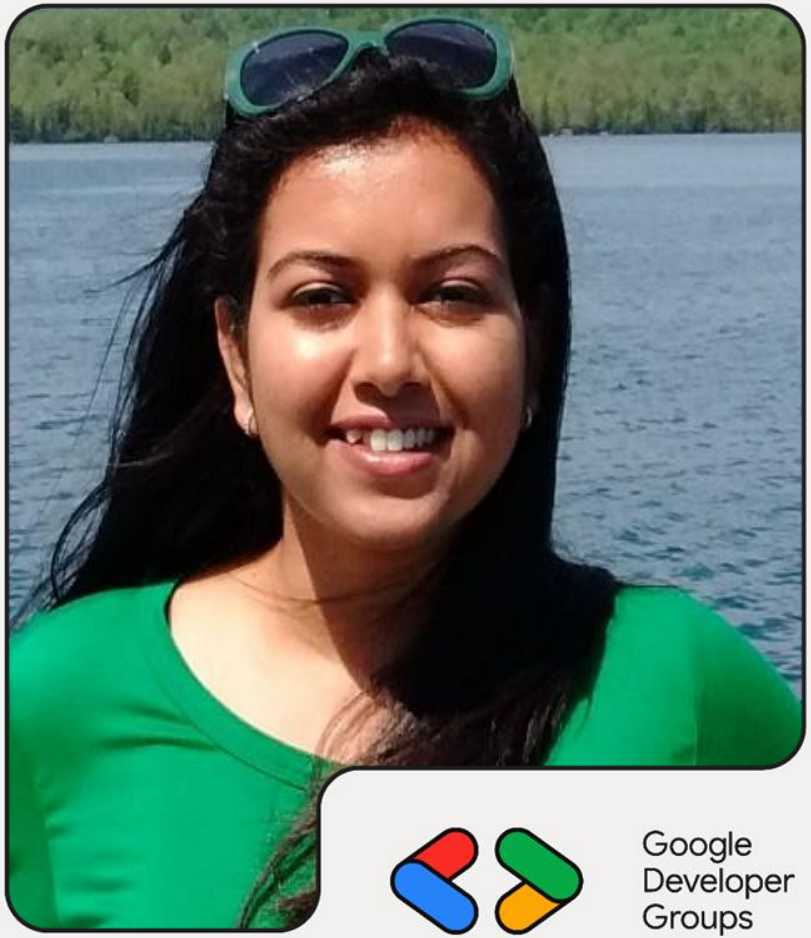
DevFest

Detroit, Michigan

Visualizing Neural Network Training with TensorBoard.

Ankita Guha
Data Analyst Programmer II, Freudenberg e-Power System
PyTorch Ambassador



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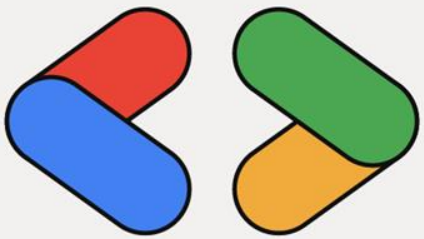
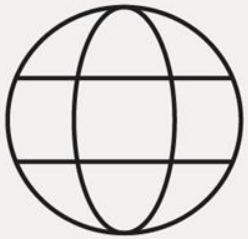
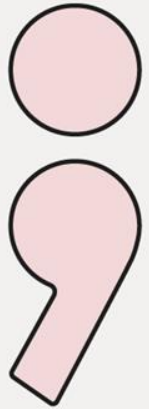



*** Data Source:**
https://github.com/zalandoresearch/fashion-mnist

*** GitHub Repo:**
https://github.com/ankitaguhaoakland/Google-Michigan-Dev-Fest-2025



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Next Steps

1. Download the Fashion-MNIST data source
2. Clone the Repo/Download the Jupyter Notebook
3. Make sure to create your own Virtual Environment
4. Activate your Environment
5. Install all Packages from “requirements.txt” file

Virtual Env Creation & Activation

(1)

Create a new conda environment
conda create -n "VirtualEnvName"
If no Python:
conda create -n "VirtualEnvName" Python 3.11.14

(2)

Open Anaconda: Show List of Environments
conda info --envs

(3)

Activate Environment
conda activate "VirtualEnvName"

(4)

Install all the packages
pip install -r requirements.txt

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Setting Up the Data & Neural Network

- Load, Process and Transform the Data (Image Sample).
- Split the data into Training & Testing dataset.
- Use “DataLoader” to build the Data Pipeline.
- Label the Data to identify various Images.
- Visualize few sample Data Images.
- Architecture of CNN.
- Define Learning Rate & Momentum.

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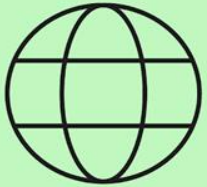
TensorBoard: Model Training Visualization



- ❑ Set up the TensorBoard
- ✓ Make sure to install "tensorboard" & "TensorFlow" before running the "*tensorboard --logdir=runs*“
- ✓ To make localhost visible to everyone: "*tensorboard --logdir=runs --bind_all*“
- ❑ Writing initial “Images” should be visible on TensorBoard
- ❑ Models Inspection: “Graphs” on TensorBoard
- ❑ Statistical Data Analysis: “Projector” on TensorBoard
- ❑ Model Performance Tracking: “Scalars” on TensorBoard
- ❑ Model Prediction: “Images” on TensorBoard
- ❑ Assessing Model Training: “PR Curves” on TensorBoard

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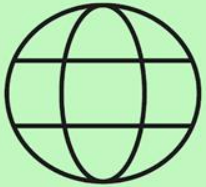

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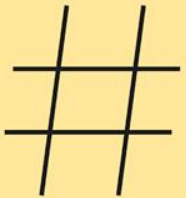
Initial Image Grid: IMAGES



TensorBoard - GRAPHS: TPU Compatibility

TensorBoard TIME SERIES IMAGES

Show actual image size

Brightness adjustment

RESET

Contrast adjustment

RESET

Runs

Write a regex to filter runs

fashion_mnist_experiment_1

TOGGLE ALL RUNS

runs

Filter tags (regular expressions supported)

four_fashion_mnist_images

four_fashion_mnist_images fashion_mnist_experiment_1

step 0 Wed Nov 05 2025 19:47:29 Eastern Standard Time

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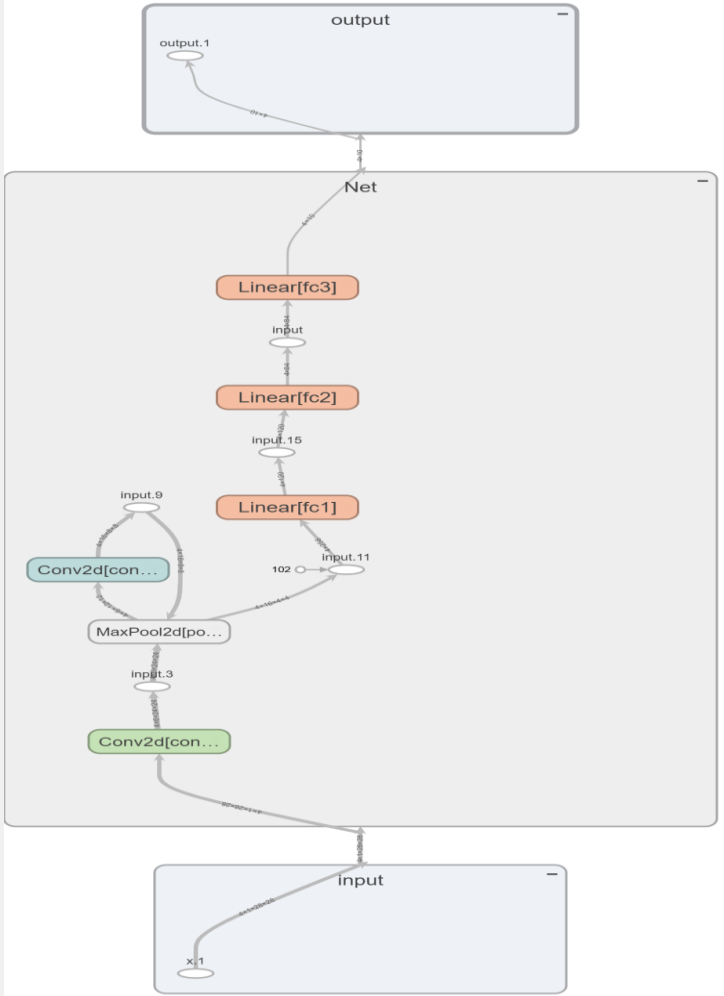
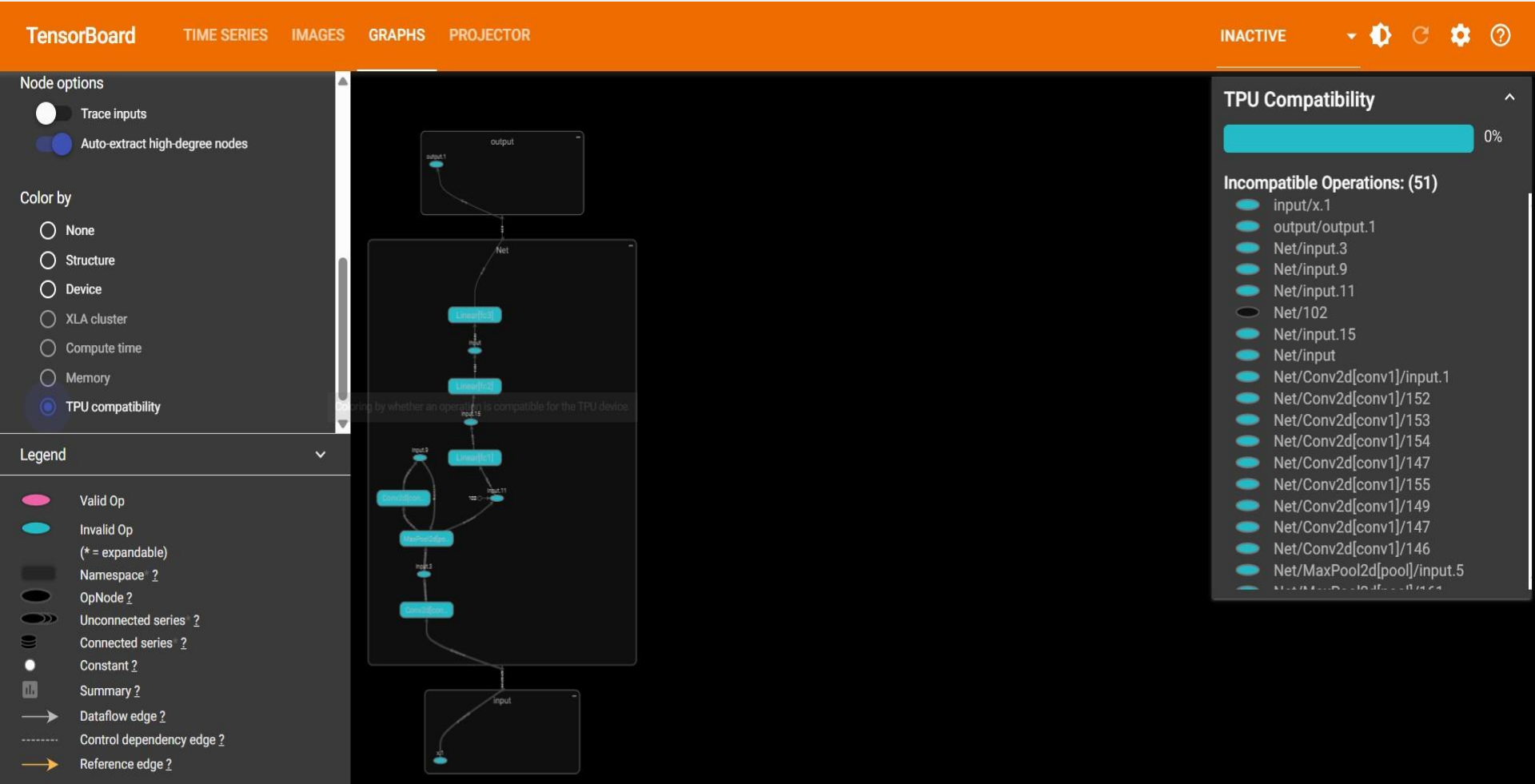
Models Inspection: GRAPHS

NN Architecture – LeNet

1. Classical LeNet-like or LeNet-derived.
2. Simplification and modernization of the original LeNet-5 architecture developed by Yann LeCun.
3. Two Convolutional Blocks (Conv-Pool Sequence): Sequential Nature of alternating Convolution & Pooling Layer > Spatial Features.
4. Full Connectivity for Classification: Model flattens resulting feature maps into a single vector and uses three standard fully-connected (dense) layers for classification.



TensorBoard - GRAPHS: TPU Compatibility



Statistical Data Analysis: PROJECTOR

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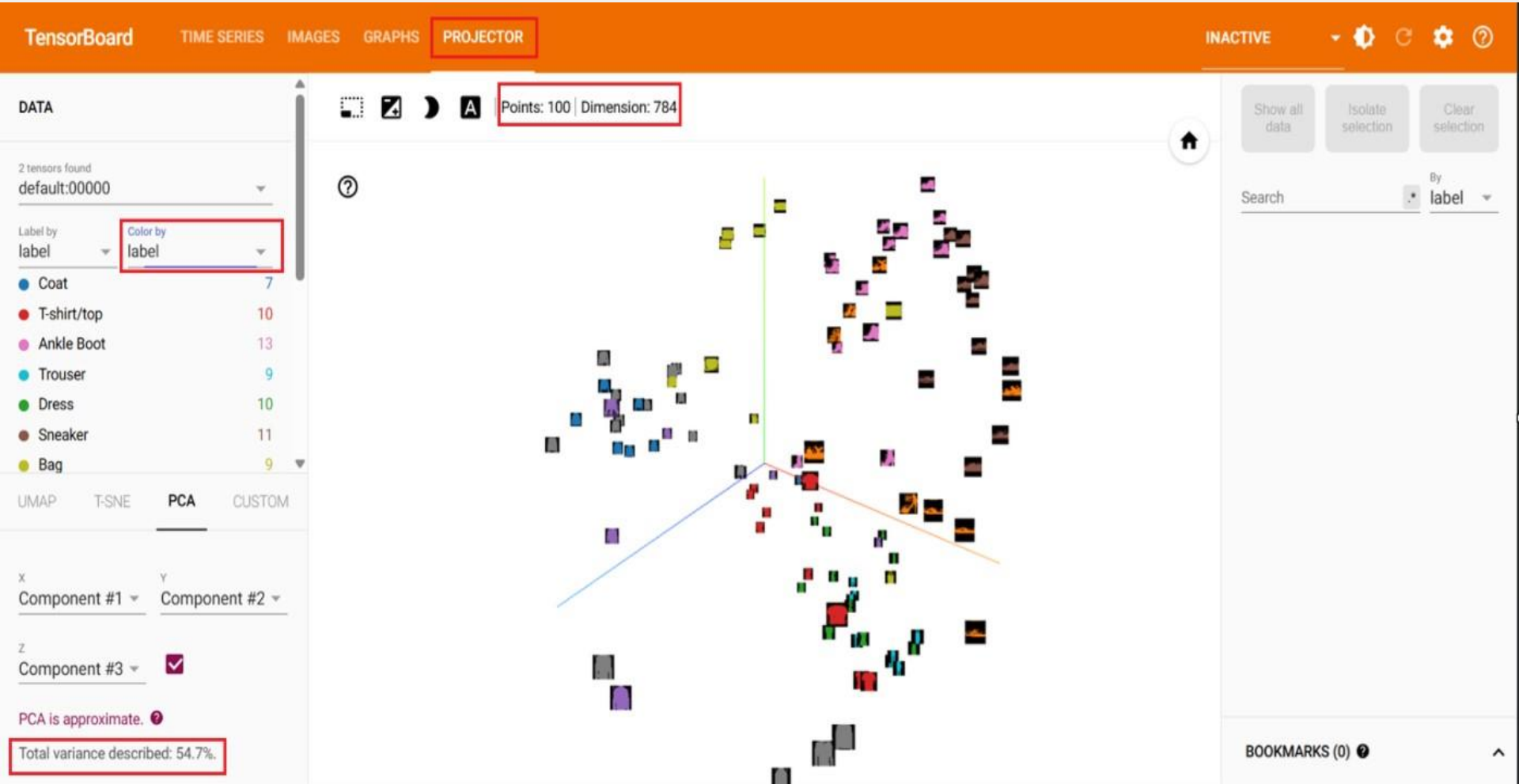
Statistical Data Analysis: PROJECTOR

TensorBoard - PROJECTOR



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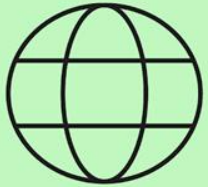
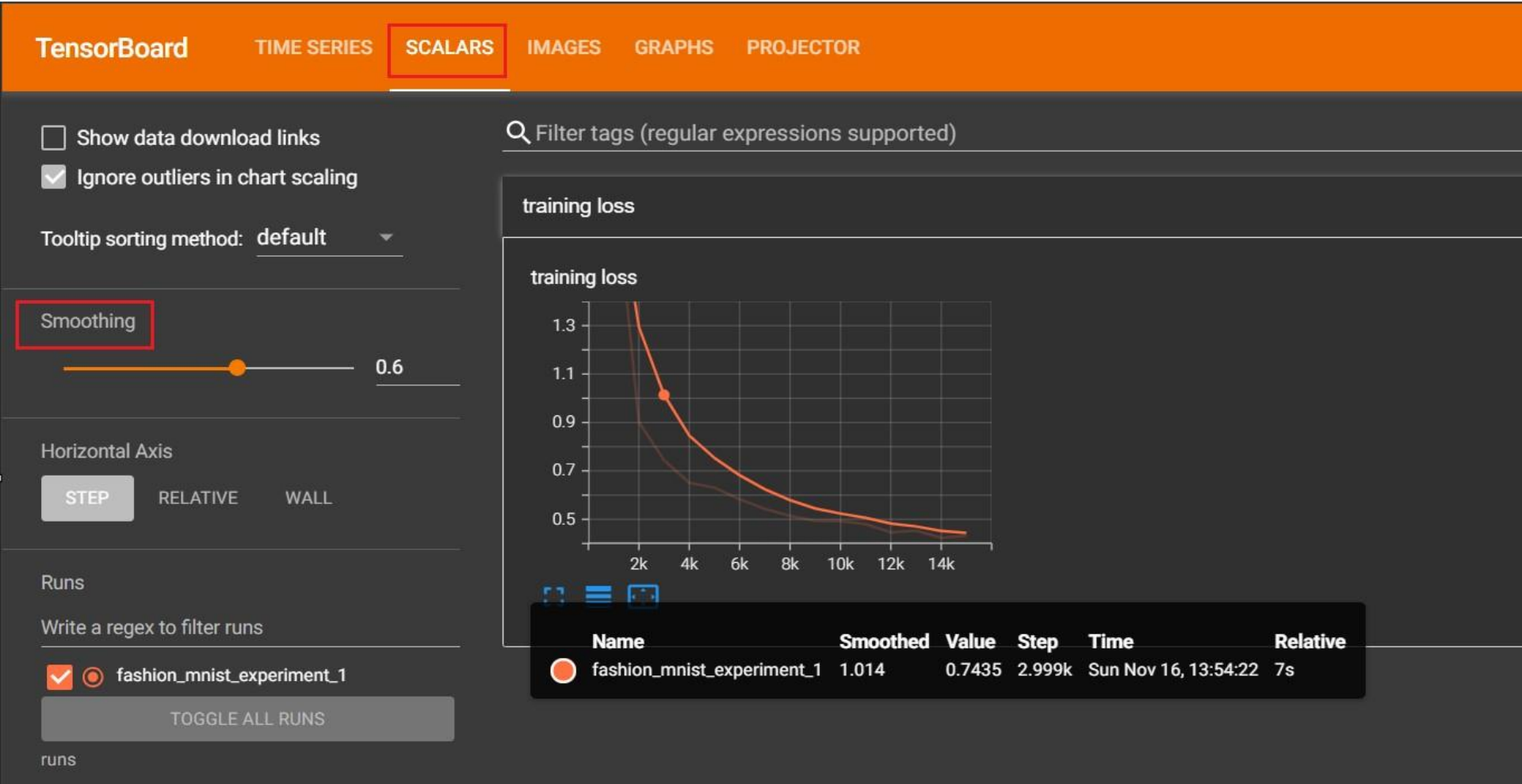
Model Performance Tracking: SCALARS



TensorBoard - IMAGES



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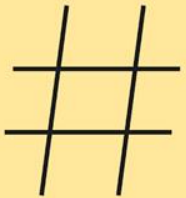
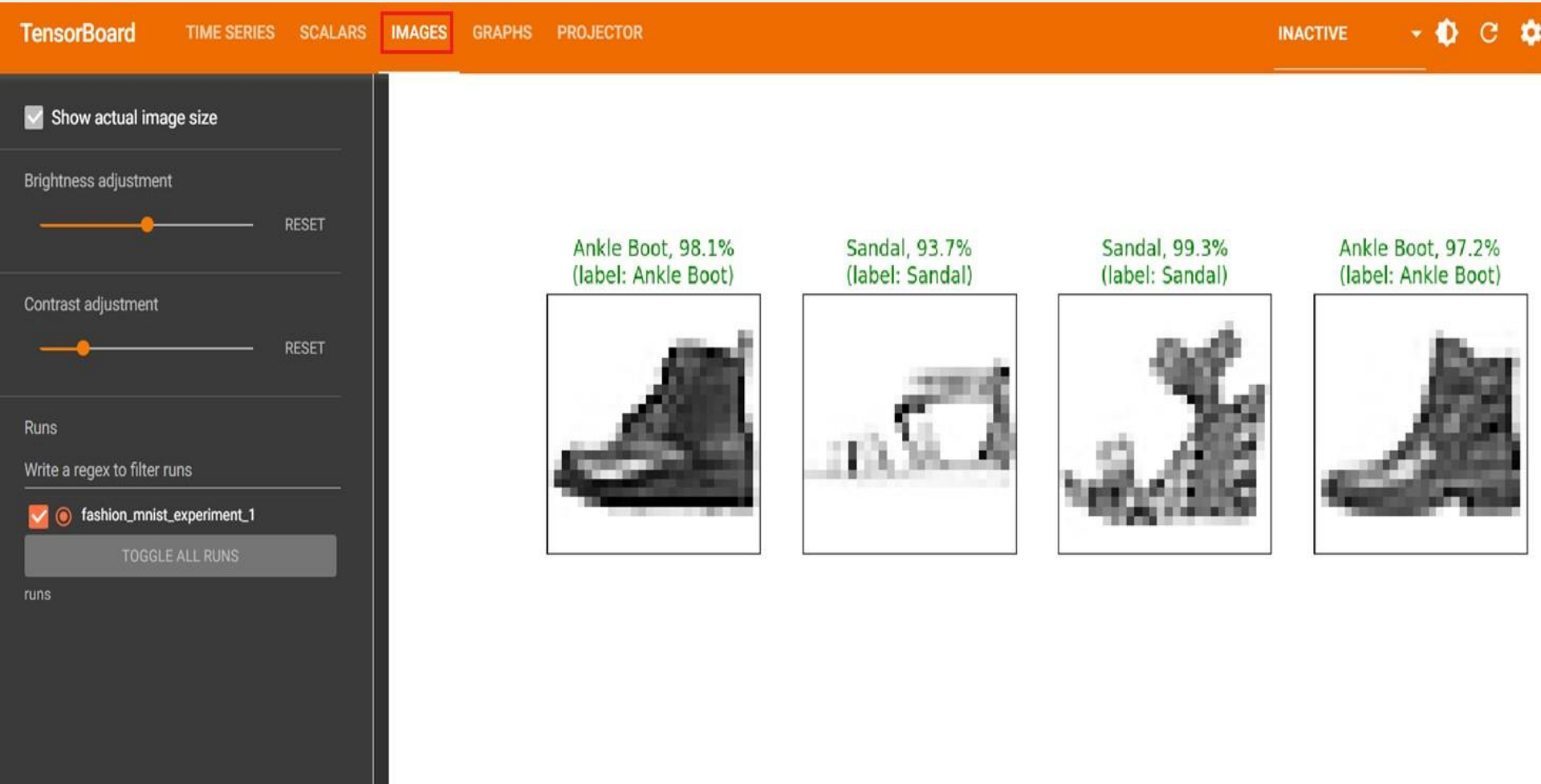
Model Prediction: IMAGES



TensorBoard - IMAGES LABELLING



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Assessing Models Training: PR CURVES

TensorBoard - PR CURVES

References

Citations

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- **PyTorch:** https://docs.pytorch.org/tutorials/intermediate/tensorboard_tutorial.html
- **CNN Image Processing:** https://svitla.com/blog/cnn-for-image-processing/
- **CNN Architecture Diagram:** https://www.linkedin.com/pulse/what-convolutional-neural-network-cnn-deep-learning-nafiz-shahriar/

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PyTorch AMBASSADOR

Ankita Guha

Data Analyst Programmer II, Freudenberg

SCAN ME

Invitation to join PyTorch Community Michigan

HAPPY TO CONNECT!

Ankita Guha

Data Analyst Programmer | PyTorch Ambassador ’25 | Women Tech Makers Am...