Poop Scooping Robot

The robot is meant for agricultural use. This means it will scoop up feces excreted by cows and other livestock. This will free up some time for the farmer and can be used repeatedly making the livestock's living space cleaner.

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Context of use: Work

Technology Impact Cycle Tool

Poop Scooping Robot

Impact on society

What impact is expected from your technology?

What is exactly the problem? Is it really a problem? Are you sure?
Scooping feces of livestock is a dirty job taking a significant amount of time. With the robots the farmer can spend time doing other work on the farm. The robots can also run more often so the livestock don't need to stand in their own feces the entire time.

Are you sure that this technology is solving the RIGHT problem?
Scooping poop is a relatively annoying job due to the amount of livestock generally present on the farm. As long as the robots work well this will improve the lives of the livestock and the farmer significantly.

How is this technology going to solve the problem?
The technology will solve the problem by generating a proper path to divide the bots over. This way the poop gets scooped the most efficiently. There will be moments where some feces gets missed, but this can be rectified with manual intervention or by other scooping runs that the same or the other robots do.

What negative effects do you expect from this technology?
The negative effect expected from this technology is that the livestock may get more distressed due to the robots moving behind them making noise and such. In this case it would be best to make the devices less noisy and less intrusive by reducing size.

In what way is this technology contributing to a world you want to live in?
It makes a very laboureous job less intensive prolonging the farmer's life.

Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.
To get the livestock to be less distressed it's a good idea to make the robot smaller and less noisy. This way the cows will not try to kick it, neither will they try to run away from it maybe destroying property in the process.

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Hateful and criminal actors
What can bad actors do with your technology?

In which way can the technology be used to break the law or avoid the consequences of breaking the law?
Due to the way the code works that's running on the robot it can be reused for other applications. A nefarious goal would be to add it to military robots which can be used for violence.

Can fakers, thieves or scammers abuse the technology?
They cannot, there's nothing to scam, fake or steal using the code.

Can the technology be used against certain (ethnic) groups or (social) classes?
Using the military example from earlier yes. A bad state actor can use it to commit crimes against certain groups.

In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.
Not directly, but it can be used as a tool to do such crimes.

How could bad actors use this technology to subvert or attack the truth?
They cannot.

Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.
It is hard to change such a widely used base of code to make it impossible to commit crimes with. What is possible is to include a clause in the open source license to never use the code to oppress groups or countries. This way the user can be sued if they use the code in ways that is not allowed.

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Privacy

Are you considering the privacy & personal data of the users of your technology?

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

Yes, specifically the location and map of where the robots drive.

Do you think the technology invades the privacy of the stakeholders? If yes, in what way?

Not necessarily, there are no sensors on the robot that can do this. The only thing it does is register locations of moving objects, but there is no camera on the robot to see who or what it is detecting.

Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?

The idea is that the robot is being controlled by a server/computer that's on site. This way the data does not leave the farm.

Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.

As said before, the robot is being controlled by a device that's on the farm itself. This is by design due to the device needing to be on the same network as the robot.

In which way can you imagine a future impact of the collection of personal data?

The location data filled in on a device that's unsufficiently secured can be used by criminals or data brokers to map out a farm. This knowledge can make life harder for the farmer in the form of break ins and targeted advertising.

Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.

Nothing on the product itself. It would be a good idea to create a guide on securing server data for the user to harden their setup.

Human values
How does the technology affect your human values?

This category is not applicable for this technology.

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Stakeholders
Have you considered all stakeholders?

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.

Name of the stakeholder
Farmer

How is this stakeholder affected?
The Farmer is the primary user for the device and will not have to scoop poop anymore.

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?

Name of the stakeholder
Livestock

How is this stakeholder affected?
The robot will have to drive around this stakeholder and will have to take their wellbeing into account

Did you consult the stakeholder?
No

Are you going to take this stakeholder into account?
Yes

Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.
It is important to consider the wellbeing of the livestock.

Data

Is data in your technology properly used?

This category is not applicable for this technology.

Inclusivity

Is your technology fair for everyone?

This category is not applicable for this technology.

Transparency
Are you transparent about how your technology works?

Is it explained to the users/stakeholders how the technology works and how the business model works?
A user/stakeholder can have the code used in the device audited by an expert. The technology is very straight forward LIDAR.

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?
The behaviour trees used on the robot are designed within a UML designer. These can be displayed and explained.

Is it possible to file a complaint or ask questions/get answers about this technology?
Yes, the code should be open sourced with an issues tab.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?
If the improvements in the "crime" section are implemented it will mean that the code cannot be used for malicious purposes. The negative consequences for the livestock depend on the livestock themselves and how they react.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.
The software running on the device need good documentation for a user to read. This way they can understand how it works on a surface level. The code also has to be non-obfuscated so it can be read by experts.

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Sustainability

Is your technology environmentally sustainable?

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

It is not, the device uses a battery to keep running away from the docking station. The electricity used can be from any source.

Do you think alternative materials could have been considered in the technology?

Since the device already uses LiPO there's no real other way to power the robot without resorting to more exotic materials.

Do you think the lifespan of the technology is realistic?

The device has an easily replaceable battery, same for all the other parts. The lifespan can be good as long as the separate parts still get manufactured?

What is the hidden impact of the technology in the whole chain?

The hidden impact is as said before in the Battery. That's where most of the precious materials reside. In the future it would be good to use more sustainable materials if they are developed.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

Make the battery controller more universal if better, more sustainable battery technologies are developed.

Future
Did you consider future impact?

This category is not applicable for this technology.