



Moedal ML: 13th Sep

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What Exists

Data

- DataSet of 441 gifs
Fullsize images covering an entire foil. 8 Fresnel channels, backlit, halo
- Sub-Set of 2500 gifs
Cropped 28x28 images, same size as MNIST, 8 channels.
Not all labeled, or of regions of interest

Code

- Data-Collection from foil using smartscope routine. Can change parameters. (zoom)
- Scripts for renaming, converting, cropping
- TensorFlow code for creating 'tf.Datasets'





ML: Mini-Analysis

- Use 28x28 x8 pixel images
- Caputres moedal pit
- Same size as MNIST + 'fashion MNIST' canonical image classification examples

Challenges: *Short term*

LABELS

- Labelling
~400 images per foil
~400 small images
- I.e., 160,000 total
to label from on foil
- -----
- Temporary 'Get
something out'
approach.

BUGS

- Previous code for classifying
w. flat images
- Was Stuck on bug with
network, multichannel
adaptation
- Found source – conflict w
code / wrapper functions
adapted from tf 1.5 vs newer
tf1.9
- 2d / 3d conv non-trivial
- depth vs channels vs frames,
hardcoded / optimised

Bug fixes / TF mechanics

- Update to newer 'canonical' ways of doing things. Keras, Layers, ..
- Much of which is designed to simplify / avoid / automate common errors
- Adapt work into more professional 'framework' type design, vs hacked together quicker – simpler - shorter

2d vs 3d image problem resolved

Convert to greyscale – swap frames vs channels – spoof 2d convolution



Labelling

- ArXiv MinerVa paper on DCNNs / DANNs
- arXiv:1808.08332v1
- Provide work around for labelling shortage
- Auto-encoders mentioned last meeting

Domain Adversarial Neural Networks

- Can Augment unlabeled, unsupervised learning in one 'Domain' via transfer learning from another
 - Eg, train FCNN to search over entire images, with training on small / cropped
- Source Domain, eg
 - Cropped images
 - Different Channels
 - Labels
 - Target Domain
 - Unlabelled
 - Similar + Different
 - Low-res

Avenues

- Label with magnified set
 - ML with low zoom

- Use Unsupervised techniques to accelerate labeling

- ‘Off the shelf’
Transfer learning
/ imagenet

- Auto-Encoders
 - Image segmentation