Classifying Images Using TPUs

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Introduction

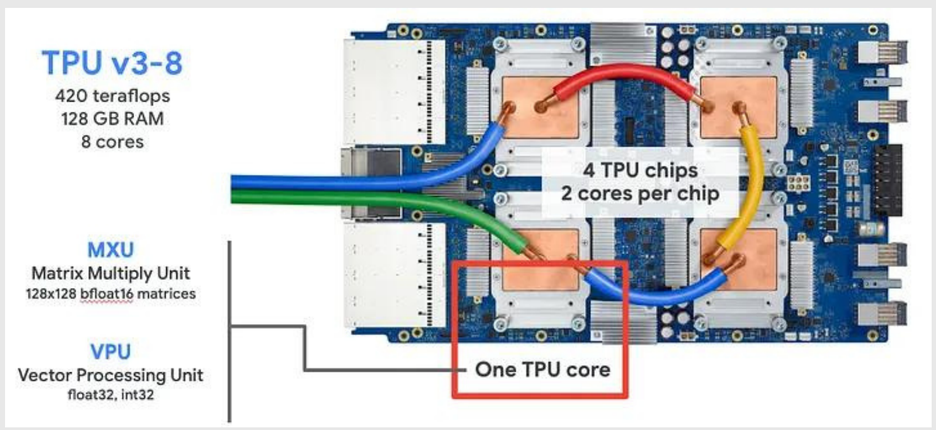
Image classification is the training of models to recognize and categorize objects within images. Machine learning techniques are used to assign labels to pictures for analysis and sorting

What are TPUs

Tensor Processing Units (TPUs) are accelerators developer by Google for machine learning workloads. They are designed to enhance the performance of TensorFlow. TPUs are highspeed processossing units for neural networks. This is what makes neural networks very effective for training and deep learning models.

Kaggle has the option to use TPUs for 20 hours a week. They have version v3 with 8 cores which.

TPUs are great for parallel processing especially in deep learning tasks



Objectives

The objective of the project was to get a glimpse of how TPUs are used for image classification learning. The goal for the project was to achieve a model with an accuracy of 88% on a flower classification problem.

Data

The data is of different types of flowers with 104 different types of flowers to classify.

The data is from Kaggle.com, consisting of TensorFlow Record
files or .tfrec for short. It consisted of 193 files or 5.15GB.

The data consist an image and label for

- 192x192
- 224x224
- 331x331
- 512x512

Classifiers

Convolutional Neural Network (CNN)

- Learn and combine simple patterns into complex features
- Recognizes patterns regardless of where they appear
- Parameter sharing through convolutional filters
- Pooling layers to focus on important features
- Consistent top performance in image classification

Feedforward Neural Network (FNN)

- Data moves from input to output for easy implementation
- Flexible and versatile for tasks like classification and regression
- Simple and straightforward
- Scalability depending on problem
- Great with tabular data

Results

In the end the Convolutional Neural Network proved to be more accurate than the Feedforward Neural Network with an accuracy of 89%