NAME: E-waste battery content detection

DATE: September 5, 2024 12:32 PM

DESCRIPTION OF TECHNOLOGY

Batteries, especially Li-po, are highly reactive and can cause accidents, such as fires and explosions that put the lives of the waste processing professionals in danger. They can cause high damages to the environment and the facilities too. This system aims to detect whether a piece of e-waste contains a battery or not. For the time being this system is to be used only on phones and potentially tablets and e-watch…

HUMAN VALUES

The identity of the users is not affected by this technology directly. It can be argued that this technology may replace jobs, such as the power loom of the Industrial Revolution, however the current situation points towards the recycling process not taking place at all if the economic circumstances aren't favorable, therefore this technology will likely have the opposite effect, enabling companies to make use of the economy of scale and hire more workers.

TRANSPARENCY

Yes, constant communication going into the specific aspects of this technology have been made with the client, receiving adjustments as needed based on the feedback provided. Further, documentation is to be created to explain in detail this technology.

IMPACT ON SOCIETY

The problem is very clear, every year dozens or even hundreds of accidents or fires are reported in waste processing facilities, with a significant impact on all involved. The employees are the first in line and the most affected with their life potentially being at stake. The environment is further degraded and the equipment can be damaged. Additionally, insurance and operating costs are higher because of these. The cause is batteries entering this process.

STAKEHOLDERS

- Front-line e-waste workers
- The environment
- Recycling company and rest of personnel
- Neighbors of the facility

SUSTAINABILITY

The energy consumption of this system has not be evaluated directly, however efficiency across multiple steps of the way have been assessed and improved, indirectly improving this factor. Ultimately the effect is expected to be fairly low and the scale of this system remains limited compared to the facility's existing consumption, a single computer could run at its maximum power for the duration of the work-day and be orders of magnitude below the conveyor belt system's consumption.

HATEFUL AND CRIMINAL ACTORS

While this technology can't be used directly to break the law, a faulty implementation that leads to certain components not being detected will degrade the performance of the entire recycling process which may put contracts and commitments in danger.

DATA

Two major shortcomings have been identified regarding the data:

1. Completeness and quality of data is low and needs to be improved before this system can be used efficiently.
2. Errors may still happen and in collaboration with the client the decision was taken to introduce a bias towards marking phones as containing a battery to properly segregate them from the rest and safeguard all stakeholders.

FUTURE

This technology at the time has a very specific and narrow scope. In the future this model can become more multi-purpose, going beyond e-waste battery content to being a multi-purpose detector. Another task we have is to work with Mercury content detection in imaging monitors, such as TVs. These could thus be combined and further functionalities added. In the future this technology could thus take over more and more waste recycling tasks, taking away jobs often held by marginalized and/or less educated people.

PRIVACY

This technology does not register personal data.

INCLUSIVITY

This technology has a bias in the form of the data that is used to train the model. Due to this some of the devices may be miss-detected. At the time being it is known that the data is also of somewhat poor quality and this does have a knock-on effect on the model being biased and producing different predictions depending on the conditions, thus reliability can't be guaranteed.

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HUMAN VALUES

How is the identity of the (intended) users affected by the technology?

To help you answer this question think about sub questions like:

- If two friends use your product, how could it enhance or detract from their relationship?
- Does your product create new ways for people to interact?…

TRANSPARENCY

Is it explained to the users/stakeholders how the technology works and how the business model works?

- Is it easy for users to find out how the technology works?
- Can a user understand or find out why your technology behaves in a certain way?
- Are the goals explained?
- Is the idea of the technology explained?
- Is the technology company transparent about the way their…

IMPACT ON SOCIETY

What is exactly the problem? Is it really a problem? Are you sure?

Can you exactly define what the challenge is? What problem (what 'pain') does this technology want to solve? Can you make a clear definition of the problem? What 'pain' does this technology want to ease? Whose pain? Is it really a problem? For who? Will solving the problem make the world better? Are you sure? The problem definition will help you to determine…

STAKEHOLDERS

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by…

When thinking about the stakeholders, the most obvious one are of course the intended users, so start there. Next, list the stakeholders that are directly affected. Listing the users and directly affected stakeholders also gives an impression of the intended context of the technology.
…

SUSTAINABILITY

In what way is the direct and indirect energy use of this technology taken into account?

One of the most prominent impacts on sustainability is energy efficiency. Consider what service you want this technology to provide and how this could be achieved with a minimal use of energy. Are improvements possible?

HATEFUL AND CRIMINAL ACTORS

In which way can the technology be used to break the law or avoid the consequences of breaking the law?

Can you imagine ways that the technology can or will be used to break the law? Think about invading someone's privacy. Spying. Hurting people. Harassment. Steal things. Fraud/ identity theft and so on. Or will people use the technology to avoid facing the consequences of breaking the law (using trackers to evade speed radars or using bitcoins to launder…

DATA

Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into…

There are fundamental issues with data. For example:

- Data is always subjective;
- Data collections are never complete;
- Correlation and causation are tricky concepts;
- Data collections are often biased;…

FUTURE

What could possibly happen with this technology in the future?

Discuss this quickly and note your first thoughts here. Think about what happens when 100 million people use your product. How could communities, habits and norms change?

PRIVACY

Does the technology register personal data? If yes, what personal data?

If this technology registers personal data you have to be aware of privacy legislation and the concept of privacy. Think hard about this question. Remember: personal data can be interpreted in a broad way. Maybe this technology does not collect personal data, but can be used to assemble personal data. If the technology collects special personal data (like…

INCLUSIVITY

Does this technology have a built-in bias?

Do a brainstorm. Can you find a built-in bias in this technology? Maybe because of the way the data was collected, either by personal bias, historical bias, political bias or a lack of diversity in the people responsible for the design of the technology? How do you know this is not the case? Be critical. Be aware of your own biases.…

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