TensorFlow

TensorFlow Lite

Agenda

TensorFlow Introduction

Tensorflow Python Example

Introduction to TensorFlow Lite

Setting up TensorFlow Lite for embedded systems

Summary and Conclusion

TensorFlow

An open-source machine learning framework

Developed by the Google Brain team

Designed to facilitate the development

Deployment of machine learning models

Particularly deep learning models

TensorFlow

Provides a comprehensive set of tools

Libraries, and Community resources

Widely used in Research and industry

Key Features of TensorFlow

Surendra Panpaliya

Flexibility

A flexible and versatile framework

Supports a range of machine learning tasks

Includes Deep learning

Machine learning

Reinforcement learning

Neural Network Capabilities

TensorFlow excels in building

training neural networks,

offering various abstractions like

Keras for high-level model building

Graph Computation

TensorFlow uses a dataflow graph

to represent computations,

allowing for efficient parallel execution

across CPUs and GPUs.

Scalability

TensorFlow supports distributed computing,

making it scalable for training large models

on multiple GPUs or

across clusters of machines.

Community and Ecosystem

Has a vibrant and active community
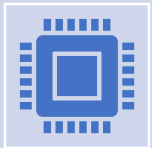
Contributes to its ecosystem.

TensorBoard

TensorFlow includes TensorBoard,

a visualization tool

that helps in monitoring and debugging models.

TensorBoard

It provides insights into the training process,

model architecture, and

performance metrics.

Compatibility

TensorFlow is compatible with multiple platforms,

Including Windows, Linux, and macOS.

Compatibility

It also supports deployment on various devices,

Including CPUs, GPUs, and

TPUs (Tensor Processing Units).

Wide Range of Applications

TensorFlow is used in

Image and Speech recognition

Natural Language Processing

Wide Range of Applications

- Recommendation systems
- Autonomous vehicles
- Healthcare.

TensorFlow 2.x

With the release of TensorFlow 2.x,

the framework underwent significant improvements,

making it more user-friendly and accessible.

Eager Execution

TensorFlow 2.x introduces

Eager execution by default,

allowing users to execute operations

immediately without building

a computational graph.

Keras Integration

TensorFlow 2.x tightly integrates

the Keras high-level API,

making it the official high-level API

for model building in TensorFlow.

Simplified API

TensorFlow 2.x provides

a more streamlined and consistent API,

making it easier for

both beginners and experienced developers

to work with the framework.

Getting Started with TensorFlow

pip install tensorflow

TensorFlow Example

```python
import tensorflow as tf
# Define the computation graph
a = tf.constant(2.0)
b = tf.constant(3.0)
c = a + b
# Execute the computation graph
print("Result:", c.numpy())
```

Summary

TensorFlow provides

the tools and capabilities needed

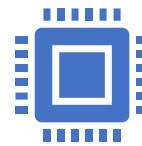for a wide range of applications.

TensorFlow Lite (TFLite)

Lightweight, open-source framework

Designed for deploying machine learning models

on resource-constrained devices

such as embedded systems microcontrollers,

mobile phones, and IoT devices.
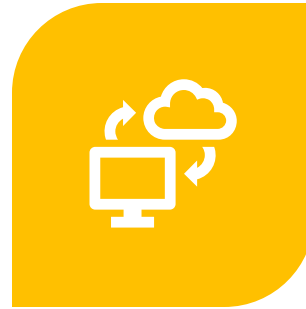
TensorFlow Lite (TFLite)

ALLOWS YOU TO RUN MACHINE LEARNING MODELS

EFFICIENTLY ON DEVICES

WITH LIMITED COMPUTING POWER,

MEMORY & STORAGE.

Lightweight and Optimized

TFLite models are

smaller in size

optimized for inference

on edge devices.

Fast Inference

Designed to perform
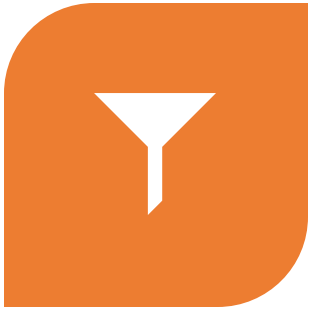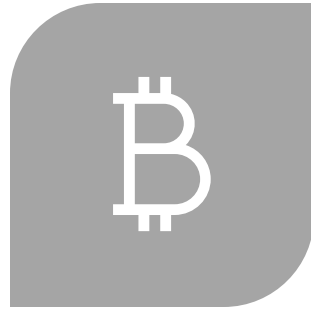
low-latency inference,

making it suitable for

real-time applications.

Supports Quantization

ALLOWS CONVERSION OF MODELS
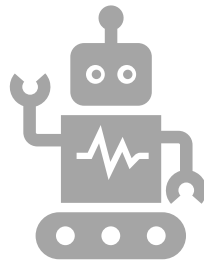
TO 8-BIT INTEGERS,

SIGNIFICANTLY REDUCING MEMORY USAGE

INCREASING INFERENCE SPEED.

Runs on Various Platforms

Raspberry Pi   Arduino, Android   iOS, and more.

Happy Learning !!

Thank You for your patience ☺

Happy to Connect !!☺

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