Develop an accurate Model for Cricket Pose Estimation

Objective

To develop a website to estimate the cricket pose of a cricket player. To distinguish between different cricket poses like bowling action, drive, catch, etc.

Abstract

Using TensorFlow, we are creating two different models. EfficientNetB0 and MoveNet/Thunder models are being used from the TensorFlow Hub. EfficientNetB0 is used to differentiate the different poses of the player. By accepting an image from the user, we pass the image in (224,224) size to the model. The model predicts based on its learnt patterns and returns a prediction probability which is converted to a class name. We have used Transfer Learning to use this model. MoveNet/Thunder is used to estimate the pose by connecting 17 different joints in the human body

Technologies Used

- TensorFlow Hub
- TensorFlow
- Google Colab
- Numpy
- CNN
- Transfer Learning
- Computer Vision
- MoveNet/Thunder
- EfficientNetB0

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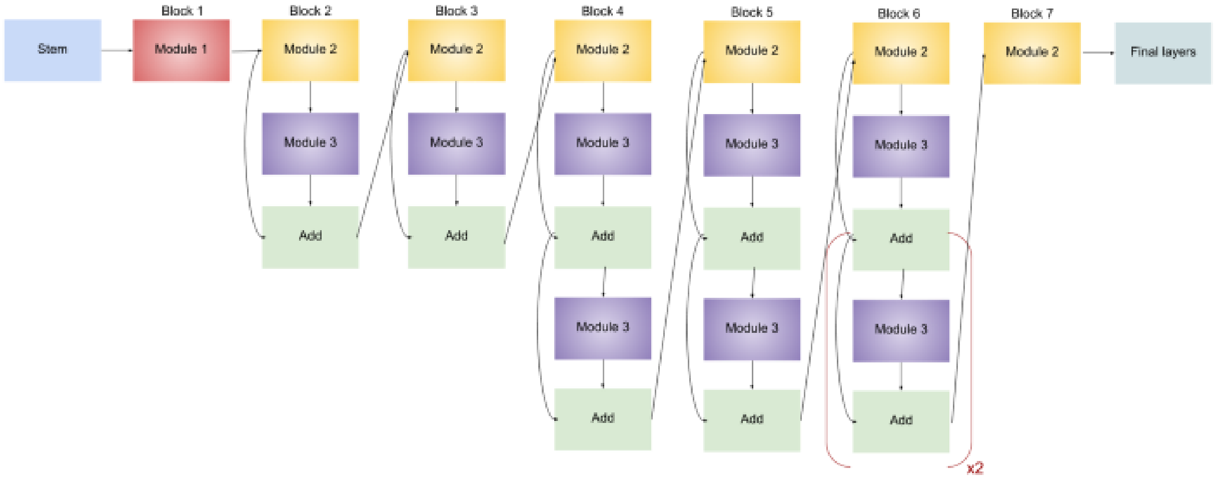
Detailed Solution

We are using EfficientNetB0 model from TensorFlow Hub to classify different types of cricketing shots and poses. We are classifying the following different types

- Bowling
- Catch
- Dive
- Drive
- Pull
- Reverse Sweep
- Sweep
- Throw
- Wicket Keeper



Architecture of EfficientNetB0

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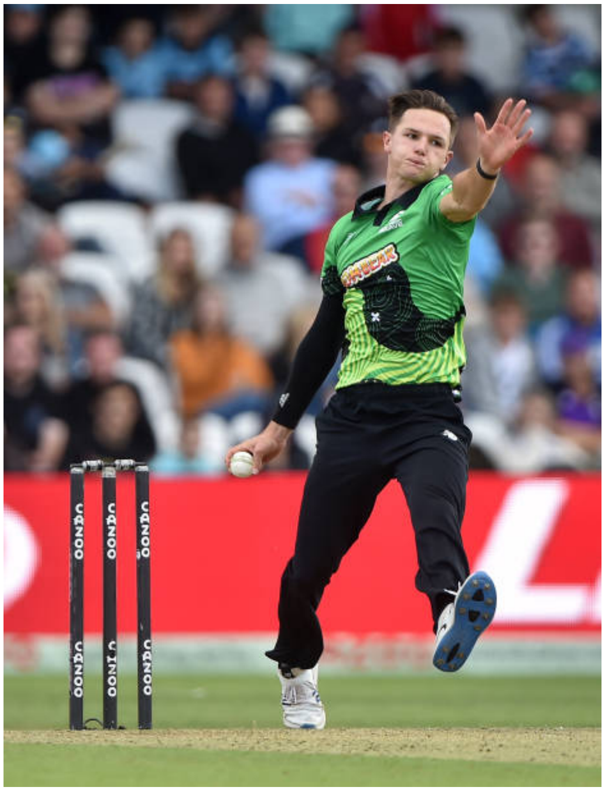
EfficientNetB0 has 237 layers. We are making the last 10 layers as trainable to change the weights to increase the efficiency of our model.

Using MovNet/Thunder model, we estimate the pose of the given image by connecting 17 different joints in the human body.The images are shrunk to the shape (256,256,3) and fed to our model. The output image is then enlarged to size (384,384) for better visibility. All the joints with confidence threshold of above 0.3 or 30% are marked on the image using OpenCV

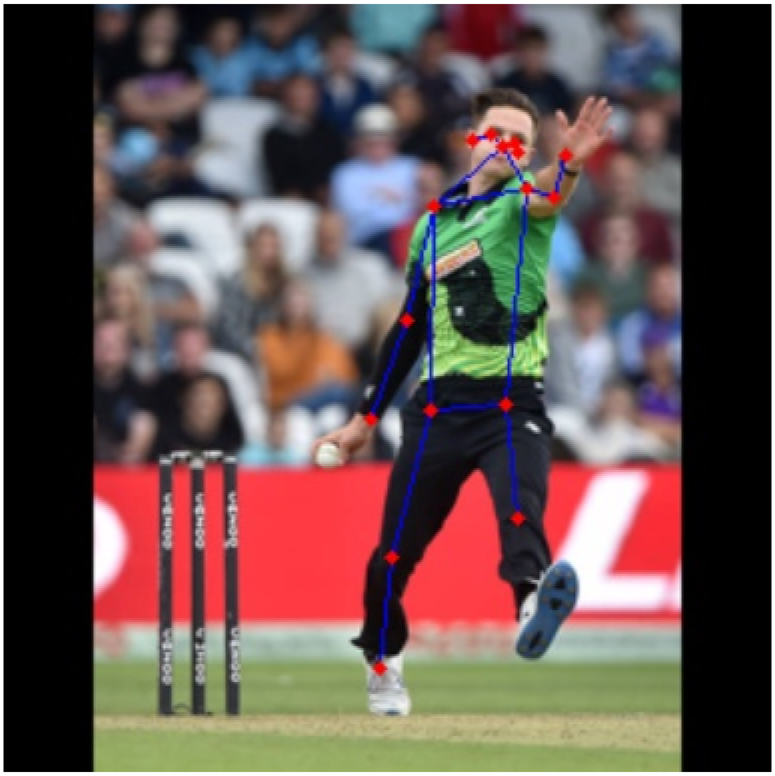
Example:

Input image

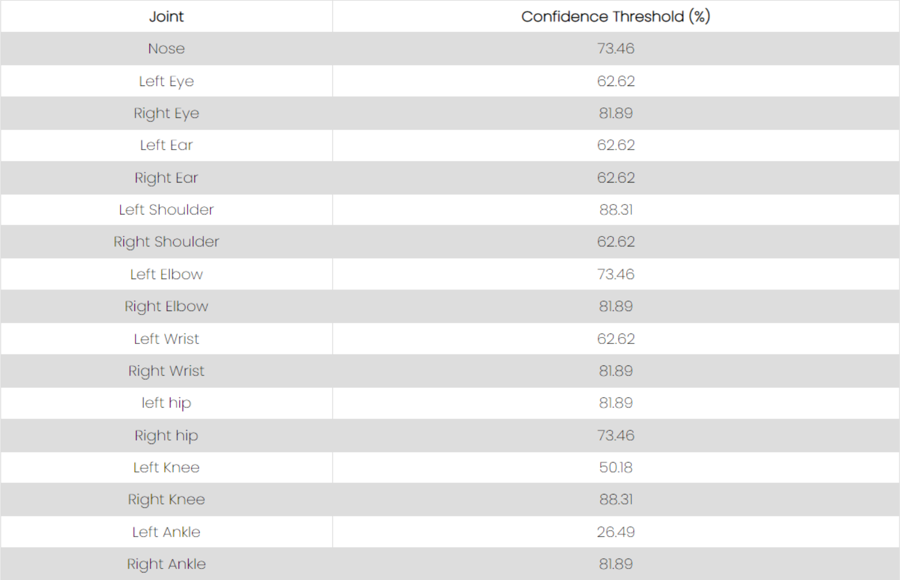


Develop an accurate Model for Cricket Pose Estimation

Output image:



Develop an accurate Model for Cricket Pose Estimation



Joint	Confidence Threshold (%)
Nose	73.46
Left Eye	62.62
Right Eye	81.89
Left Ear	62.62
Right Ear	62.62
Left Shoulder	88.31
Right Shoulder	62.62
Left Elbow	73.46
Right Elbow	81.89
Left Wrist	62.62
Right Wrist	81.89
left hip	81.89
Right hip	73.46
Left Knee	50.18
Right Knee	88.31
Left Ankle	26.49
Right Ankle	81.89

This website is created with Django for improved speed and security.
We also have a blog section, where users can learn about our application and use cases of our application. The blog page can be updated using the Django Admin Panel.

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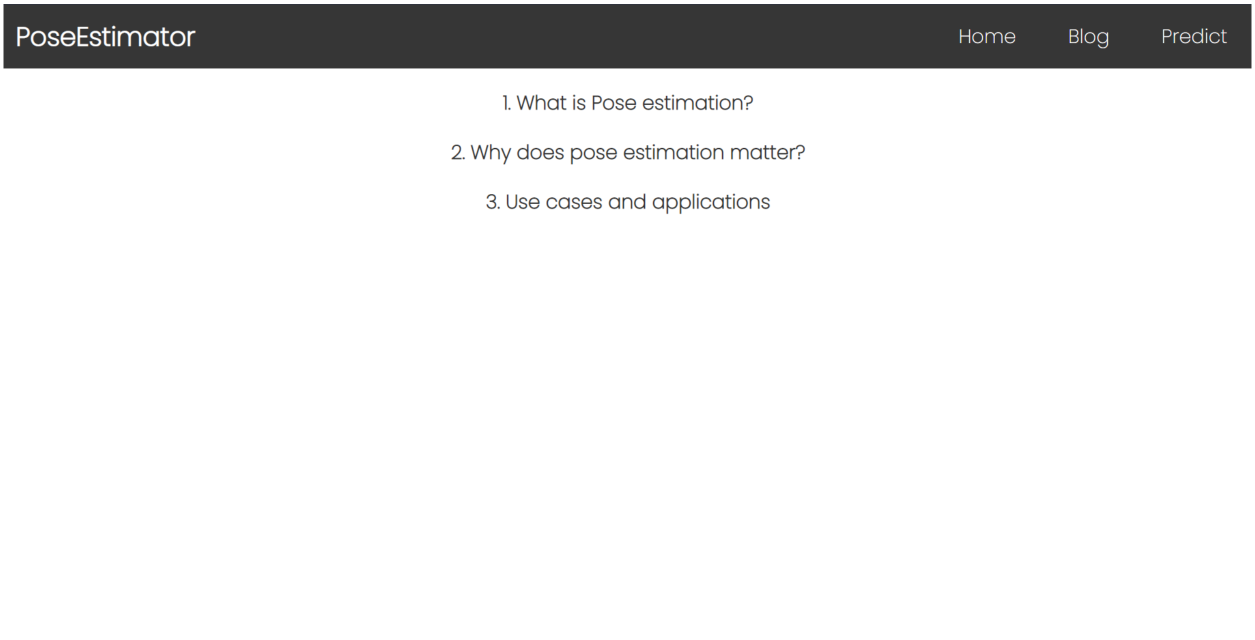
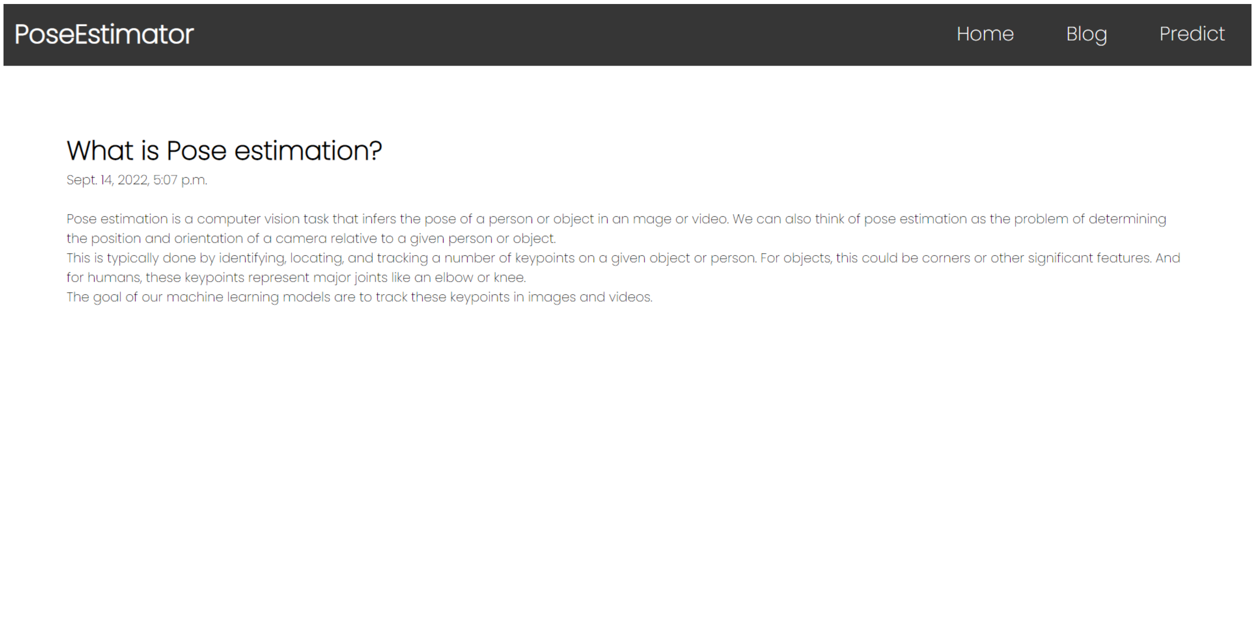


1. What is Pose estimation?

2. Why does pose estimation matter?

3. Use cases and applications



What is Pose estimation?

Sept. 14, 2022, 5:07 p.m.

Pose estimation is a computer vision task that infers the pose of a person or object in an mage or video. We can also think of pose estimation as the problem of determining the position and orientation of a camera relative to a given person or object.
This is typically done by identifying, locating, and tracking a number of keypoints on a given object or person. For objects, this could be corners or other significant features. And for humans, these keypoints represent major joints like an elbow or knee.
The goal of our machine learning models are to track these keypoints in images and videos.

Github Link: Pose Estimation