AirDrums - Computer Vision-Based Virtual Drumming System

Overview

AirDrums is an AI-powered, computer vision-based drumming application that allows users to play a virtual drum set using hand gestures. It leverages OpenCV, Mediapipe, TensorFlow, and PyQt5 to track hand movements and trigger real-time drum sounds.

Installation Guide

Step 1: Clone the Repository

To download the project from GitHub, open your terminal or command prompt and run:

```
git clone https://github.com/YOUR_GITHUB_USERNAME/AirDrums.git
cd AirDrums
```

Step 2: Create a Virtual Environment (Optional, but Recommended)

```
python -m venv airdrums_env
source airdrums_env/bin/activate  # On macOS/Linux
# OR
airdums_env\Scripts\activate      # On Windows
```

Step 3: Install Dependencies

Install all required libraries from the `requirements.txt` file:

```
pip install -r requirements.txt
```

Usage Guide

Launching the Application

To start the AirDrums application, run:

```
python Airdrums_Full_App.py
```

How to Use

1. The application will display a welcome screen with instructions.
2. Click **Start Playing** to begin.

3. Position your hands in front of the camera.
4. Move your hands over the virtual drum set displayed on the screen.
5. The application will detect your movements and play the corresponding drum sounds.
6. Click **Exit** to close the application.

Requirements

- A webcam (built-in or external)
- Python 3.7 or later
- A system with OpenCV-compatible hardware

Troubleshooting

- **Camera Not Detected?** Ensure no other applications are using your webcam.
- **No Sound?** Check your system audio settings and ensure Pygame is installed correctly.
- **Hand Not Detected?** Ensure good lighting conditions and place your hands within the camera's view.

Future Enhancements

- Multi-gesture recognition for more drum patterns.
- Drumstick tracking for realistic playing.
- Foot movement detection for kick drum and hi-hat pedal.
- Song playback and recording features.

Contributing

Feel free to fork the repository and submit pull requests with improvements!

License

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