Smart Glasses Proposal

Justin Robles, Viva Sachdev, Johansen Zuniga & Kenneth Romero

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Professor. Sara Jacobson

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Contents

Introduction

When we talk about smart glasses, you might think of a futuristic movie in which people use virtual reality in their glasses to become powerful or solve any life-threatening problems. However, the need for safety smart glasses has become increasingly crucial in many public environments. These innovative glasses are designed to help detect potential hazards and prevent accidents in any location. The safety smart glasses serve as an engineering-based improvement to existing personal protective equipment, such as apps that notify when danger is near or radio scans, that are often insufficient in detecting potential danger in real-time. With the advent of smart technologies, safety smart glasses have the potential to transform the way we approach any danger that is near.

Figure 1

Smart Glasses Concept

Note: By X., 2022,

The technical environment surrounding safety is constantly evolving. While traditional safety equipment is still widely used, it is limited in its ability to provide real-time data on potential danger. Safety smart glasses solve this problem by integrating sensors and analytics technology to detect danger from a person's surroundings using these glasses. This innovation has the potential to revolutionize safety by providing real-time data and alerts to people, thereby minimizing the risk of danger.

Engineering Innovations and Limitations

There have been various engineering innovations proposed in society with safety, such as mobile apps, drones, and augmented reality glasses. However, these proposals have limitations in terms of practicality, usability, and cost-effectiveness. Apps such as the citizen app are helpful in the aspect of being a free application for anyone to download on their phone and being able to get a quick understanding of how it works. However, it is limited due to the fact that smart glasses can be worn to provide the exact location and be able to sense the direction of where danger is taking place when glasses are worn and being used.

In addition, Drones are limited in their ability to navigate indoor environments. While they can be useful for inspecting outdoor areas, they may not be able to provide detailed information on indoor hazards. Drones would not be able to provide rapid detection to an individual if any sort of danger such as crimes, violence, etc is taking place. Drones can be expensive to purchase and maintain, which may make them cost-prohibitive for many organizations. Lastly, augmented reality glasses require significant investment and can be difficult to operate for people who are not really familiar with the technology. They also require a stable network connection and a powerful computer system to run, which may not always be accessible. Lastly, reality glasses may be distracting or uncomfortable for people to wear, which could reduce the overall effectiveness.

Technical Description

Smart glasses have a short history, with the first prototype dating from 1989. The first practical concept of smart glasses was developed by Steve Mann, a computer science professor at the University of Toronto, in the late 1990s. Mann created a device called the "EyeTap", which

was a wearable computer system that could capture and display images in real-time, allowing the owner to overlay digital information onto the real world.

Since then, the technology of smart glasses has continued to evolve over time.

In 2013, Google launched an early version of smart eyewear called Google Glass Explorer. The glasses were designed as a wearable computer that could display information, take photos, and connect to the internet. However, they proved to be too uncomfortable and too expensive to become a hit and were discontinued after 18 months. (X., 2022)

Components of Smart Glasses

There are many essential parts of eyeglasses, but there are some that are specific to smart glasses. The specific features and capabilities of smart glasses can vary widely depending on the manufacturer and intended use case.

Figure 2

Parts of Glasses

Note: By SmartBuy Glasses, (n.d.)

Frame

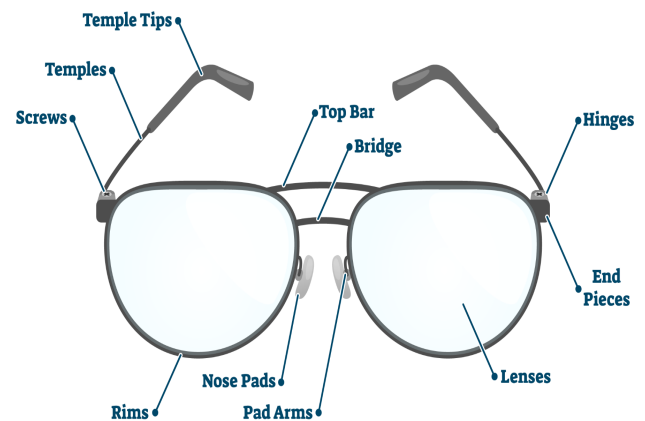With the frame, it refers to everything that is surrounding the lenses. The frames of the glasses provide support and hold the lenses in place. The frames can be made with many materials, such as plastic, acetate, metal, wood, and other eco-friendly materials. They can also have different shapes and features.

Lenses

The lenses are the most crucial part of your glasses. They are chosen according to the prescription for correcting your vision problems. In smart glasses they can be used as a display.

Hinges

The hinges are the metal joins of the glasses. They are held together by the screws or sometimes

The hinges connect the arms of the glasses to the frame to allow them to fold in and out.

Nose pads

The nose pads contain traditional glass material as it includes silicone,Pvc and acetate.The

silicone is used to make the user feel as comfortable as possible .

Temple arms

The temple arms in our glasses will contain buttons that are used to turn the smart feature on or

off as well as a volume button.

Display

Smart glasses incorporate a display technology, typically a small screen, to present digital

information or content to the user. The display can take different forms, such as a heads-up

display projected onto the lenses or a small screen mounted on the frames. The purpose of the

display is to enable the user to access and interact with digital information without needing to

look at a separate device, such as a smartphone or a computer screen.

Processor

The processor of smart glasses serves as the brain of the device, responsible for handling all the

computing tasks required to run the glasses' features and functions. This includes processing data

from sensors such as accelerometers and gyroscopes, managing wireless connectivity for

communication with other devices, and running apps or software that provide augmented reality

experiences, voice assistants, or other features. A powerful processor is essential for delivering a

smooth and responsive user experience and ensuring that the glasses can keep up with the

demands of their users. The processor contains a cpu which is powered by the Apple A16

chip(can be changed).The processor is what makes our glasses run and is located on the Temple arms.

Camera

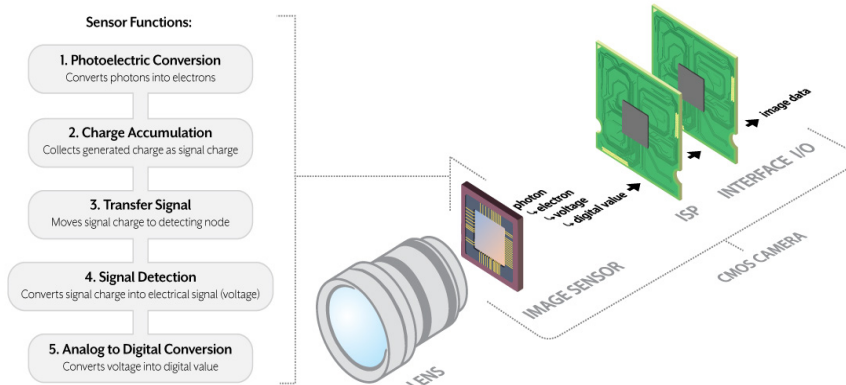The camera can be used to capture images or take videos of the danger going on at a certain area.The camera contains a small Cmos image sensor which is used to turn light into images.

Figure 3:

CMOS Image

Sensor Functions:

1. Photoelectric Conversion
Converts photons into electrons

2. Charge Accumulation
Collects generated charge as signal charge

3. Transfer Signal
Moves signal charge to detecting node

4. Signal Detection
Converts signal charge into electrical signal (voltage)

5. Analog to Digital Conversion
Converts voltage into digital value

By LUCID Visions Lab

Connectivity

Connectivity for smart glasses has the ability of the glasses to connect to other devices such as smartphones, tablets, and computers via wireless networks such as Bluetooth or Wi-Fi. This connectivity allows users to access a wide range of information and applications, enhancing the functionality and versatility of the smart glasses. For example, this will allow users to be able to get a smooth and efficient experience for smart glasses which is an essential in maximizing their potential as a powerful tool for enhancing safety.

Eye tracking

Eye tracking for smart glasses is a technology that enables the glasses to track and analyze the user's eye movements and direction. By monitoring the movements, smart glasses can provide a more intuitive and hands-free user experience. Eye tracking can also be used to control the glasses' functionality, such as scrolling through menus or selecting options. Additionally, data gathered can be used to gather information into the user's behavior, such as what they are looking at and for how long. Overall, eye tracking for smart glasses enhances the glasses' functionality and usability, providing a more seamless and personalized user experience.

Function

Smart glasses are being used in a variety of industries, including manufacturing, healthcare, and logistics, to provide workers with real-time information, increase productivity, and enhance safety. The benefits of safety smart glasses extend beyond safety. These glasses have the potential to transform the way we approach any danger that is near, from hazardous weather conditions to everyday situations like cycling or driving. With their advanced technologies and real-time feedback capabilities, safety smart glasses represent a significant step forward in personal safety and risk management.

The Innovation Process

The process of innovation for safety smart glasses involves researching and testing various sensors and analytics technologies to determine the most effective combination for detecting potential hazards. The glasses are designed to use computer-aided design (CAD) software, with multiple iterations and prototypes tested and refined before the final design was chosen. The building process involves sourcing high-quality materials and components, including sensors, batteries, and frames. The glasses are assembled using precision tools and techniques, with

precise quality control procedures in place to ensure that each pair of glasses meets the highest standards of safety and reliability.

Cost and Timeframe

The cost of safety smart glasses varies depending on the materials and components used, as well as the volume of production. A rough estimate for the cost of materials is approximately $50 per pair, with an additional $50 for production costs, resulting in a total cost of $100 per pair. The glasses can be produced in large quantities in a relatively short amount of time, with a production time of approximately 2-3 weeks. The sensors and analytics technology used in the glasses are state-of-the-art, designed to detect any sorts of danger in real-time and provide alerts and directions on the location for people. The glasses are also designed to be easy to use and comfortable to wear, with adjustable straps and nose pads for a secure and comfortable fit.

Conclusion

Safety smart glasses are a critical innovation that addresses the pressing issue of safety for society. The glasses incorporate advanced technologies that can detect danger and alert the user in real-time, providing an efficient and reliable way to prevent accidents. While other engineering innovations have been proposed, safety smart glasses provide a more comprehensive and effective solution to workplace safety, ensuring workers' well-being and productivity.

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