PROGRESS REPORT: Skateboard Trick Recognition through an AI-based Approach

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Abstract

This is a test

Introduction

Skateboarding dates back to the 1940s when handmade skateboards first appeared [1]. It has since developed into a worldwide phenomenon, with its popularity skyrocketing, after gaining recognition as an official sport in the 2020 Tokyo Olympics [2]. Skateboarding comprises the dynamic activities of riding a skateboard and skillfully performing a repertoire of tricks, manifesting as a popular and exhilarating "extreme sport".

This dynamic and multifaceted sport encompasses various disciplines and styles of riding, each of them offering unique challenges for skateboarders to delve into. Two of the most prominent styles are "vert" and "Street", vert skateboarding revolves around riding on specialised structures known as half-pipes or ramps, emphasising areal manoeuvres. Whilst, street skateboarding transpires in urban environments, utilising a diverse array of obstacles, including stairs, rails, ledges, gaps or flat ground for skaters to showcase their creativity and versatility through various techniques [3].

0.0.1 Skateboard Tricks

Skateboard tricks are the heart and soul of skateboarding. These tricks originate from the dynamic orchestration of rotations and revolutions of a skateboard along various axes emphasising the significance of precise placement of a skateboarder's feet to initiate these rotations. These tricks serve as excellent examples of how the skateboarder's body and skateboard work in perfect harmony. Some common skateboard tricks include:

- **Ollie:** One of the first tricks beginners learn. Where the skateboarder pops the tail of the board while sliding their foot across the board, causing the board to level out in the air, used to jump over obstacles.

- **Kickflip:** A trick where the skateboarder flips the board under their feet while jumping, making it spin 360°around the x-axis.

- **360 kickflip:** A combination of a kickflip and a 360°board rotation around the y-axis.

Skateboarders continually innovate and come up with new trick combinations, contributing to the dynamic nature of the sport.

General Aims and Goals

The primary goal of this project is to design and develop an efficient Artificial Intelligence (AI) model that can recognise and distinguish differnent skateboard tricks from video footage. Initially, the focus will be placed on the recogntion of tricks such as kickflips, ollies and shuvits. This approach entails applying the appropriate Machine Learning (ML) techniques to overcome commonly encountered challenges in computer vision. By addressing these challenges, such as the fluctuation of camera angles, lighting conditions and the complex dynamics of skateboard manoevers, this project seeks to develop an accessible tool that may be utilised by skateboarders, coaches or skateboard contests.

Bibliography

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