**ARVR Lab Assignment No. 1**

**Submitted by:**

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| **Sr. No.** | **PRN** | **Student Name** |
| **1** | **1032211329** | **Aryan Bansal** |
| **2** |  | **Aerth Saraogi** |
| **3** |  | **Akshit Singh** |
| **4** |  | **Sai Venktesh Dubey** |

**Title:** Comparison of various Augmented Reality and Virtual Reality hardware Devices.

**Aim:** To study and compare various Augmented Reality and Virtual Reality devices on various

attributes.

**Comparison of Augmented Reality and Virtual Reality Devices:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Specification / Model** | **Oculus Quest 2 (VR)** | **Microsoft HoloLens 2 (AR)** | **Apple Vison Pro (AR)** |
| Device manufacturer with Launch Date | Oculus (Facebook), October 2020 | Microsoft, November 2019 | Apple, 2024 |
| Device form factor | Standalone VR headset | Mixed Reality (AR) headset | Mixed Reality (AR) headset |
| Processing capability | Qualcomm Snapdragon XR2 | Qualcomm Snapdragon 850 | |  | | --- | | Apple M2 and R1  chip |  |  | | --- | |  | |
| Number of Sensors on the Device | 6 | 7 | 12 |
| Names of Sensors on the Device | Accelerometer, Gyroscope, Proximity, 4 tracking cameras | Depth sensor, IMU, 4 visible light cameras, IR camera | LiDAR, 6DoF tracking cameras, depth sensors, eye tracking sensors |
| Platform of the device | Oculus Platform (Android-based) | |  | | --- | | Windows Holographic |  |  | | --- | |  | | visionOS |
| GPS Enabled | No | No | |  | | --- | | No |  |  | | --- | |  | |
| Degree of Freedom | 6DoF | 6DoF | 6DoF |
| Display Type | LCD | MEMS-based laser display | Micro-OLED |
| Resolution | 1832 x 1920 per eye | |  | | --- | | 2048 x 1080 per eye |  |  | | --- | |  | | 4K per eye |
| Field of View (in degrees) | 90 degrees | 52 degrees | 120 degrees |
| Pass through Camera | Yes | Yes | Yes |
| Primary / Major application domains | Gaming, Virtual Tours, Education | Enterprise, Healthcare, Remote Assistance | Enterprise, Productivity, Entertainment |
| Dedicated SDK available for application development? | Yes (Oculus SDK) | |  | | --- | |  |  |  | | --- | | Yes (Windows Mixed  Reality SDK) | | Yes (visionOS SDK) |
| Advantages | Affordable, Wireless, High resolution | High precision, Hands-free operation, Enterprise support | High resolution, seamless integration with Apple ecosystem, advanced sensors |
| Disadvantages | |  | | --- | |  |  |  | | --- | | Limited battery life,  Heavy for prolonged  use | | Expensive, Limited consumer apps | Expensive, yet to be widely adopted |
| Headset Weight | 503 grams | 566 grams | 515 grams |
| Connection Type | Wi-Fi, Bluetooth | Wi-Fi, Bluetooth | Wi-Fi, Bluetooth |
| Price | Rs 35,000 | Rs 2,80,000 | Rs 3,00,000 |

**Discussion :**- After the comparative study of the headsets indicated above, it is observed that each device has its strengths and is best suited for specific applications

**Conclusion:** The choice of headset depends largely on the specific application requirements. For gaming and general VR experiences, the Oculus Quest 2 is a solid choice. For enterprise and specialized professional applications, the Microsoft HoloLens 2 stands out. For high-end productivity and entertainment within the Apple ecosystem, the Apple Vision Pro offers an unparalleled experience.

**FAQs:**

**1. What is the field of view? Preferred Field of view should be less or more?**

**2. What is the degree of freedom? Why does it matter?**

**3. What are various types of displays available for Augmented Reality and Virtual Reality?**

**4. What is the device form factor? How does it affect the usability of the device?**