Approach

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Problem Definition

The project aims to classify images of badminton players into individual player classes using a dataset containing images of players in different positions on the court. The dataset includes:

- **TopTwoPlayers:** Images of players on the top half of the court.
- **BottomTwoPlayers:** Images of players on the bottom half.
- **CourtImage:** A background image of the court for color modeling.

Methodology

1. Dataset Preparation

- Organized the dataset into folders for each category and uploaded it to the working environment.
- Extracted image file paths for processing.

2. Image Processing

- Utilized OpenCV for image handling tasks such as reading, resizing, and saving.
- Preprocessed images to ensure uniform dimensions and consistent color representation.

3. Feature Extraction

- **ResNet50 Model:** Employed a pre-trained ResNet50 model for efficient feature extraction from the images. The model was chosen for its effectiveness in image classification tasks.
- Resized images to (224, 224) pixels and applied necessary preprocessing to make them compatible with the ResNet50 model.

4. Clustering

- Implemented **KMeans Clustering** on the extracted features to classify the images into four clusters, each representing a different player.

- Each cluster was labeled according to the corresponding player based on the aggregated images.

5. Results Organization

- The classified images were saved into distinct folders for each player class, effectively segregating the dataset based on clustering results.

6. Execution Time

- Ensured that the total execution time of the code remained within the limit of 2 minutes, optimizing processes such as image loading, processing, and clustering.