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Immersive Music Experience

Summary:

The Proposal outlines a project where those involved want to create a musical instrument in Augmented Reality that a user can learn to play. The significance is that music development has not experienced much growth in computer aided creativity aside from synthesizer programs. This project could allow musicians and non-musicians alike to create music in another outlet. It could also display musical notes for the user. There are currently a few similar patents and applications, but none that are exactly like this.

Inputs:

1. Arduinos: Arduinos are open-source microcontroller development boards used for creating various electronic projects.
2. HC-05 Arduino Wireless Bluetooth Receiver RF Transceiver Module: The HC-05 is a Bluetooth module compatible with Arduino and other microcontroller platforms. It enables wireless communication between devices, making it useful for creating projects that involve remote control or data transfer.
3. Mechanical Mat: A mechanical mat is a pressure-sensitive input device that can detect and record the location and force of physical interactions. It is often used in applications like gaming, where it can register user movements or actions.
4. Accelerometer: An accelerometer is a sensor that measures acceleration, which can include both static (e.g., gravity) and dynamic (e.g., movement) forces. It is commonly used in devices like smartphones to detect orientation and motion.
5. Gyroscope: A gyroscope is a sensor that measures angular velocity or the rate of rotation. It is used to determine the orientation and position of an object in space and is commonly found in drones, gaming controllers, and other motion-sensing applications.
6. Magnetometer: A magnetometer is a sensor that measures magnetic fields. It is used for various purposes, including navigation, orientation, and detecting the presence of magnetic materials or objects.
7. PlayStation Eye Camera: The PlayStation Eye is a camera accessory for Sony's PlayStation gaming consoles. It is used for video chat, motion tracking, and capturing images and video for gaming and other applications.
8. STM32F103VBT6 (microcontroller): The STM32F103VBT6 is a microcontroller used for various embedded system applications, including robotics, industrial control, and more.
9. Cambridge Silicon Radio BC4RE Bluetooth module: Bluetooth module used for wireless communication. It allows devices to connect and exchange data over short distances.
10. Handheld PlayStation Wand: A handheld PlayStation wand for Sony's PlayStation gaming console. It has buttons, sensors, and motion-tracking capabilities for gaming interactions.
11. Intel RealSense D415 (Depth Camera): Depth-sensing camera that can capture 3D depth information. It is used for applications such as gesture recognition, facial tracking, augmented reality, and 3D scanning.
12. Leap Motion Controller: The Leap Motion Controller is a hand-tracking device that allows users to interact with computers and applications using hand gestures and motions. It is often used for virtual reality (VR) and augmented reality (AR) experiences.
13. Monochromatic IR Cameras: Monochromatic IR cameras are specialized cameras that capture images in the infrared spectrum. They are used in various applications, including night vision, thermal imaging, and scientific research.
14. Infrared LED Emitters: Infrared LED emitters are light sources that emit infrared (IR) light, which is outside the visible spectrum. They are commonly used in conjunction with IR cameras for night vision, remote control systems, and data transmission.

Processing:

1. CPU (Central Processing Unit): The CPU, or Central Processing Unit, is the primary component of a computer responsible for executing instructions and performing calculations. It acts as the brain of the computer, processing data and managing various tasks, including running software applications, and managing hardware resources.
2. Intel RealSense SDK 2.0: A software package developed by Intel for developers and programmers. It is designed to work with Intel RealSense depth-sensing cameras and other related hardware. This SDK provides tools and libraries to access and utilize depth perception, 3D imaging, and gesture recognition capabilities in applications such as robotics, computer vision, and augmented reality.
3. Leap Motion SDK (LeapC): The Leap Motion SDK, specifically the LeapC variant, is a software development kit provided by Leap Motion for integrating their hand-tracking technology into applications. It enables developers to create interactive and gesture-controlled software and experiences, allowing users to interact with computers and devices using natural hand movements without the need for traditional input devices like a mouse or keyboard.
4. OpenCV (Open-Source Computer Vision Library): OpenCV is an open-source computer vision library that provides a comprehensive set of tools and functions for image and video analysis, manipulation, and processing. It is widely used in fields such as robotics, machine learning, and computer vision to develop applications that involve object recognition, image stitching, facial recognition, and more.
5. Unity: Unity is a popular cross-platform game engine and development environment used for creating interactive 2D and 3D applications, including video games, simulations, and virtual reality experiences. It offers a user-friendly interface and a wide range of tools and assets for game development, as well as the capability to export projects to various platforms, including desktop, mobile, and virtual reality (VR) headsets. Unity also supports the integration of other SDKs and libraries, making it a versatile choice for developing interactive applications with features like 3D graphics, physics simulations, and user interfaces.

Outputs:

1. Graphics (Screen): The graphics, often referred to as the screen, represents the display component of a device, typically a monitor or screen on a computer or mobile device. It is responsible for rendering visual information to the user, including images, text, videos, and graphical user interfaces (GUIs). The quality and resolution of the screen play a crucial role in determining the visual experience of the user.
2. ARCore Android Development Kit: ARCore is a software development kit (SDK) developed by Google for creating augmented reality (AR) applications on Android devices. It provides tools and libraries for developers to integrate AR features, such as object tracking, motion tracking, and environmental understanding, into their Android apps. ARCore allows apps to overlay virtual objects or information onto the real world when viewed through the device's camera.
3. Bluetooth: Bluetooth is a wireless communication technology that enables short-range data transfer between devices. It is commonly used for connecting peripherals like headphones, speakers, keyboards, and mice to smartphones, tablets, computers, and other devices. Bluetooth can also facilitate data exchange between devices, making it suitable for tasks such as file transfer and connecting to IoT (Internet of Things) devices.
4. User-Facing App (Unity VR/AR): A user-facing app refers to an application that is designed for end-users to interact with directly. This app is developed using Unity, a popular game engine and development platform.
5. Speakers: Produce audible sound, including music, voice, and other audio content. They are commonly used in various devices, such as computers, smartphones, televisions, and audio systems, to provide an audio output that complements the visual experience.

Remote Pregnancy Monitor

Summary:

The Proposal is for a device that will be attached to a pregnant woman to monitor the fetal heart rate and contractions. There will also be a bracelet to monitor the woman's vital signs (heart rate, oxygen levels, and stress levels). The significance is that not everyone always has access to health care. This could ensure that women of all economic levels have access to pregnancy monitoring at any time of day. It could also enhance that availability for women that do have access to healthcare as well. A similar patent for the technology already exists, the only difference is that the data will be sent to their program and alerts can be sent to the mother, emergency contact and the mother's doctor.

Inputs:

1. Pulse Sensor Amped: The Pulse Sensor Amped is a specialized sensor designed to measure a person's heart rate or pulse. It typically uses an optical sensor to detect changes in blood volume beneath the skin as the heart beats. This sensor is commonly used in health and fitness applications to monitor heart rate during exercise or other activities.
2. MyoWare Muscle Sensor: The MyoWare Muscle Sensor is a sensor that measures electrical activity in muscles, known as electromyography (EMG). It is commonly used in biofeedback and medical applications to monitor muscle activity and can be utilized in prosthetic control, physical therapy, and muscle performance analysis.
3. Optical Heart Sensor (SEN-12650): The Optical Heart Sensor (SEN-12650) is a sensor that employs optical principles to measure heart rate or pulse. It often utilizes light-emitting diodes (LEDs) and photodetectors to detect changes in blood volume and calculate heart rate. This type of sensor is frequently integrated into wearable devices and fitness trackers.
4. Eval Board Heart Oximetry Monitor (MAX1921, MAX14595, MAX30102 - Medical): This evaluation board is a development platform for building a heart oximetry monitor, which is a medical device used to measure oxygen saturation (SpO2) and heart rate. It includes the MAX1921, MAX14595, and MAX30102 integrated circuits (ICs), which are essential components for accurate SpO2 and heart rate monitoring in medical equipment.
5. Pulse Oximeter (PO or SpO2) Sensor Evaluation Board: This evaluation board is used for testing and evaluating pulse oximeter sensors. Pulse oximeters are medical devices that noninvasively measure oxygen saturation in a person's blood and heart rate. The evaluation board helps developers assess the performance and accuracy of pulse oximetry sensors for medical applications.
6. Temperature/Humidity Sensor (DHT-11): The DHT-11 is a sensor that measures both temperature and humidity in the surrounding environment. It is commonly used in weather stations, climate control systems, and IoT (Internet of Things) devices to monitor and provide data on temperature and humidity levels.

Processing:

1. Raspberry Pi: The Raspberry Pi is a series of small, affordable, single-board computers developed by the Raspberry Pi Foundation. They come with various models, each featuring different specifications and capabilities, but all are designed to run a Linux-based operating system and support a wide range of programming languages. Raspberry Pi devices are commonly used for tasks such as web browsing, programming, home automation, and robotics.
2. MCP3008: The MCP3008 is an analog-to-digital converter (ADC) chip. It allows microcontrollers like the Raspberry Pi to convert analog signals (e.g., voltage levels from sensors) into digital data that can be processed and analyzed. It is often used to interface with analog sensors or devices that provide data in analog form, such as temperature sensors or potentiometers.
3. Protoboard: A protoboard, also known as a breadboard, is a reusable electronic circuit board used for building and testing prototypes of electronic circuits without soldering. It consists of a grid of holes into which electronic components, wires, and connectors can be inserted and interconnected.
4. Printed Circuit Board (PCB): A printed circuit board is a flat board made of non-conductive material (usually fiberglass) with conductive traces etched onto its surface. PCBs are used to mechanically support and electrically connect electronic components such as resistors, capacitors, integrated circuits, and more. They are widely used in electronics manufacturing to create compact and reliable circuits for various applications.
5. Housing: In the context of Raspberry Pi or other electronics projects, a housing refers to an enclosure or case that provides physical protection and sometimes thermal management for the components inside. Housings come in various forms, including plastic or metal cases, and they help shield the electronics from dust, moisture, and physical damage while allowing access to ports and connectors.
6. Server: A server is a computer or software system that provides services or resources to other computers, often referred to as clients, over a network. Servers can serve various purposes, including web hosting, file storage, database management, and more.
7. MySQL: MySQL is an open-source relational database management system (RDBMS) commonly used for storing and managing structured data. It is known for its speed, reliability, and ease of use, making it a popular choice for web applications and other software that require database functionality.
8. Node.js: Node.js is a JavaScript runtime environment that allows developers to run JavaScript code on the server side. It is widely used for building scalable and real-time web applications and services.

Output:

1. LED (signifying device is on): An LED, or Light Emitting Diode, is a semiconductor device that emits light when an electric current passes through it. It is often used as an indicator to show that a device or component is powered on and operational. LEDs are commonly found on electronic devices, appliances, and circuit boards to provide visual feedback to users.
2. HTML (Hypertext Markup Language): HTML is the standard markup language used to create and structure content on the World Wide Web. It consists of a set of tags and elements that define the structure and layout of web pages.
3. CSS (Cascading Style Sheets): CSS is a stylesheet language used to control the presentation and formatting of HTML documents. It allows web developers to define the visual appearance of web pages.
4. JS (JavaScript): JavaScript is a versatile and widely used programming language that allows developers to add interactivity and dynamic behavior to web pages.
5. SMS (Short Message Service): SMS is a text messaging service used for sending short text messages between mobile phones or from a computer to a mobile phone. It is a widely used communication method for sending brief messages, notifications, and alerts. SMS messages can contain text, links, or other multimedia content, depending on the capabilities of the mobile network.
6. Swift: Swift is a programming language developed by Apple for building applications on iOS platforms. It is designed to be fast, safe, and easy to read and write. Swift is the primary language for developing iOS and macOS applications and is known for its performance and modern syntax.
7. Java: Java is a versatile, object-oriented programming language that is known for its portability and platform independence. It is commonly used for developing a wide range of applications, including web applications, mobile apps (using Android).