Is the Mars Curiosity Rover taking a selfie?

Scott Armstrong
DSI 2020, 9 June 2020
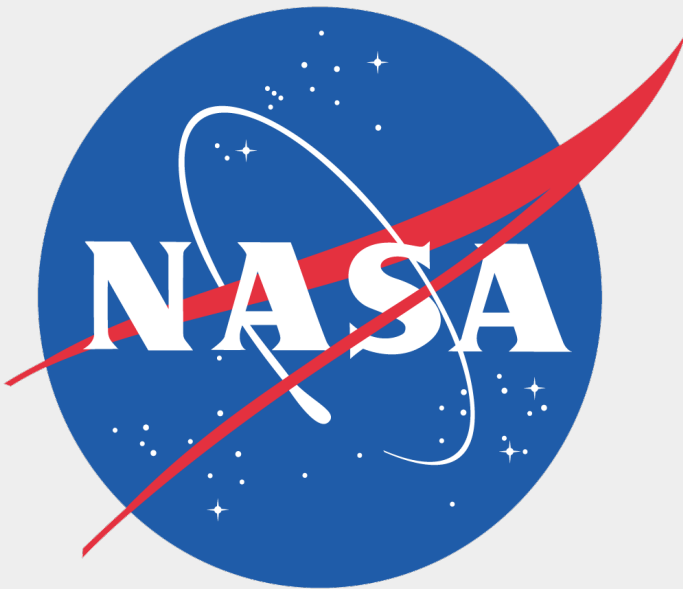
Dataset

Deep Mars: CNN Classification of Mars Imagery for the PDS Imaging Atlas

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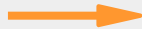[2]Information Sciences Institute, University of Southern California, Marina Del Rey, CA 90292, tg@isi.edu
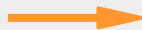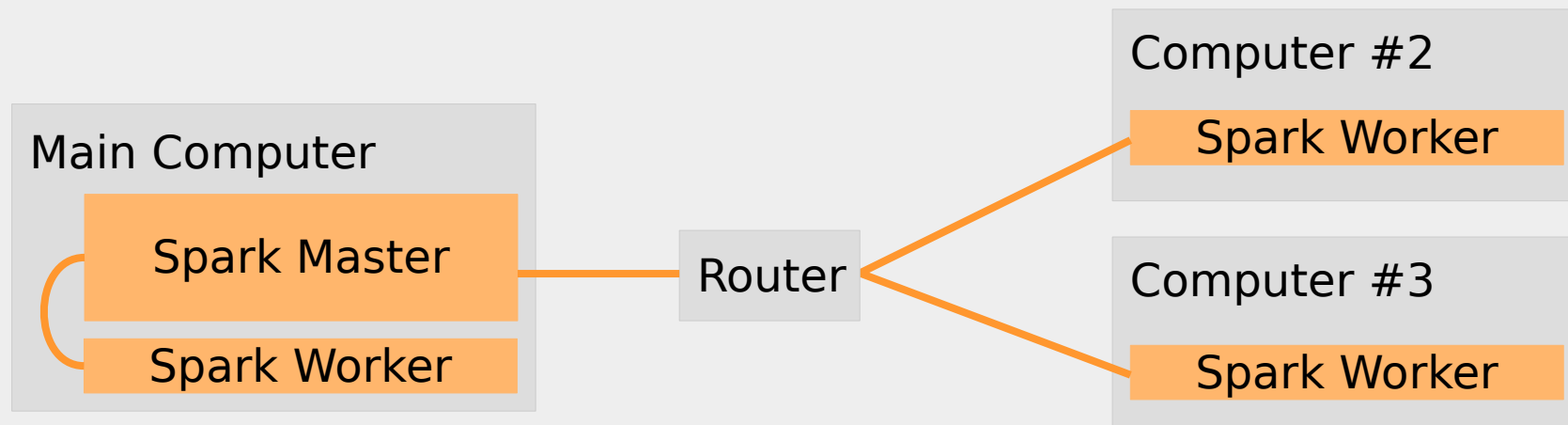
Images

#nofilter

Processing

imageTrain.csv

id, pixel 1, pixel 2, …
0, 124, 103, …
1, 114, 148, …
…

Distributed Training

Scala (Java) → Spark is cross-platform

Main Computer
- Spark Master
- Spark Worker

Router

Computer #2
- Spark Worker

Computer #3
- Spark Worker

Master
Runs main process, distributing
requests among workers

Worker
Completes requests of master
and sends back result

5

Results

MLP NN   → 11% accuracy

Linear SVM   → 17% accuracy

Random Forest → **75%** accuracy
- 256 trees
- max depth 16 nodes

Next Steps

Improve images
- Color
- Larger images
- Augmentation

Improve distribution
- Distributed file management
- Image processing in Scala

Thank you