SPOT

SOCIETAL PERSPECTIVES TO INNOVATION OPPORTUNITIES IN TECHNOLOGY

EXPLORING H3D-VISIONAIR CASES: PART 2

A! Aalto University

TUDelft

ATTRACT

Report:

AUGMENTED VISION: OPPORTUNITIES IN CREATIVE FIELDS, FOOD & WELLBEING.
A student perspective

Prepared for:

H3D-VISIOnAiR

Projects completed within the course:
PROTOTYPING FOR INNOVATION
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The *Prototyping for Innovation* course offers a combination of theory, company case explorations and hands-on practice in purpose driven prototyping for innovation. After completion participants will be familiar with key principles in purpose-driven experimentation and will recognize a range of prototypes of different forms and different levels of fidelity. Key to the programme is the development of students' ability to plan and execute meaningful experiments to develop ideas further in innovation projects.

Students were introduced to the H3D-VISIOnAiR consortium and technology through the ATTRACT technology card.

Students were asked to focus on the combination of portability and the application of augmented reality to assist in the completion of high-detailed tasks. The focus was on finding alternative application, no matter how abstract or the technology state needed.

This compilation of student insights represents a curated selection from 70 anonymous individual submissions. The theme for this compilation was possible applications in creative disciplines, such as craft and design, concepts relating to the food industry as well as examples from general health and wellness.

Comments presented in this compilation are those of students, and to retain their voice, their comments have not been edited.

Cover images from Unsplash.com

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Creative fields:
Examples from art, design & craft.

Example 1: Making patterns visible

The user sees the pattern they are sewing through these glasses and can cut the fabric right away with accurate measurements.

Key features:
1. Tilted transparent screen for ergonomic -> no need to bend over, also easy to see the fabric over the top of the screen if needed.
2. Band that goes around the head - quick to put glasses on and off.
3. Over head band to help with the weight.
4. Ergonomic design for the part on your nose.

Example 2: Interior decorating
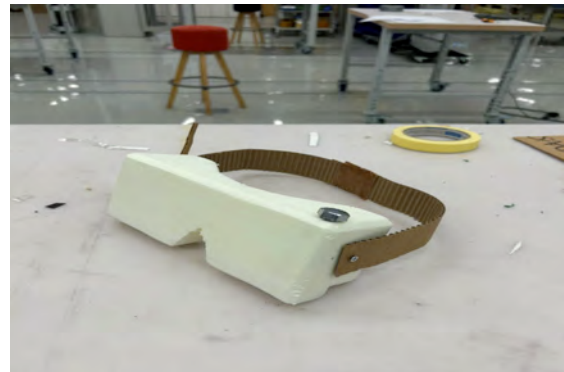
The intended use of my AR glasses is to help people redecorate their apartments or houses. Looking through the glasses, you can download sketches / photos of your desired furniture and see live how it all fits in your house / apartment. This is far more convenient than traditional furniture shopping, where you must travel to multiple stores and must make expensive investments with the possibility of everything not matching.

The three critical features of my AR glasses are as follows:
1. Ability to download and view furniture sketches through the glasses to make better decisions regarding interior design. Feature is seen in the second photo, where looking through the glasses you see the green chair, if the sketch of it is downloaded into the glasses.

2. Ability to connect to other devices (Bluetooth, internet etc). This is illustrated in the prototype via the antenna on the right side of the glasses.

3. To take pictures of your desired places that need redecoration. Then one can download them to devices and apps that

help the person with design ideas and latest trends.

Example 2b: Interior decorating
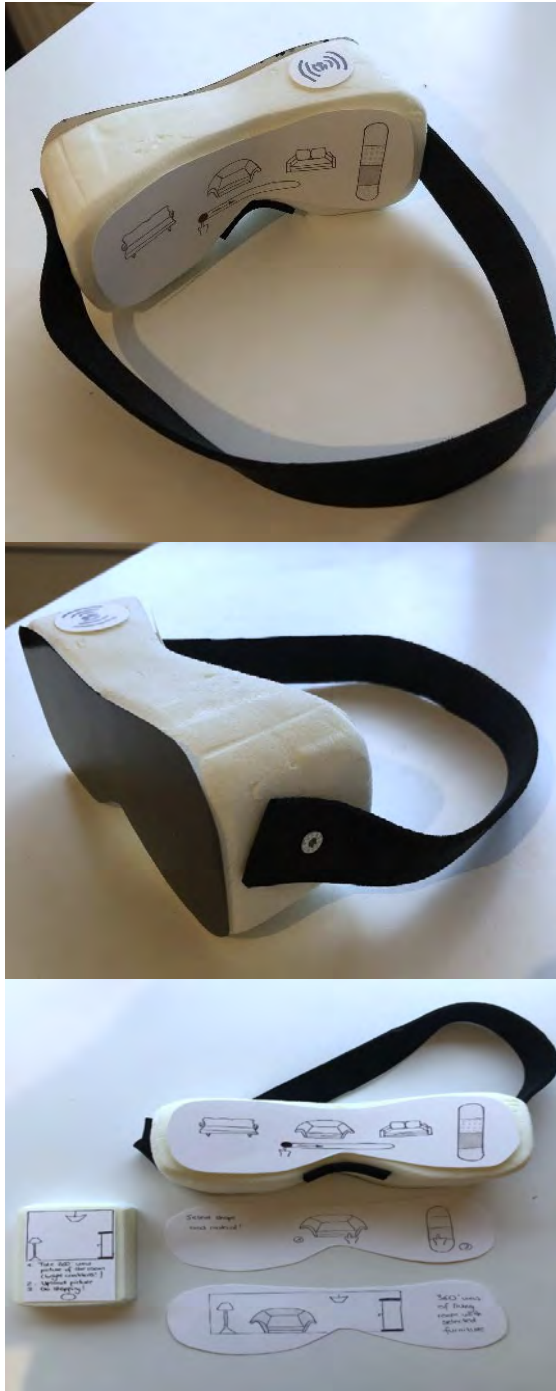
The intended use case for the created prototype is the personalised selection of furniture in a furniture shop. The AR glasses shall help the customer to visualize the offered furniture in the environment of his own home and to see if the size/ shape/ design of the furniture suits the room. By uploading a picture of its own living room to an app, the AR glasses can visualize it.

Features
1. Adjustable headband (for universal fit)
2. Nose support for comfort
3. Wireless charging

Example 3: Visualizing a new space for real estate agents

Real estate agents can lend out these AR glasses for potential buyers during the house tour to visualize how the space would look like once fully furnished.

Critical features:
1. Lightweight and portable: Glasses are easily carried around and can be folded to a compact size.
2. Transparent lens: Lenses provide enough vision to fully see the real space with the virtual furniture.
3. Charge pack system: Lenses have compact batteries built in the corners of the specs. They can be charged with a dock which can also serve as back-up battery bank for quick recharge. The dock is charged through a usb-c. The dock also locks the glasses to the fold position.

4. High-end sensors: Smart sensors are located at the brow of the glasses and create an immersive experience.
5. App connection for shared AR experience: A phone app can be connected to the glasses for other people to see the experience of the main user from their phone screens.

## Example 4: Aiding communication in interior decorating

This device is designed to assist architects in providing their customers with a wide range of options. It is connected to a database where furniture manufacturers list their products along with their specifications such as price. With the help of this device, customers can view the space designed for them along with the selected furniture.

The device is equipped with a heart rate measurement sensor that helps designers understand the level of excitement in customers. By observing the changes in the indicator, designers can determine how close the customer's preferences are being met. This helps them implement the customer's taste without requiring verbal communication.

Example 5: Learning origami

This AR headset is for children who want to learn how to make origami. It can tell how to fold paper, and children can easily understand the next step. By using this AR headset and the app, they don't have to get confused with the side of the paper or whether it is mountain fold or valley fold.
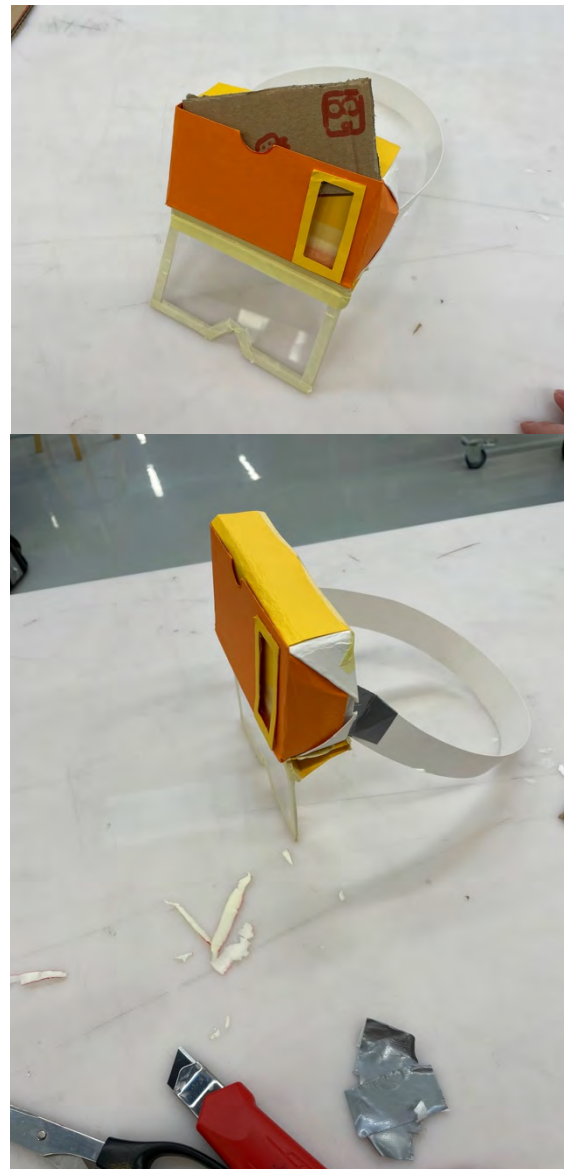
Critical features
1. Origami structure is used in its appearance.
2. It uses one's smartphone, resulting in preventing the headset itself weight heavy.

3. Colourful appearance which attracts children.
4. Clear glass instead of colored one, for children's safety and their health. (I don't want to make it like a VR headset that covers all of our field of vision.)

Example 6: Lego assembly

My initial idea was to envision a phone application that provides Lego assembly instructions using augmented reality based on available Lego pieces. For this purpose, I envisioned an augmented reality headset that incorporates a phone inside. The "without mask" or "with mask" modes should remain available. To best align with my idea, the mask includes the following capabilities: a system for inserting and ejecting the phone, a speaker system allowing for hands-free assembly instruction guidance, and an adjustable mask system. When conceptualizing this idea, I thought its usage should be adaptable for people of all ages, similar to today's Lego users. Of course, when wearing the mask, augmented reality instructions for assembly are visible through the camera connected to the phone included in the mask, but the use of this tool remains accessible only with a phone. The ultimate goal is to have a tool that enables us to build Legos from mixed pieces.

Example 7: Piano teacher
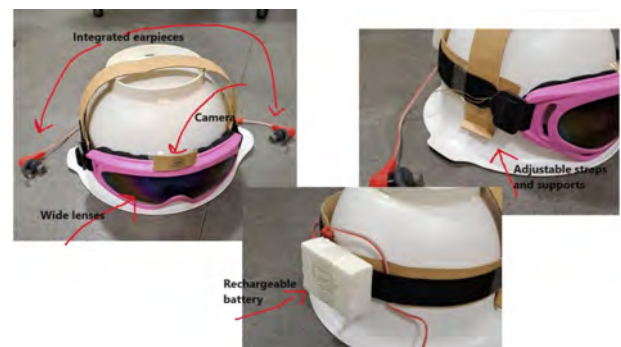
My AR piano "teacher" offers visual cues for playing songs, providing real-time audiovisual feedback on note accuracy and timing.

Critical features include:
1. Lightweight design, using materials like plastic and elastic ribbon (excluding electronics), minimizes neck strain while head is tilted forward when playing.
2. Large lenses ensure a wide field of vision.
3. Adjustable for various head sizes.
4. Integrated earpieces facilitate audio feedback and connect to electric pianos for private practice.
5. The device enhances piano learning by combining immersive technology with ergonomic considerations, creating a user-friendly and adaptable solution for effective and comfortable piano instruction.

Example 8: Sculptor aid

The AR headset is designed for sculptors to assist in sculp ng certain high-detail sculptures based on digital 3D-models. The headset scans the working space and reflects the 3D image to the glass visor. The headset also keeps track of the accuracy of the sculpture. The spa al sensor and other electrical circuits and components are a ached to the front of the headset.

Functions
1. Usability: the visor part can be turned to upright position so that the sculptor can take the
2. AR vision easily off and inspect the quality of the work with a naked eye, without AR.
3. Tight fit: Sculp ng includes a lot of bodily movements so the headset needs to be lightly fi ed to the user. length of the straps can be adjusted so that the headset fits to different sized heads.

4. Lightness: Sculp ng work can take several hours so it's important that the headset is light and bothers the sculptor as little as possible.

Food:
Examples for professional chefs, home cooks and foragers
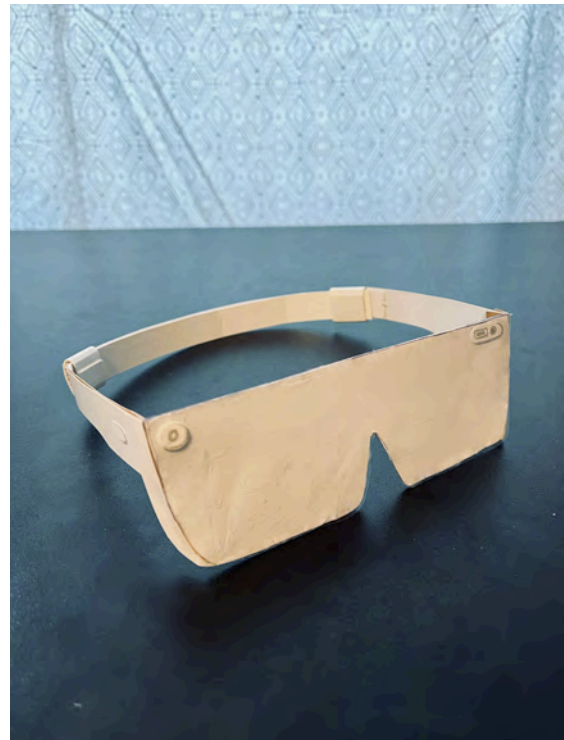
Example 1: Mushroom hunting

This VR device has the use-case for the plants and mushrooms species identification and their health status monitoring when one goes on a hike/trail in the mountains.

Main features:
Optical Cameras, Humidity Sensor/Depth Cam, USB ports, Buttons, Band Tightening Knob

Example 2: CookPal

CookPal is a device designed to assist users with their cooking. The intention behind this device is to provide users with an easy cooking experience. The device provides users with recipe suggestions when they are indecisive about what to cook. CookPal provides step-by-step cooking instructions, nutritional information, and cultural information about the dish and monitors the cooking time.

With respect to the design aspects of the device, some of the critical features are listed below:
1. Sleek and lightweight.
2. Anti-fog layer over the glasses to avoid steam from clouding the user's vision while cooking.
3. Adjustable band around the head for a good grip to avoid falling off the user's face.

4. A temperature sensor with a laser pointer that points to specific components of the dish and indicates its cooking temperature.
5. Camera lens that captures images of the user's dishes by simply pressing the button placed on the side of the device's frame.

Example 3: Farming support

This is AR/VR glass for farmers which they can control their farming process, harvesting times or any layout issues easily. Size of the ar/vr glass resembles the mix of ar and vr glasses. Buttons next to the glass enables to scan the farming area. Then, created 3d area projected on to the adjustable opaque black screen, whether to see real life analysis with ar or whole area with vr. There is also foldable hat on top of the ar/vr glass which protects farmers from the sun if necessary, since wearing a hat is very hard with ar/vr glass. There is also headband which made from elastic material.

Example 4: Fine dining kitchen
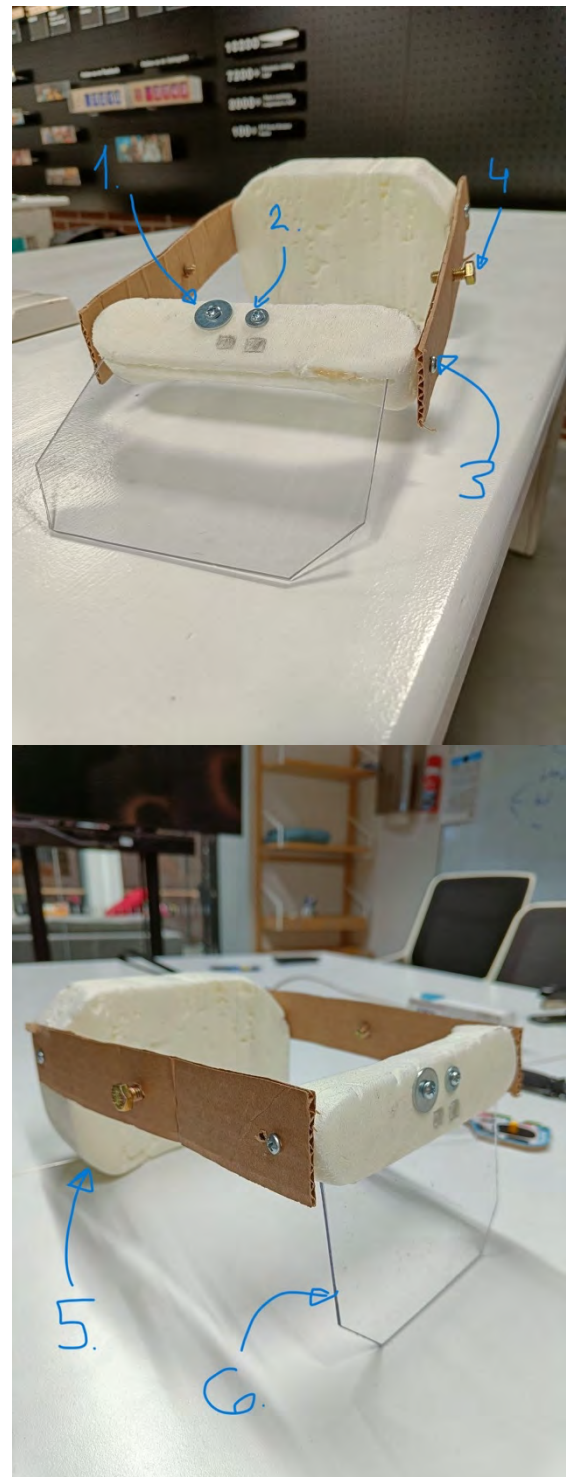
The intended use case for this AR-headset is in the industrial/fine dining kitchen. With this headset the chefs can get the instructions for the dishes displayed on the screen and get a visual representation of the dish they are making on the empty

plate. Furthermore, when the chef is assembling the dish they can see what is still missing from a simple checklist that is in displayed on the screen.

Critical features explored:

1. 3D-Lidar sensor - makes the headset able to make the visual representation accurate on the screen and also scan the example dishes provided by the head chef.
2. Heat Sensor - In professional kitchens due to health regulations the serving temperature needs to be tracked, this makes this an autonomous task.
3. Only the screen can be tilted up away from view if needed for steamy situations in the kitchen. This minimizes the need to take the headset off during the day.
4. The headset can be adjusted to fit the head of the chef with the two screws on either side of the headset.
5. Big computational unit with battery pack at the back of the headset. This makes the eatures of the headset possible. The large size because of the current lack of smaller technology.
6. The screen for the device where everything is displayed as said above.

## Example 5: Learn to cook with what you have

Do you struggle choosing what to eat? Do you often have to throw out spoiled items in your fridge? Do you spend too much money on takeout out of laziness to cook? These chargeable glasses allow you to cook the finest dishes with no prior experience! Just scan your kitchen and fridge using the green laser scanner, and the Easy Chef will project a variety of delicious dishes you can prepare for yourself with step-by-step instructions of how to do so.

The Easy Chef connects to your local network using its interchangeable SIM card and using the network, everything being captured by the camera/scanner is being processed. The glasses then provide the steppingstones in front of you, in real time, to reach the gourmet meal you wish to eat.

Health and Wellness:
Examples for skiing, defibrillation and exercise

### Example 1: Defibrillation training
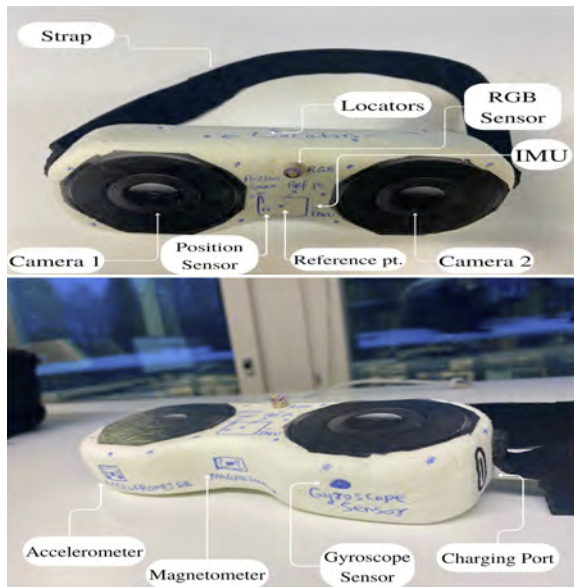
I designed a VR glasses prototype aiming to enhance defibrillator training. The immersive experience simulates emergency scenarios, providing realistic simulations for medical personnel. Users can practice proper defibrillator usage in a virtual environment, refining their skills and boosting confidence in critical situations.
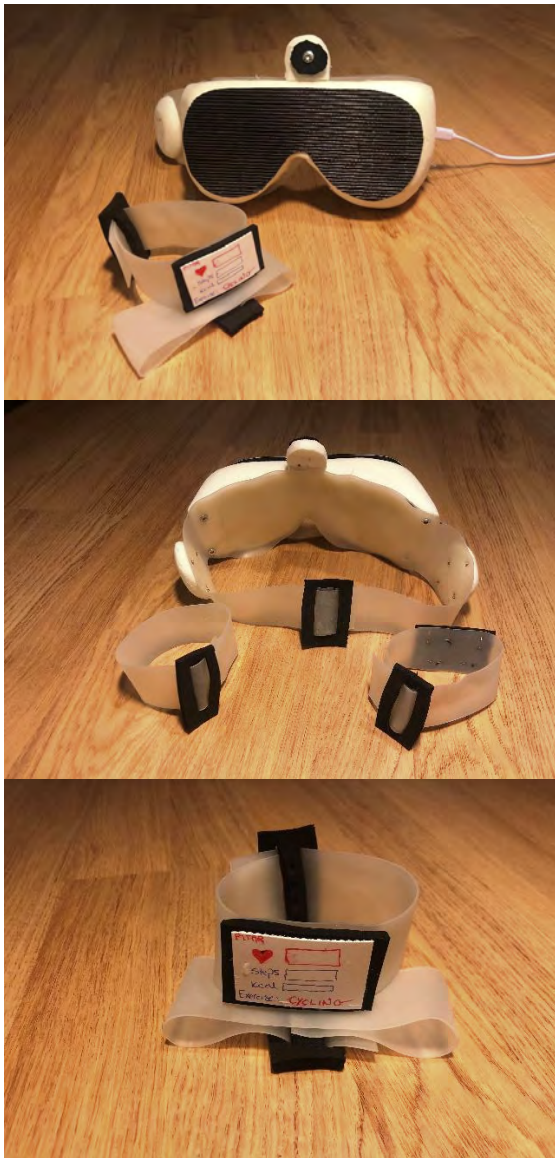
Features
1. Realistic Simulation: The VR glasses offer immersive scenarios replicating real-life emergency situations, providing a lifelike training environment.
2. Interactive Controls: Users can practice using interactive controls, mimicking the physical actions required during defibrillator operation for a hands-on experience.
3. Performance Feedback: The prototype provides real-time feedback on the user's performance, allowing for immediate assessment and improvement in defibrillator usage skills.

Example 2: Ski assistant
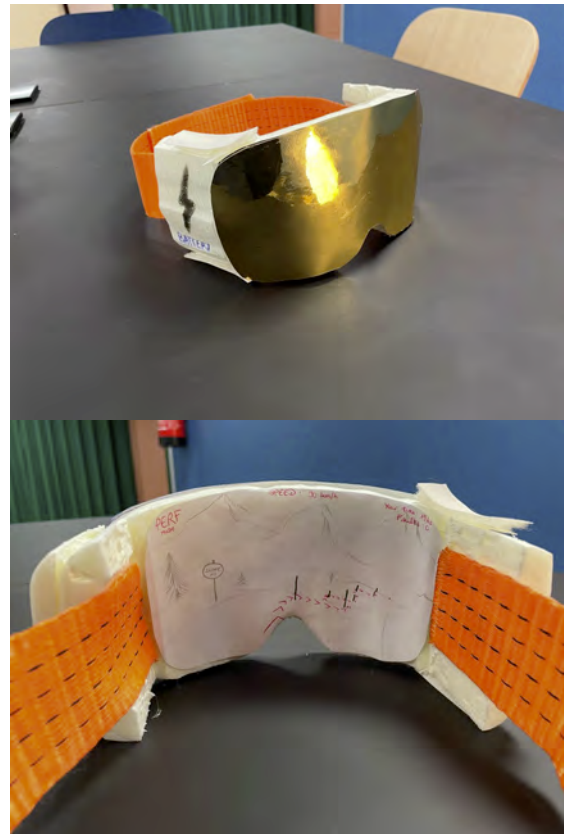
The prototype I've created represents an AR mask meant for skiing. It replaces a normal ski mask and brings augmented reality features: three different modes are available, which you can select from the button on one side of the mask. The first one, performance mode, shows the best trajectory to follow to be as fast as possible. The second one, discovery mode, allows you to see the names of surrounding mountains or villages, or anything worth sightseeing. The last one is GPS mode, which shows you the way in case you get lost or want to go somewhere. The headset has a replaceable and rechargeable battery on the other side and an adjustable band to maintain the mask.

Example 3: FitAR

FitAR is an AR headset used for personal training and group exercises for fitness purposes. While many people do not have the time to go to the gym before work mainly because of commutation time, FitAR provides the environment of a gym with feedback given from the device to do the required training in a personalized fitness plan. With the headset, the user is able to hear the instructions from the trainer while visualizing the class in front of him/her with a camera to detect whether the user is performing the training exercises in a correct manner.

Key features:
1. Breathable material for the headset and the hand detectors which is also removable when the headset is not being used for fitness.
2. Camera and charging port.
3. Headset and hand detector have adjustable straps.