

# Human Enhancements at Work

**Avi Dantess**  
MA Student  
avi.dantess@post.idc.ac.il

**Ilana Shmaltsov**  
MA Student  
shmaltsov.ilana@post.idc.ac.il

## ABSTRACT

The human body has many limits, different developments are made to help us overcome those limits and improve human performance. This is human enhancement. Enhancement can be physical or cognitive.

We propose a speculative future in which employers make their employees use advanced enhancements to improve their quality of work and increase the company's profit. We focus on a speculated product we called "Hoolilens", which are smart eye contact lenses. The employees are obligated to wear them all the time even after work hours. The "Hoolilens" use AR (Augmented reality) technology for assistance, but also censors content that is against company's policy. On one hand the person receives a tool that enhances him but on the other is it used as a surveillance tool and controls the persons sight. We want to emphasize that enhancement and progress comes with a price, and ask what is the price we would be willing to pay.

## Author Keywords

Speculative; Speculative Design; Augmented Reality; Human Enhancement

## CSS Concepts

• Human-centered computing~Human computer interaction (HCI)

## INTRODUCTION

Over the years developments are made to help humans overcome different limitations, it can be mental or physical limitations. Many developments strive to help improve the performance of people at work. We would like to research the possibilities of trying to achieve a better performance at work by using enhancements.

To do so, we present a speculative society in the future. We took inspiration from different movies like "Limitless" where a mysterious pill helps the user to access 100% of his brain abilities, or "Alita: Battle Angel" where different cyborgs have different abilities depending on their body parts. We rely on the existing advancements in enhancements - pills, implants, limbs or robotic technology. For example, a robotic technology that helps the individual using it to lift very heavy objects. While wearing it, a human can lift 90 kg while feeling like they're lifting just 4.5 kg[1]. We also look at the advancements in AR technology, and the existing developments made trying to combine contact lenses and AR technology like Innovega's developments of smart lenses [8].

We speculate about the use of the enhancement technology and how it will affect the user at work and outside of work. We created a scenario presenting this speculated technology being used and we demonstrate it by a video.

## RESEARCH OBJECTIVES

We wanted to explore the implications of using enhancements at work and the different questions it presents. Mainly the following questions:

- How does it affect day to day life?
- Who is the owner of the embedded technology?
- Does the human become a property of the employer?
- Who is responsible for regulations?
- Can our privacy still be maintained?

## RELATED WORK

What field and topic is your focus? This section is the place to discuss previous and related work in your topic of interest.

AR is already improving worker performance in several use cases, in various verticals such as construction, design, manufacturing [4,5], training, education [3] On different occasions, AR helped to improve spatial orientation skills [2], precision and accuracy [5], and collaboration between teammates [1]. AR can be useful and encourage collaboration in the field of healthcare. [6] demonstrated how smart glasses can play a crucial role in three use cases: (A) as a viewer of information (B) as a source of information - using sensors (C) as a filter of healthcare information - using face recognition.

A report [7] discussing the impact of human enhancements at the workplace was published and aimed to identify potential areas for debate around issues like a potential harm of new technologies for enhancements or individuals feeling coerced into using these enhancements and other concerns. It shows the need for further discussion on this issue, which we would like to continue here by presenting the discussed speculated future.

## SPECULATIVE RESEARCH

### EXPLORATION THROUGH COLLAGE

We wanted to demonstrate our questions through the collage [Figure 1], before we focused on a specific enhancement technology, we showed in the collage the different types of enhancements - cognitive and physical. The regulations issue. The human in the collage is enhanced by different types of enhancements - whether it's pills, robots or eye technology to help him work. Part of it is also signing a binding contract at work.



Figure 1. Collage of future society with enhancements.

### SPECULATIVE SOCIETY: POLITICAL SPECTRUM

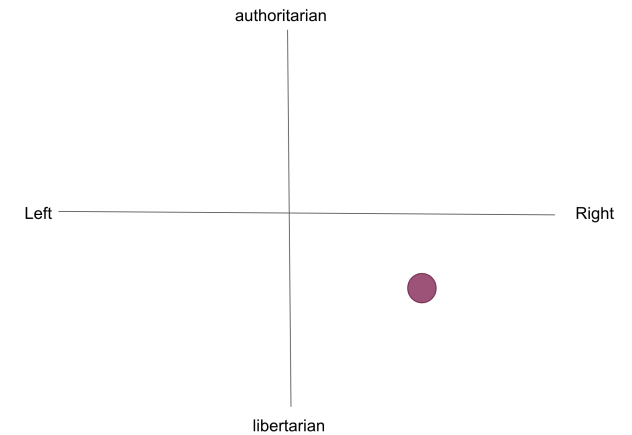


Figure 2. Speculated society in the political spectrum graph.

We placed our society on the bottom right [Figure 2]. In our society the economy is run by competing individuals and organizations, each company provides its employees with different enhancements to maximize their productivity and profits.

The people are free to use these enhancements also outside of work.

### SPECULATIVE DESIGN PROPOSAL

We started with a broad idea of different enhancements - both physical and cognitive as was explained in the collage. We then narrowed it down to a specific technology. With that we started to formulate our future speculated work and society. "Hooli" is a company that enforces the use of "Hoolilens" - smart eye contact lenses that use AR technology [Figure 5] to help the employers during their day, it offers assistance and suggestions relating to the task presented. It also records everything the person is looking at for the employer, when something that is against the company's policy

reaches the user's sight, it censors [Figure 3] it or changes the content with an alternative content which is aligned with the company policy or interests. For example - on a billboard, instead of an advertisement of a competitor's product, the lenses switch the content with the employer's company's own product[Figure 4].



Figure 3: censoring coworkers screens

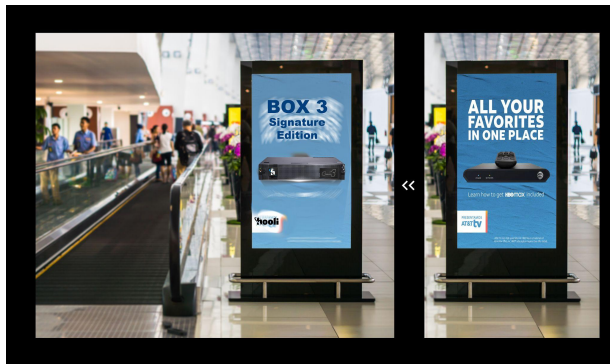


Figure 4: switching advertisements

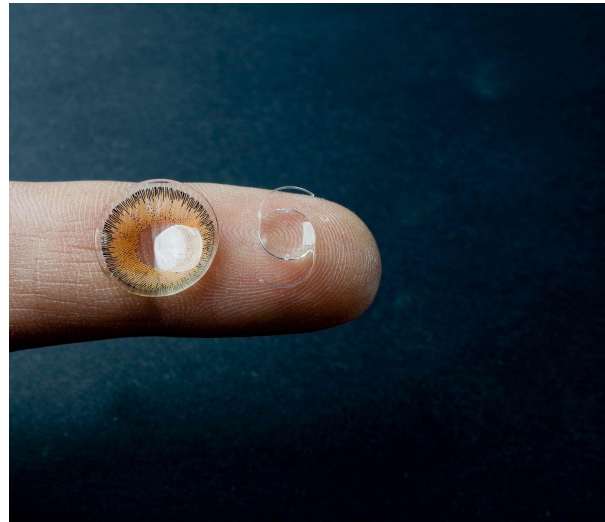


Figure 5: Smart contact lens

#### DIEGETIC PROTOTYPE VIDEO

Describing in the video the story of a specific individual using the proposed technology shows the viewer the perspective of a person using the technology and the effect on this person's life. The video combines pictures of scenarios with captions describing them. The story describes a typical day, it starts by showing the value of using the lenses at work, and continues to show the implications of the lenses outside of work and how eventually the individual gets into a breaking point but even so, can't give up the use of the lenses completely. The video explains the story in a simple way and allows the viewer to connect to it with a story that is feasible and can possibly happen.

#### DISCUSSION

Our goal was to present a speculated society to show the possible future and emphasize the implications of using enhancements at work. We wanted to show that while enhancements have value and allow overcoming our human limitations, it can also have dangerous effects.

The "Hoolilens" are a great assistive tool to improve the performance at work or just assist in daily tasks, but it also takes control of the person's life. We emphasized the possible privacy violations, the control of an outsider of an individual life which can lead to negative effects of a person's life. We should not forget the need for regulations and responsibility in order to avoid this kind of abuse of power. We want society to be able to take advantage of technology but not forget our humanity during the process.

Discuss your proposal, your speculative goal, what you set out to explore, your approach, ethics and problematic issues, challenging our assumptions.

- Our goal was to present a speculated society to show the possible future and emphasize the implications of using enhancements at work.
- Possible outcomes - privacy violations, control
- With the good - the help and performance improving, comes also a responsibility to avoid abuse of power

#### CONCLUSION

To sum up, progress it's something that we strive to achieve, but without regulations it can have negative results. There is nothing wrong in using technology to help us advance, but we can't take it too far and forget the individual.

## REFERENCES

### REFERENCES AND CITATIONS

- [1] Mark Billinghurst., Hirokazu Kato. 2002. Collaborative augmented reality. *Commun. ACM* 45, 7 (July 2002), 64–70. DOI: <https://doi.org/10.1145/514236.514265>
- [2] Carlos Carbonell Carrera & Luis A. Bermejo Asensio. 2017. Landscape interpretation with augmented reality and maps to improve spatial orientation skill. *Journal of Geography in Higher Education*, 41:1, 119-133. DOI: 10.1080/03098265.2016.1260530
- [3] Andreas Dünser, Karin Steinbügl, Hannes Kaufmann, and Judith Glück. 2006. Virtual and augmented reality as spatial ability training tools. In *Proceedings of the 7th ACM SIGCHI New Zealand chapter's international conference on Computer-human interaction: design centered HCI (CHINZ '06)*. Association for Computing Machinery, New York, NY, USA, 125–132. DOI: <https://doi.org/10.1145/1152760.1152776>
- [4] Alex Heinzl., Salman Azhar., Abid Nadeem. 2017. Uses of Augmented Reality Technology during Construction Phase, In *The Ninth International Conference on Construction in the 21st Century (CITC-9)“Revolutionizing the Architecture, Engineering and Construction Industry through Leadership, Collaboration and Technology*, March 5 - 7, 2017, Dubai, United Arab Emirates. <https://www.tandfonline.com/doi/pdf/10.1080/13467581.2020.1869557>
- [5] Andrew Y.C. Nee., S. K. Ong., George Chrysosolouris., Dimitris Mourtzis. 2012. Augmented reality applications in design and manufacturing. *CIRP Annals-Manufacturing Technology*, 2012, vol. 61, pp. 657-679. DOI: <https://doi.org/10.1016/j.cirp.2012.05.010>.
- [6] Jacek Ruminski., Adam Bujnowski., Tomasz Kocejko., Aliaksei Andrushevich., Martin Biallas., Rolf Kistler. The data exchange between smart glasses and healthcare information systems using the HL7 FHIR standard. 2016. 9th International Conference on Human System Interactions (HSI), Portsmouth, (2016), 525-531. DOI: 10.1109/HSI.2016.7529684.
- [7] Evan A. 2019, Sarcos Demonstrates Powered Exosuit That Gives Workers Super Strength <https://spectrum.ieee.org/autoton/robotics/industrial-robots/sarcos-guardian-xo-powered-exoskeleton>
- [8] Emacula, panoramic virtual and augmented reality by innovea <https://www.emacula.io/>