Age Prediction

AI Model Development

Time: 60 mins

Introduction

In this class, the student/s will learn to preprocess the real time video, load age prediction model and predict the age of faces detected in camera.

New Commands Introduced

- flip()   Flips the image.

- resize()   Resizes the image with a given value.

- load_model()   Loads the model

- cv2.imshow("Images", img)   Displays the img image and adds "Images" as title of the window

- img[Y: Y+H, X: X+W]   Crops the image as per specified dimension

- compile()   Compiles the model

- model.predict()   Gives prediction value as per model

Vocabulary

- **Traning dataset** is a dataset which is used train a model.
- **Testing dataset** is a dataset which is used to test a trained model

Learning Objectives

Student/s should be able to:
- *Recall* how to process to create a model
- *Demonstrate* how capture a video, process the video to predic the age of the person.
- *Explain* the steps required to capture a video, process the video and predict the age.
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Activities

1. **Class Narrative:** *(2 mins)*

   - Brief the student/s that you can capture a live video, process it to predict the age of the person in the video.

2. **Concept Introduction Activity:** *(5 mins)*

   - Let the student/s play the explore-activity to see how the feature to predict the age in real time works. Ask the students to add the model file in every activity sub-folder.

   - Using the slides, explain that the student/s will learn:

     - to capture video and detect faces.

     - to process the video

     - to predict the age

3. **Activity 1: Capture Video and Detect Faces** *(14 mins)*

   Teacher Activity: *(7 mins)*

   - Ask the student/s to recall how they read the camera feed to detect the hands.

   - Explain how to capture and store the video in real time.

   - Explain that the video is stored in flipped frames as the original video captured is flipped so you need to flip it again.

   - Explain how to detect and highlight the faces.

   Student Activity: *(7 mins)*

   - Guide the student/s to capture and store the video, detect and highlight the faces in the video.

4. **Activity 2: Preprocess the Video** *(12 mins)*

   Teacher Activity: *(3 mins)* .

   - Demonstrate how to preprocess the detected faces in real time video by cropping and resizing them.

   - Explain how to store the preprocessed video frames as an image in a numpy array for further processing.

   Student Activity: *(9 mins)*

   - Guide the student/s to preprocess the detected faces in real time video.

5. **Activity 3: Predict the Age** *(12 mins)*

   Teacher Activity: *(6 mins)*

   - Demonstrate how to use the trained tested model to predict ages in real time.

   - Explain how to load the age detection model, predict the ages of the detected faces, and display ages for detected faces.

   Student Activity: *(6 mins)*

   - Guide the student/s to use the trained tested model to predict ages in real time.

6. **Introduce the Post class project:** *(2 min)*

   - Use the lung images to detect if the patient is a Pneumothorax patient.

7. **Test and Summarize the class learnings:** *(5 mins)*

   - Check for understanding through quizzes and summarize learning after respective missions.

   - Summarize the overall class learning towards the end of the class.

8. **Additional activities:**

   - Encourage the student/s to color the bounding box and age prediction values with different colors.

   - Encourage the student/s to run the model on video and debug to change the bounded box dimensions and show the face detection with predicted age.

9. **State the Next Class Objective:** *(1 min)*

   - In the next class, student/s will learn to create an AI tool to automate adding a caption to the video..

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	Age Prediction	https://s3-whjr-curriculum-uploads.

		whjr.online/360ab19f-18db-49d0-b522-1109737a61f3.html
Explore Activity	Age Prediction	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Student Activity 1	Capture Video and Detect Faces	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Teacher Reference: Student Activity 1 Solution	Capture Video and Detect Faces	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS
Student Activity 2	Preprocess the Video	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Teacher Reference: Student Activity 2 Solution	Preprocess the Video	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS
Teacher Activity 3	Predict the Age	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Predict the Age	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-TAS
Student Activity 3	Predict the Age	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Teacher Reference: Student Activity 3 Solution	Predict the Age	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS
Student's Additional Activity 1	Change the Color	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Change the Color	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS
Student's Additional Activity 2	Debug the Code	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Debug the Code	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-SAS
Post Class Project	Predict the Pneumothorax Detection	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-PCP-BP
Teacher Reference: Post Class Project Solution	Predict the Pneumothorax Detection	https://github.com/Tynker-Computer-Vision/TNK-M10-PRO-C76-PCP