permission to ask.

₩ Made with Flourish

(https://public.flourish.studio/visualisation/12822172/?utm source=embed&utm campaign=visualisation/12822172)

Headache

"The atmosphere during the interview was not good," says Imane. She was embarrassed that she had been called. During such a re-examination, the official checks all bank statements, possessions and purchases within a certain time frame to see if someone is concealing additional income. Imane had brought her bank statements, but according to the official, they were not the correct ones. The official wanted to check more income and expenses with her bank card on the spot. Imane did not agree to this, with the result that her benefits were stopped for the duration of two days. Only after submitting the additional information was the payment continued. An unjustified measure, she later heard from a lawyer. But Imane did not file an objection. "I have enough headaches in my life," she said.

In total, around 30 thousand Rotterdammers receive social security benefits, over three thousand of whom were selected by the algorithm for a re-examination. Such a check is experienced as very invasive because people do not know why they receive the invitation letter. The reason is not stated in the letter, nor does the income consultant know why someone is invited for the re-examination. This is because the selection is not only done by the algorithm, but also may come from random sampling and "thematic investigations" into, for example, possessions abroad. The counselor does not know whether someone is invited by the algorithm, or by random sampling, and thus cannot explain it.

The risk model determines for a few thousand welfare recipients who sits in the chair opposite the income counselor and who does not

But the consequences of an investigation can have a huge impact on the lives of welfare recipients. If the official finds that someone has (small) income and has not reported it to the municipality, it can lead to an adjustment of the

benefit amount, a fine or even the complete cessation of benefits. According to the municipality, it works in this way so that the algorithm never independently decides on the legality of the benefit. Nevertheless, for a few thousand welfare recipients, the risk model determines who sits in the chair opposite the income counselor and who does not.

For Imane, it was not the first time she had her benefits cut. Earlier, in 2019, the assistance was even withheld for a month. It was right after Imane stopped working in return for her benefits. The cleaning work proved too hard after all. She had indicated beforehand that she would see if she could physically handle the work, but when she stopped, an invitation for a re-examination was immediately on the mat. Because she refused to apply, her benefits were stopped. "I could only pay the rent, food I borrowed. It took me two years to recover from this, I was completely broken mentally."

"We do not conduct reexaminations to look for fraudsters, but to ensure that the benefit remains legitimate," the City of Rotterdam responded to our questions. Many welfare recipients are unaware that under the Participation Act they have a duty to provide information. So they do not report changes in their personal situation. "The longer this goes on, the more annoying the outcome," says the municipality.

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(https://public.flourish.studio/visualisation/12845632/?utm_source=embed&utm_campaign=visualisation/12845632)

Criticism and betterment

The use of algorithms has prompted fierce political debate in the City Council several times in recent years. For example, the System Risk Identification (SyRI) - known from the benefits scandal - was discontinued after criticism from the council (https://www.versbeton.nl/2019/07/een-geheim-profileringsalgoritme-loslaten-op-arme-wijken-is-onethisch/). This algorithm was used in the Hillesluis and Bloemhof neighborhoods to detect fraud until 2019. The following year, SyRI was officially https://www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Rechtbanken/Rechtbank-Den-Haag/Nieuws/Paginas/SyRI- legislation-in-fight-with-the-European-Treaty-for-the-Rights-of-Humanity_aspx)

In 2021, when a report by the Rotterdam Court of Auditors on the risk estimation model appeared, critical questions were again raised in the council about the algorithm that the municipality had been experimenting with for three years by then. The report drew a harsh conclusion: there are insufficient guidelines within the organization for fair and transparent use of the risk model. Ten motions were submitted during the debate, all of which were widely supported. The motions call for more control, transparency and ethical safeguards.

"It's a new technology, you don't have to run away from that," said Alderman Arjen van Gils (finance, organization, port and major projects) during the debate. His colleague Richard Moti (work and income) emphasizes that the computer does not decide whether someone commits fraud, but the official does. A re-investigation is drastic, "but the algorithm should ensure precisely that that Rotterdammer who sticks to the rules and passes everything on neatly on time needs to be bothered as little as possible."

But the model does not check at all that people are following the rules neatly and that they report everything on time. It selects people based on personal characteristics such as gender, health or financial circumstances, so certain groups are checked more often than others.

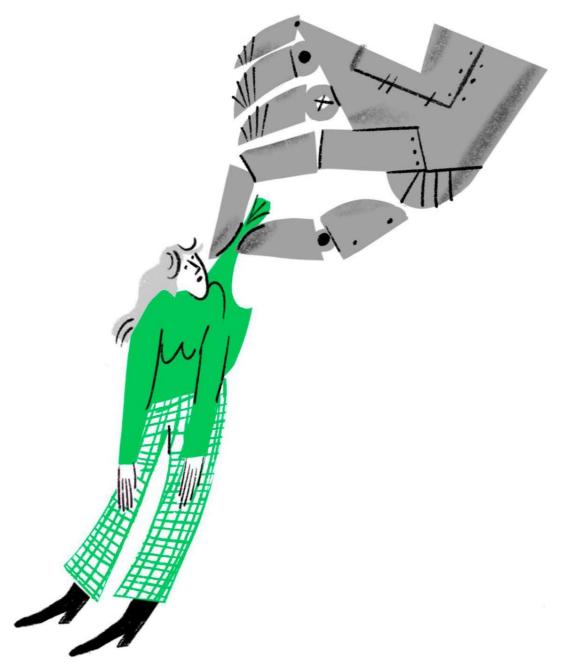


image: Lucia Lenders

Unequal playing field

The model was fed with the data of 13 thousand people who previously received a reexamination, through, for example, thematic surveys and random sampling. Half of this group in the dataset had their benefits labeled as illegitimate, while the other half did not. According to the municipality, it is a "coincidence" that half of the training set consists of "illegitimate" benefits.

For an algorithm to discover patterns and relationships between 315 traits, a data set of 13 thousand people is too small. "We have a situation here where there is not enough information to properly model the nuances that exist in the real world," concludes scientist Margaret Mitchell when we present her with the results of our research. She is a computer scientist at John Hopkins University in Baltimore, but has become best known as an ethicist at Google. She is harsh and clear about the Rotterdam algorithm: she says it amounts to "random guessing," or random guessing, and should never have been used. "There is work to be done to turn this system into something that works much better, in a way that harms fewer people," she says. She strongly doubts that is possible.

This creates an "uneven playing field" between municipality and residents. Which may even be reinforced by the actions of the government

The municipality of Rotterdam describes the results from our research as "interesting, instructive and partly recognizable." She points out that it is now working on a new algorithm that is transparent and does not use variables from which age, gender or nationality can be derived. "Over time, we have found that the risk estimation model could never remain 100 percent free of bias or the appearance thereof. That situation in itself is undesirable, especially when it involves variables that carry a risk of bias based on discriminatory grounds such as age, nationality and gender."

"You cannot ask the government: use an algorithm, but also guarantee that it does not discriminate," says Marlies van Eck, recently a member of Rotterdam's Advisory Council on Algorithms, which was established last year at the request of the city council. Van Eck researches legal aspects of the use of technology at Radboud University and wrote a report for the Human Rights Board on municipalities, algorithms and human rights. She also works for the consultancy firm Hooghiemstra & Partners.

"The problem with algorithms is that predictions are made based on historical data," Van Eck argues. So the outcome will have the same weaknesses and strengths. "You get a reflection of the groups you've looked at recently. That can be problematic because you keep doing what you've always done. So you basically keep going in circles."

It is quite possible, she says, that in the past the congregation skipped over difficult groups. "Because they are difficult, have lawyers. While the mothers who did get selected were easy slaughteroffers. They don't have a big mouth when they are checked." This creates an "uneven playing field" between municipality and residents. Which may even be reinforced by the actions of the government."

Five notable features of the risk assessment model

- 1. The municipality says it checked itself to see if certain groups, including women, were overrepresented. Despite these attempts, the algorithm selected 70% women. In Rotterdam, 52% of welfare recipients are
- 2. It is constitutionally illegal to discriminate on origin, so variables such as nationality may not be included. Instead, the algorithm checks for native language and whether you have passed your Dutch language test. Earlier, the Court of Auditors and Argos (https://bijvoorbaatverdacht.nl/luistertip-argos-over- biased-fraud-algorithms/) warned about these so-called "proxy variables. For the variable on language proficiency, the municipality argued that people without a migration background also have language problems. In response to criticism, the municipality nevertheless chose to remove-these-proxies-from-the-new model (https://gemeenteraad.rotterdam.nl/Reports-litem/9d13c871-5cf2-41b7-a017-c244a40813fc)
- 3. The algorithm takes subjective assessments from the work coach. That assesses how employable someone is and notes someone's appearance and whether someone comes across as motivated. The algorithm cannot read these comments, but only looks to see if there is a note in the computer. Each comment positive or negative increases the risk scores. In its defense, the city says that "if a person cannot plan and organize well and does not take good care of themselves, there may be a reasonable chance that the benefit situation is not current."
- 4. The algorithm was trained with data that were unrepresentative and colored. As a result, it was likely to learn to discriminate in the same way. Once implemented, greater targeting of marginalized groups reinforced these biases, a process more often described as a "feedback loop.
- 5. The invitation to the re-examination did not mention why you were selected. Even client managers did not know how the selection came about. Finding this out required a very specific application that required specialized knowledge.

Marketplace

"I didn't sleep last night," Laila says as she sits on a school chair at the white plastic table in the cafeteria. She looks pale and has circles under her eyes. "But it's not neat not to come." Then she puts her hand on her chest. "Talking about it is good. I can't handle it on my own anymore. They have to stop hurting us."

Five years ago, Laila* had to come to the municipal office on Librijesteeg to have the legality of her welfare benefit checked. She had been receiving it since 2002 and at the time of the reexamination had been single for a long time, something she still had a very difficult time with. Her oldest son was a teenager at the time of the reexamination; her other children were still in elementary school. Because Laila can't speak Dutch well, her neighbor helps her take care of government business. He prints three months' worth of bank statements for her that Laila brings to the interview. Why she needs to bring them, Laila doesn't know. "Everything is already in the computer, isn't it?"

During the check, the clerk's eye catches a credit of 17 euros. "Where did this come from?" the official asks in a stern tone. "My son sold a game through Marketplace," says Laila. Because he is a minor, the money was transferred to her account via a Tikkie. "You must never do that again, or we will have to reclaim your benefits."

When Laila tells us this, she cringes. She explains that monthly, after deducting all fixed expenses, she has about 800 euros to "do everything from." That money goes mainly to the children. "I sometimes don't have shampoo in the house," she averts her gaze and begins to cry.

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(https://public.flourish.studio/visualisation/12735686/?utm_source=embed&utm_campaign=visualisation/12735686)

Generous social system

According to former alderman Richard Moti, tracking down welfare fraudsters is essential to maintaining a "generous social system." Rotterdammers must be able to trust that the money is well spent." But whether working with risk profiles is the method for that is questionable. And how long Rotterdam can continue to develop that kind of algorithm also remains to be seen.

On December 6, 2022, the Council of the European Union (https://www.consilium.europa.eu/nl/press/press-releases/2022/12 /06/artificial-intelligence-act-council-calls-for-promoting-safe-ai-that-respects-fundamental-rights/) pledged to start imposing stricter requirements on high-risk artificial intelligence (AI), which includes this algorithm. All high-risk algorithms will now have to pass an inspection. The European Council also favors a ban on AI aimed at scoring citizens ("social scoring") and profiling people who are "vulnerable because of their social or economic situation."

The municipality emphasizes that the legal position of Rotterdam citizens was always safeguarded. "The objection and appeal process was and is accessible to everyone and functions well." The years 2019 and 2020 show a spike in objection procedures. While in 2018 the outcome of a re-examination was challenged 586 times, in 2019 (1201 times) and 2020 (1100 times) this number doubled. In 2019, 229 objections were well-founded, in 2020 it was 333 times.

Since it was discontinued in 2021, the Municipality of Rotterdam has been working on a new version of the risk assessment model. That should

be explainable, avoid bias and have the ability to communicate transparently about it. But that new, fair and transparent algorithm is still not finished. In October 2022, Deputy Mayor Simons wrote in a <u>letter</u>

(https://gemeenteraad.rotterdam.nl/Agenda/Document/ebc7c486-943b-4b30-8a94-eceed886387?documentId=f3580cce-

0b04-4d84-9cc0-0eb0b2c36b2a&agendaltemId=dcc2beb0-f30d-4076-8cc1-d148b8abfcca) to the council that the council has doubts. Meeting the city council's requirements "is proving complicated," he writes. For that reason, "it is not clear at this time whether we can build the new model within those frameworks."

Humiliating

In Hoek van Holland, we speak to a woman whose municipality has confirmed that the algorithm selected her. Pepita is 60, divorced, chronically ill and the mother of an adult son. She found the re-examination "frightening and humiliating." Her brother had to justify in writing a birthday gift of €150 to her bank account. For months it was unclear whether she would be cut for this reason, which ultimately did not happen. She is shocked that her gender and motherhood caused a higher risk score. "Rotterdam always talks about the human touch, but there is nothing human about algorithms," she concludes.

See in the video below from OPEN Rotterdam what the effect is of this method of the municipality on Rotterdammers:



Call: between 2018 and 2021, have you been invited for a re-examination of social security benefits and do you suspect that you have been selected by the algorithm? If so, Vers Beton and OPEN Rotterdam would like to get in touch with you. Mail to saskia@versbeton.nl (mailto:saskia@versbeton.nl)

Measure your risk score

A score above 0.59 means high risk. Built with support from the Eyebeam Center for the Future of Journalism.

About this research

Lighthouse Reports (https://www.lighthousereports.nl/investigation/the-algorithm-addiction/) asked several European cities over the past two years for documentation, evaluations, code and training data used to train algorithms. Rotterdam turned out to be the most transparent: the investigative journalists were given access to the source code of the algorithm used in 2020, including all associated evaluations and documentation. What the municipality did not realize is that it also handed over the training data used to build the model. All results of the research with the algorithm were double-checked by data scientists.

Vers Beton was involved in this research to find Rotterdammers who belonged to the highest risk profile. We were assisted by members of the neighborhood council, (social) lawyers, community workers and advocates. The names of Imane and Laila in this article are fictitious for privacy reasons.

This production was made possible thanks to support from the Stimuleringsfonds voor de Journalistiek. This is a collaboration between Vers Beton, OPEN Rotterdam and Lighthouse Reports, with cooperation from Wired, Argos and Follow The Money.

Read the full justification for Lighthouse Reports' study here (https://www.lighthousereports.com/suspicion-machines-methodology/)



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Response



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