

# Exo-glove

glove that allows people with muscle atrophy to use their hands

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# Technology Impact Cycle Tool

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## Impact on society

What impact is expected from your technology?

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

Dat mensen met een NMA weer hun handen kunnen gebruiken voor ADL.

### Are you sure that this technology is solving the RIGHT problem?

We zijn bij iemand op bezoek geweest met NMA, we zagen dat deze persoon overal hulpmiddelen voor had en dat de persoon zelf eigenlijk helemaal niks kon.

### How is this technology going to solve the problem?

De cliënten kunnen door de handschoen weer hun handen gebruiken om bijvoorbeeld dingen op te kunnen pakken, hierdoor hebben ze een stuk zelfstandigheid terug.

### What negative effects do you expect from this technology?

Dat cliënten met NMA niet altijd de handschoen kunnen gebruiken, de ziekte is progressief dus op een gegeven moment helpt de handschoen niet meer.

### In what way is this technology contributing to a world you want to live in?

Deze personen kunnen zelf weer dingen doen, ze kunnen dus bijvoorbeeld weer gaan werken. Zo zijn ze niet afhankelijk van een uitkering.

### 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.

Nee

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## Hateful and criminal actors

What can bad actors do with your technology?

*This category is not applicable for this technology.*

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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?**

Nope

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

Nope

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

Yes, it doesn't store data or analyse it. It's just a tool to help people use their hands.

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

Yes, no data is stored or used in any way.

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

Doesn't apply to our product

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

No we did not

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## Human values

How does the technology affect your human values?

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

Het product zou voor stigmatisering voor de doelgroep (mensen met een spierziekte) kunnen zijn. Dit komt doordat het product, de handschoen, bepaalde vormen heeft die de aandacht van andere mensen zou kunnen trekken. Maar daarentegen zorgt het gebruik van het product wel dat de persoon zelfstandig weer functie heeft van zijn of haar hand.

### **How does the technology influence the users' autonomy?**

Door het gebruik van het product kan de gebruiker weer zelfstandig zijn hand gebruiken om bijvoorbeeld voorwerpen op te pakken. Hierdoor kan de gebruiker zelfstandig beslissen om een voorwerp te pakken i.p.v. dat er iemand moet komen om het voorwerp voor de gebruiker te brengen.

### **What is the effect of the technology on the health and/or well-being of users?**

Doordat de gebruiker meer zelfstandigheid terug krijgt door het product kan de gebruiker zich minder als een last voor andere mensen gaan voelen.

### **Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.**

Designkwesties omtrent het uiterlijk zijn tot stand gekomen door samenwerking met de doelgroep. Dit maakte het mogelijk om een middle ground te vinden tussen uiterlijk en functionaliteit.

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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**

Armon products

**How is this stakeholder affected?**

Opdrachtgever

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Name of the stakeholder**

Project groep

**How is this stakeholder affected?**

Moet het project uitvoeren

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Name of the stakeholder**

Unknown

**How is this stakeholder affected?**

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**Did you consult the stakeholder?**

No

**Are you going to take this stakeholder into account?**

No

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**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**

Aceo

**How is this stakeholder affected?**

3d printen van bepaalde onderdelen

**Did you consult the stakeholder?**

Yes

**Are you going to take this stakeholder into account?**

Yes

**Name of the stakeholder**

Hogeschool Fontys

**How is this stakeholder affected?**

Door hun is de opdracht opgedragen.

**Did you consult the stakeholder?**

Yes

**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.**

Neer.

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## Data

Is data in your technology properly used?

*This category is not applicable for this technology.*



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## Inclusivity

Is your technology fair for everyone?

### **Will everyone have access to the technology?**

This technology will be sold to anyone, but to make the price more equitable for most people this device will be funded through health insurance for which you need specific conditions to apply

### **Does this technology have a built-in bias?**

It is biased towards people with normal hand shapes as the glove is not designed for people with contracture

### **Does this technology make automatic decisions and how do you account for them?**

there is no automation present in this product, the glove works with an emg sensor which maps the inputs via a mathematical model directly to the actuator

### **Is everyone benefitting from the technology or only a small group?**

#### **Do you see this as a problem? Why/why not?**

Everyone is benefitting from this technology it helps people with a neuromuscular disorder to participate in society

### **Does the team that creates the technology represent the diversity of our society?**

For this product to work the client needs a average/normal hand shape, so people with disformation in their hands might not be able to use this product

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

no

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## 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?**

Met een uitgebreide gebruiksaanwijzing en een persoonlijke training bij aankoop van het hulpmiddel. In hoeverre de gehele constructie werkt zal overigens niet zo snel vrijgegeven worden aan de consument.

### **If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?**

Het product werkt aan de hand van EMG (elektro myo grafie) sensoren. dus wanneer de gebruiker dezelfde spieren gebruikt om bijvoorbeeld te knijpen dan zal de handschoen dit detecteren en het juiste proces starten om de gewenste beweging te ondersteunen.

### **Is it possible to file a complaint or ask questions/get answers about this technology?**

Dat zou eventueel bij de sales branche van het bedrijf van afkomst ingediend worden.

### **Is the technology (company) clear about possible negative consequences or shortcomings of the technology?**

Net zoals andere producten van hetzelfde bedrijf kunnen klachten en tekortkomingen teruggekoppeld worden naar het bedrijf zodat deze meegenomen zullen worden in nieuwe versies van het product.

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

Tijdens de ontwerp fase is er samengewerkt met de doelgroep van het product zodat de design aspecten zo optimaal mogelijk aansluiten op de eindgebruikers.

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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?**

Ja, de handschoen is neet per patient op maat gemaakt. Het zijn standaard maten, daardoor kunnen ze herbruikt worden.

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

Waarschijnlijk wel, de rubbers en siliconen worden misschien kort waardoor deze vervangen moeten worden, maar verder kan alles herbruikt worden.

### **Do you think the lifespan of the technology is realistic?**

Nee, de handschoen verbruikt lucht om de handschoen te laten knijpen, en elektrisiteit om de lucht te verplaatsen.

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

*This question has not been answered yet.*

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

Nee.

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## Future

Did you consider future impact?

### What could possibly happen with this technology in the future?

*This question has not been answered yet.*

### Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.

The year is 2069, one hundred years after humanity landed on the moon. The world has reached a state of peace and harmony. There is no war and no poverty. People born with disabilities no longer have to live with the disadvantages that accompany it. Where once people couldn't use their hands because of diseases, they can now retain use of their limbs despite them. This allows them to stay independent for longer and let's them retain their quality of life.

### Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.

In a distopian world, only the ultra-rich can afford the tecchnology that allows them to remain healthy despite age and disease. They live for hundreds of years while retaining for control over their bodies. While the poor struggle to survive in an ever-changing world that punishes those who dont have the money to escape their hellish lives.

### Would you like to live in one of this scenario's? Why? Why not?

In the utopian scenario of course. Why would anyone want to live in a distopian future is beyond me.

### What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?

Companies could abuse the technology. If for example the military bought it, it could be developed into weapons of war.

### Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.

No we did not.