Raspberry Pi Head-mounted Cybernetic Augmentation

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ARISE & SHINE

ABSTRACT: Raspberry Pi Head-mounted Cybernetic Augmentation is a wearable technology that functions as an assistive enhancement to display real-time data requested by the user. Its role is to function as an interactive brain-computer interface that responds to the user's voice in real-time. The objective is to create a cost-effective alternative to wearable technology like Google Glass and Microsoft's HoloLens.

INTRODUCTION:

Wearable devices are capable of performing many of the same computing tasks as smartphones, tablets and laptops; however, in some cases, wearable technology are proficient enough to outperform these portable devices entirely. Wearable tech tend to be better engineered and often employ cutting edge technologies that a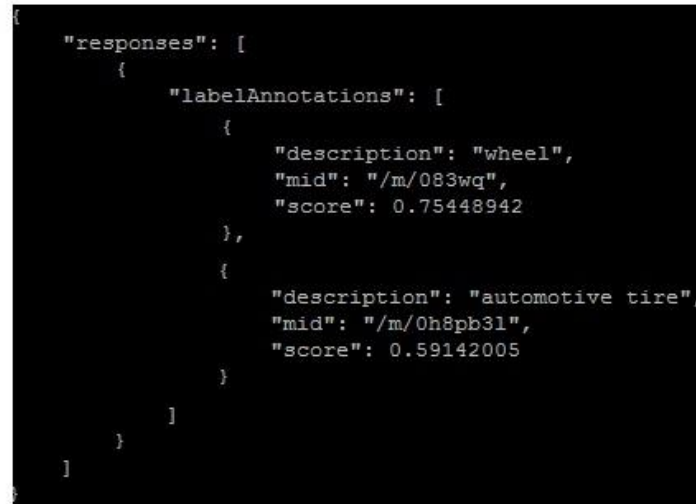re rarely found in hand-held technology on the market today. Raspberry Pi Head-mounted Cybernetic Augmentation (RpHCA) is engineered to be used as a wearable device that can be used for navigation, finding real-time information using an intelligent user interface and recognizing objects through a Raspberry Pi camera integrated within the head-mounted augmentation. All information visible on the screen is projected onto a semi-transparent mirror suspended to the anterior of the augmentation.

SYSTEM ARCHITECTURE:
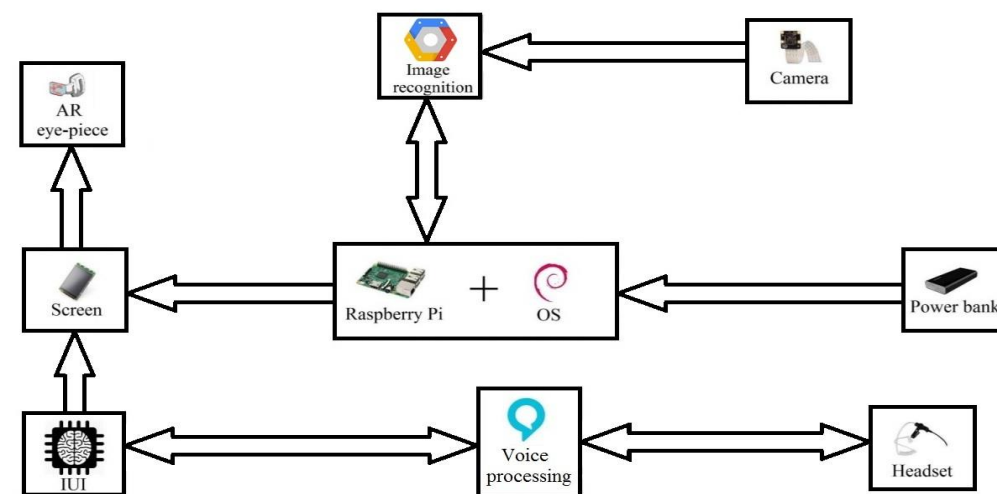
MODULES:

1. Raspberry Pi   2. Augmented reality display   3. Intelligent user interface
4. Camera module   5. Head-mount

APPLICATIONS:

- Real-time information
- Navigation
- Night vision
- Push notifications
- Vocal control
- Personal virtual assistant
- Object recognition and labeling
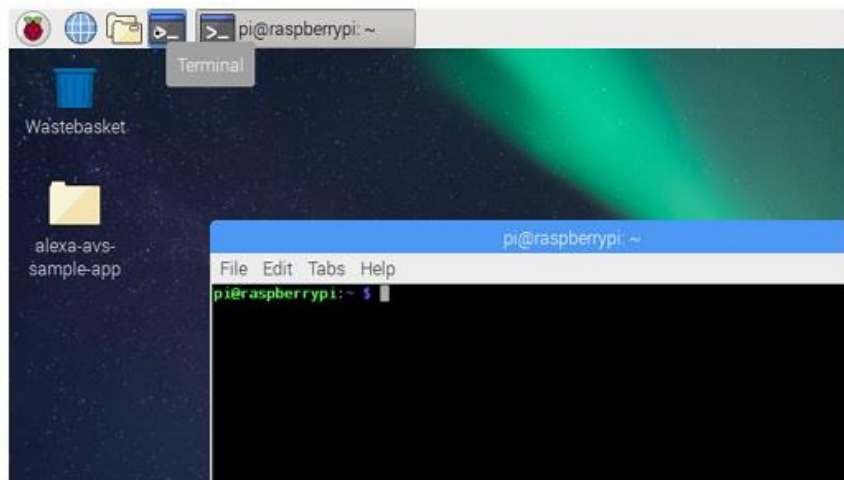- News and weather updates

IMPLEMENTATION:

Voice recognition

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{
    "responses": [
        {
            "labelAnnotations": [
                {
                    "description": "wheel",
                    "mid": "/m/083wq",
                    "score": 0.75448942
                },
                {
                    "description": "automotive tire",
                    "mid": "/m/0h8pb3l",
                    "score": 0.59142005
                }
            ]
        }
    ]
}
```
Object recognition

Navigation

VNC

SSH

RpHCA

REQUIREMENTS:

Hardware- Raspberry Pi 3, Pi NoIR camera, 3.2 inch LCD display, Android Smartphone, Headset with microphone

Software- Raspbian Linux, Google TTS, Google Cloud Vision, Python libraries, VNC, SSH.

CONCLUSION AND FUTURE SCOPE:

Conclusion- The augmentation is a cost-effective solution to available wearable technology. It can provide the user real-time information and also be used to navigate in the real world.

Future Scope- RpHCA can be further developed to perform facial recognition using databases and the intelligent user interface can be modified to use Wolfram Alfa's libraries to perform mathematical calculations.

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[3] Exploring a Cognitive Basis for Learning Spatial Relationships with Augmented Reality, B.E. Shelton and N.R. Hedley, 2004, Technology, Instruction, Cognition and Learning, vol. 1, no. 4, pg. 323- 357.