AI IMAGE RECOGNITION: FROM IMAGE CAPTURE TO MODEL TRAINING WITH ROBOFLOW AND TENSORFLOW

How AI Can Identify Objects Using Machine Learning

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OVERVIEW OF AI IMAGE RECOGNITION WORKFLOW

- Brief explanation of how AI technology works for image recognition.
- High-level steps:
- 1. Collecting images (Taking pictures)
- 2. Annotating images with Roboflow
- 3. Training a model with TensorFlow

STEP 1: COLLECT AND PREPARE DATA



Description: The first step is to collect a dataset of images. - Take pictures manually or gather from existing datasets. - Ensure diversity in image angles, lighting, and backgrounds. Example: Show images of objects like fruits being captured from various angles.



STEP 2: IMAGE ANNOTATION WITH ROBOFLOW

- Explanation of what annotation means:
- Drawing bounding boxes around objects.
- Labeling objects in the image.
- Process:
- 1. Upload images to Roboflow.
- 2. Draw bounding boxes.
- 3. Label each object.







DATASET AUGMENTATION IN ROBOFLOW

- Description of how dataset augmentation works:
- Applying transformations like rotations, flips, brightness adjustment to enhance dataset diversity.
- Purpose: Improve model robustness by simulating different conditions.



Exporting annotated images and labels from Roboflow in TensorFlow-compatible formats:

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- TFRecord, COCO JSON, or VOC XML.

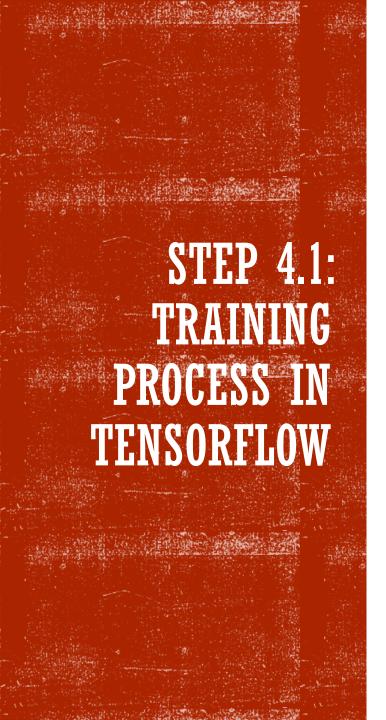


Note: Roboflow provides easy export options.

STEP 4: BUILDING AND TRAINING THE MODEL IN TENSORFLOW

- Description:
- Load the dataset into TensorFlow.
- Build a Convolutional Neural Network (CNN) for image recognition.
- Set up training, validation, and testing splits.





- Description:
- Define hyperparameters like learning rate, batch size, and number of epochs.
- Monitor accuracy and loss during training.



After training, the model is evaluated on unseen images:



- Measure performance (e.g., accuracy, precision, recall).



- Fine-tune by adjusting parameters or adding more data.

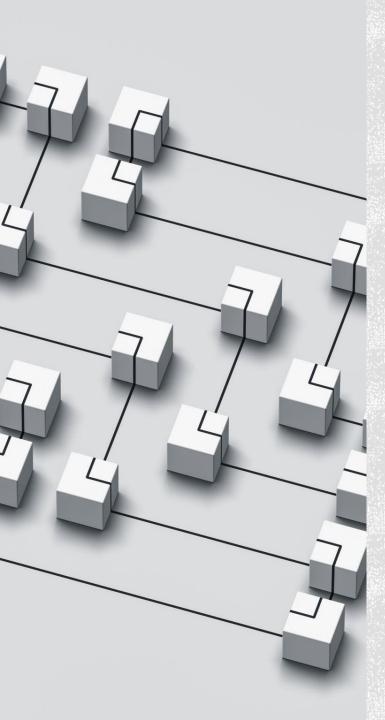
STEP 5: TESTING AND FINE-TUNING



STEP 6: DEPLOYING THE TRAINED MODEL

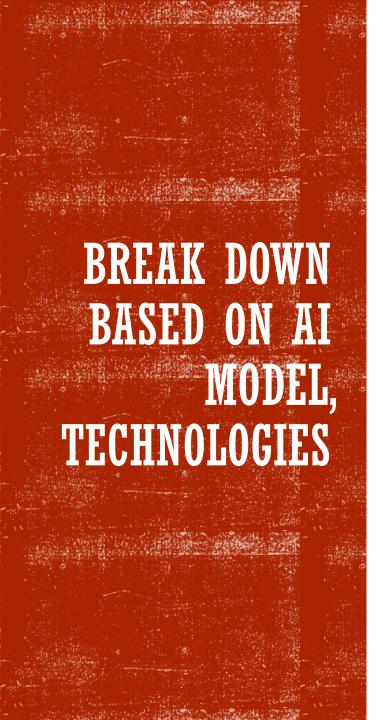
- Use the trained model in real-world applications like:
- Web applications, mobile apps, or IoT devices.
- Example: Show the integration of the model in a mobile app recognizing objects in realtime.





RECAP: AI IMAGE RECOGNITION PROCESS

- Key Steps:
- 1. Collect and annotate images.
- 2. Augment the dataset.
- 3. Export and load into TensorFlow.
- 4. Build and train the model.
- 5. Evaluate, fine-tune
- 6. Deploy.



- For AI models like the one described, various technologies, servers, and coding languages are used depending on the requirements of the project.
- Here's a breakdown

A. SERVERS USED FOR AI MODELS

- Cloud Servers: AI models often require significant computational power for training and inference. Many companies and individuals rely on cloud infrastructure for scalability and flexibility.
- AWS (Amazon Web Services): Offers services like EC2 for virtual computing and Sagemaker for building, training, and deploying machine learning models.
- Google Cloud: Provides services like AI Platform for model development, Tensor
- Processing Units (TPUs) for accelerated computation, and Google Kubernetes Engine (GKE) for scaling.





A. SERVERS USED FOR AI MODELS (CONTINUED)

- Microsoft Azure: Provides services like Azure Machine Learning for managing machine learning models and virtual machines for computation.
- IBM Cloud: Offers Watson Machine Learning for deploying AI models.
- On-Premise Servers: In some cases, organizations may choose to use their own physical servers.
- GPU Servers: Servers equipped with GPUs (like NVIDIA's Tesla or RTX) are commonly used for training AI models, particularly for deep learning.





B. CODING LANGUAGES FOR AI MODELS





CONCLUSION

- Final thoughts on how AI is revolutionizing image recognition tasks.
- How this process can be applied in various industries (e.g., healthcare, agriculture, retail).
- Thank the audience and invite questions.