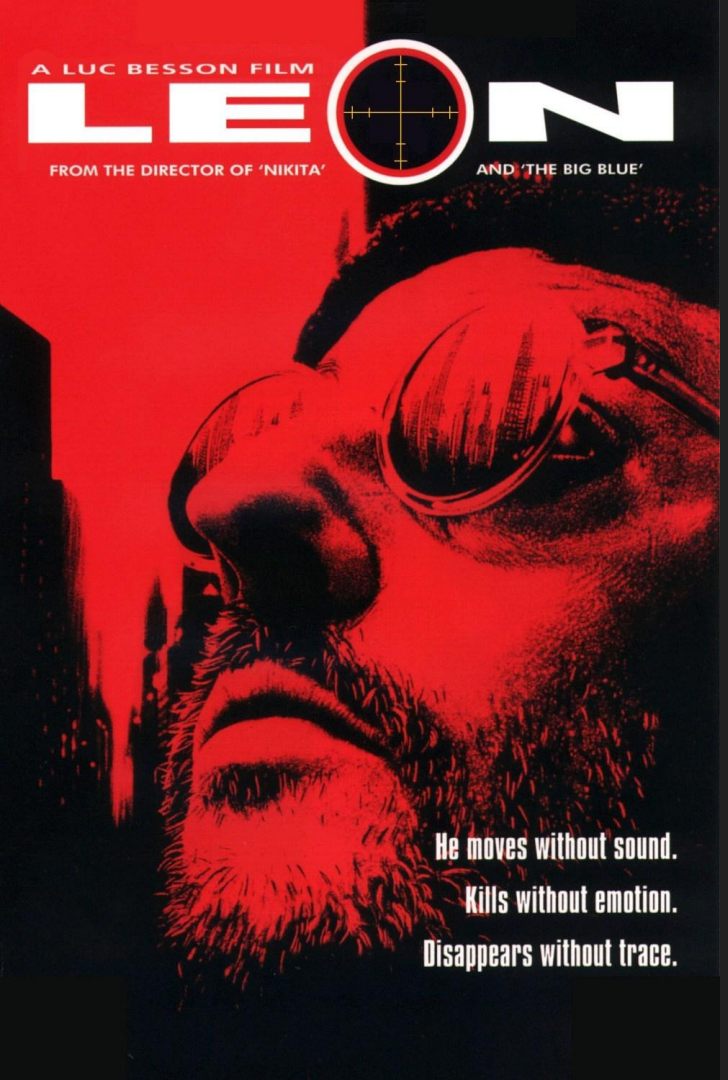

MARIANA

The **Cutest**
Deep Learning
Framework

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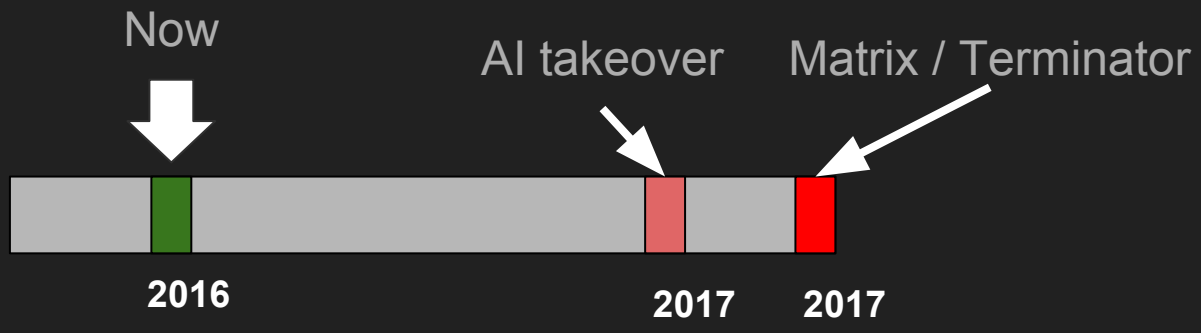
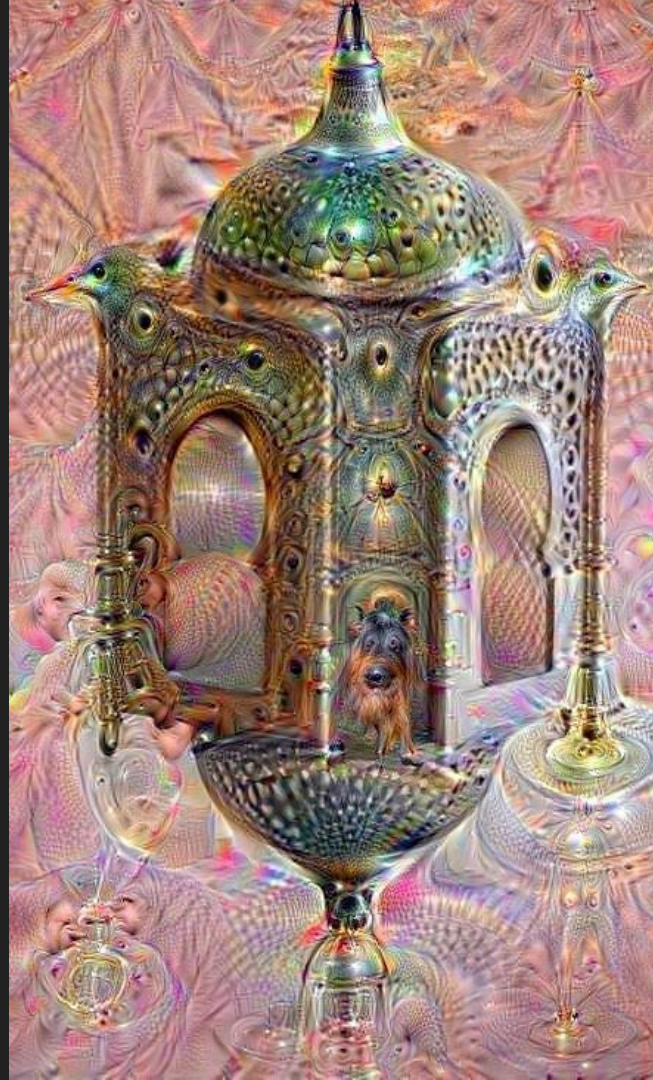
The **Cutest**
Deep Learning
Framework

Deep Learning is Hot

- Deep Learning is getting out of the labs
- Big companies are interested
- There's is more ML being done
- More people want to learn it
- **It works**: Alipanahi et al. Nature Biotechnology, 2015



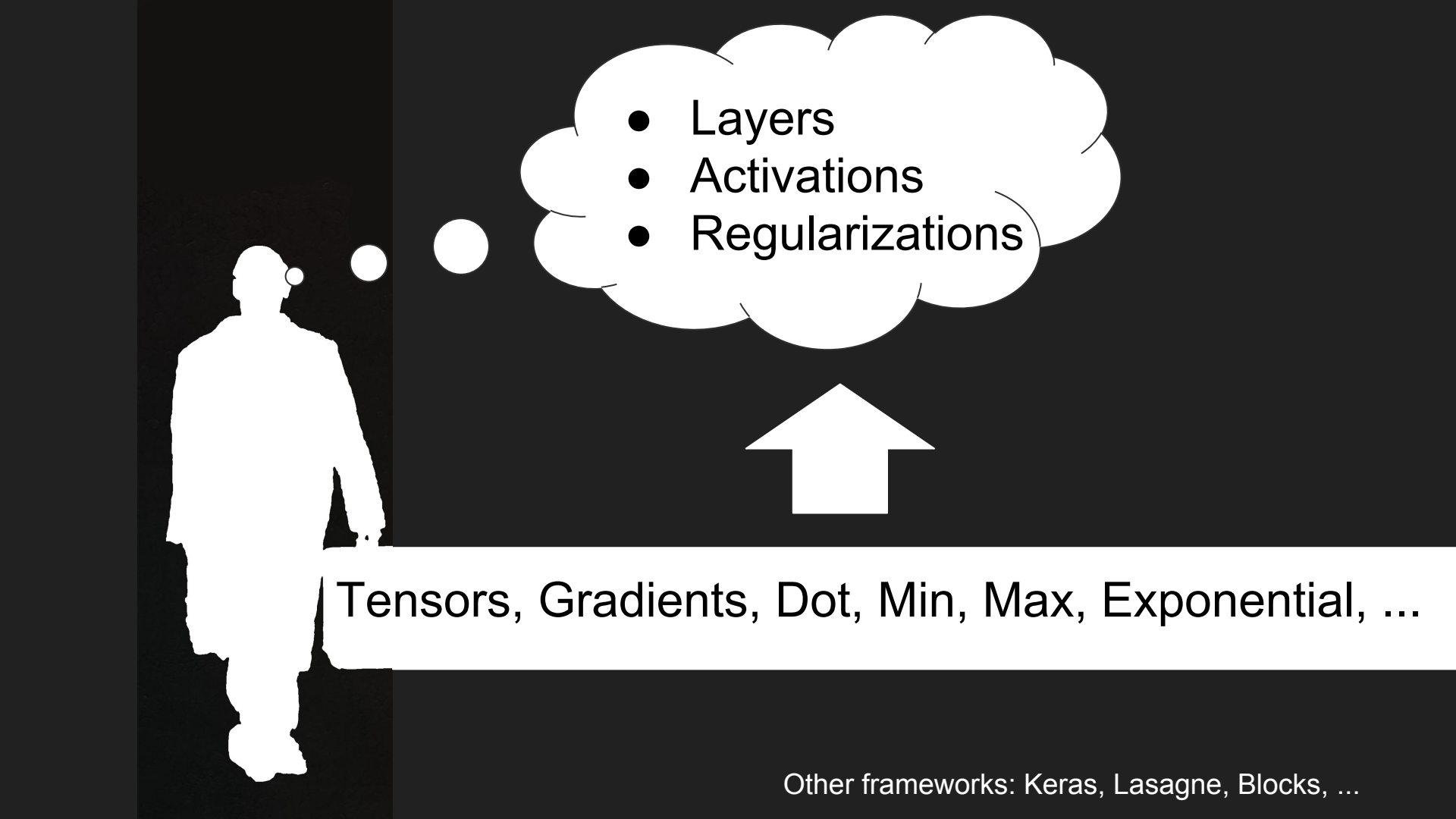


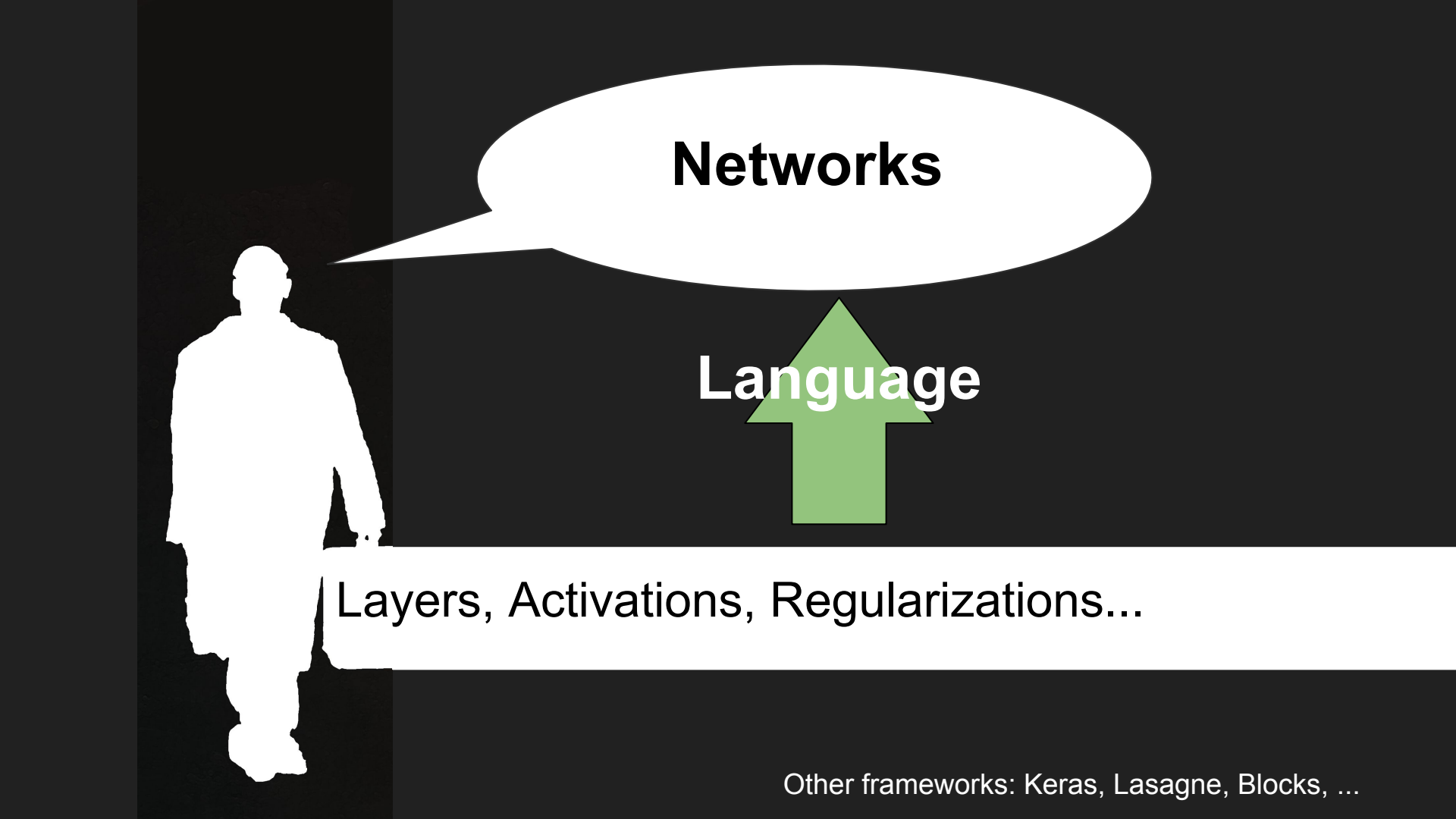
- Repetitive
- Time consuming
- Hard to debug
- Hard to teach

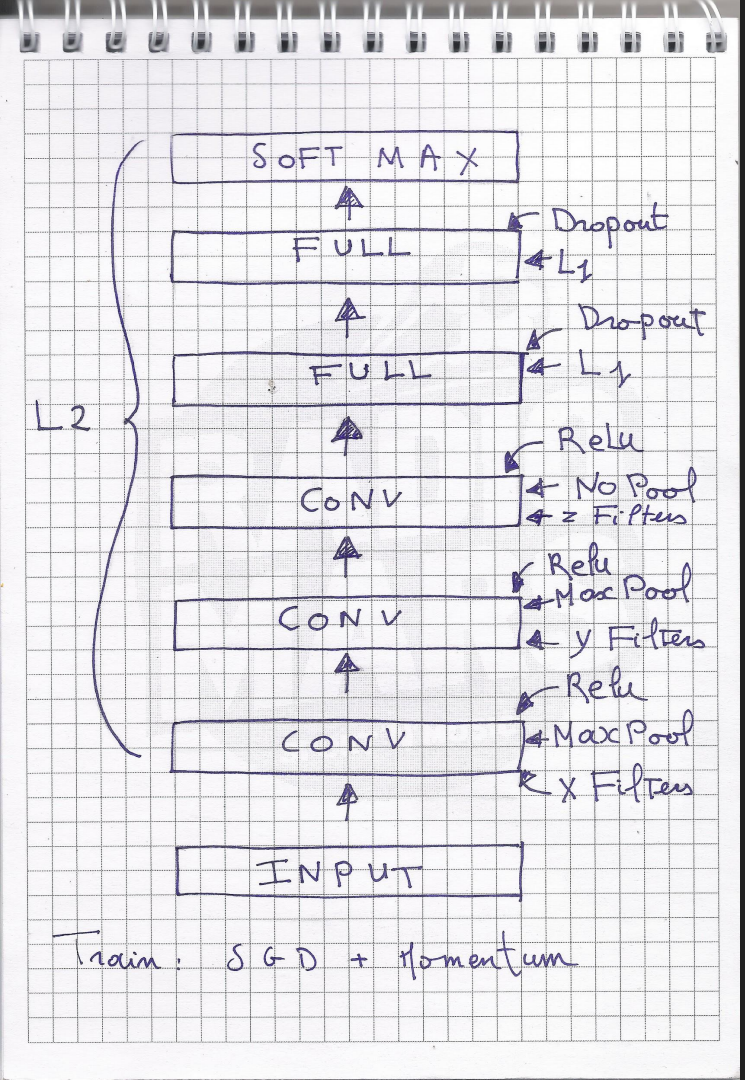
- Very Hard to learn

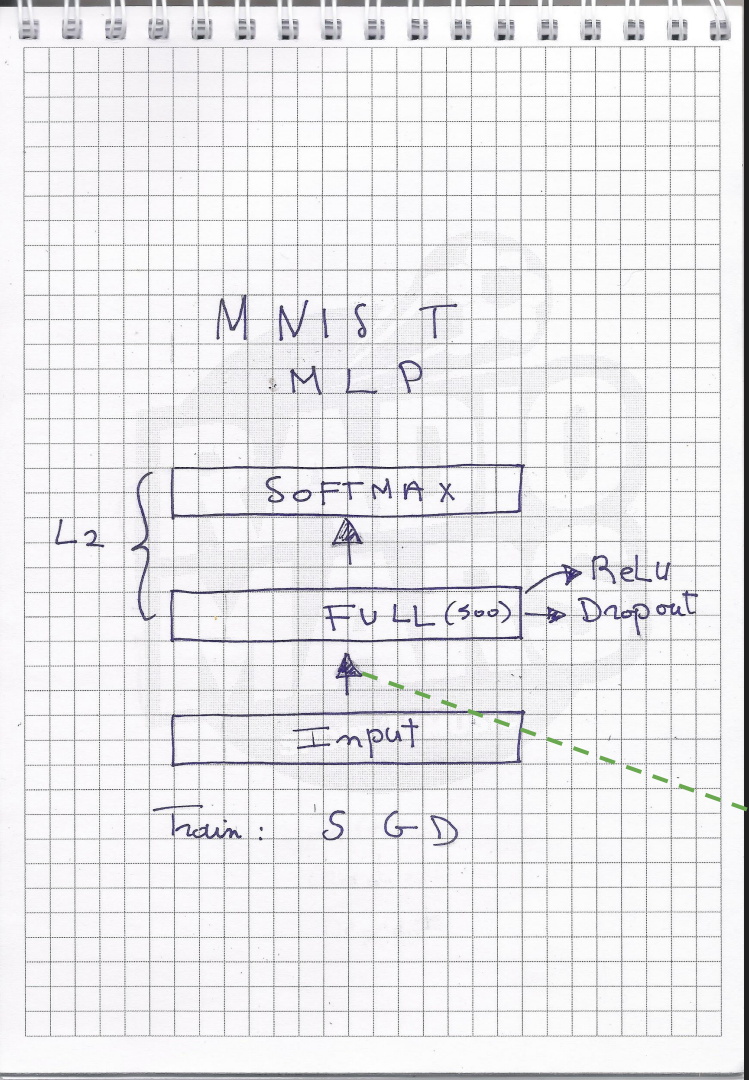
Neural Nets Complexity

Leon minimalist poster by landlcreations

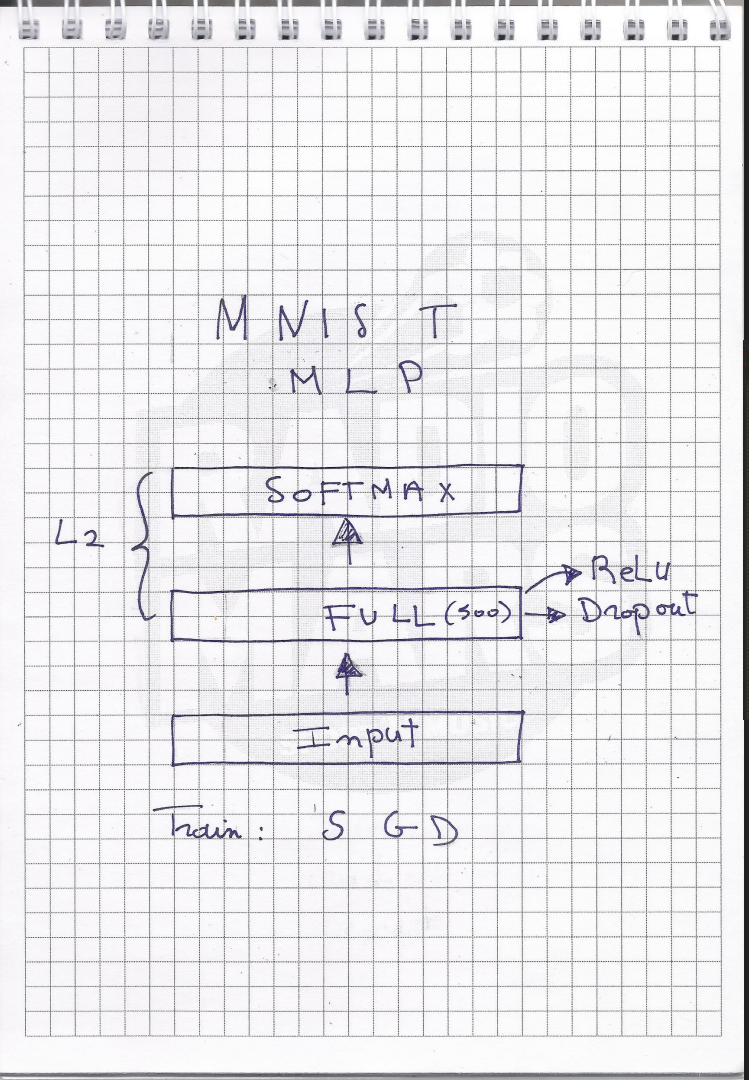

Layers
Activations
Regularizations
Tensors, Gradients, Dot, Min, Max, Exponential, ...
Other frameworks: Keras, Lasagne, Blocks, ...


Networks
Language
Layers, Activations, Regularizations...
Other frameworks: Keras, Lasagne, Blocks, ...

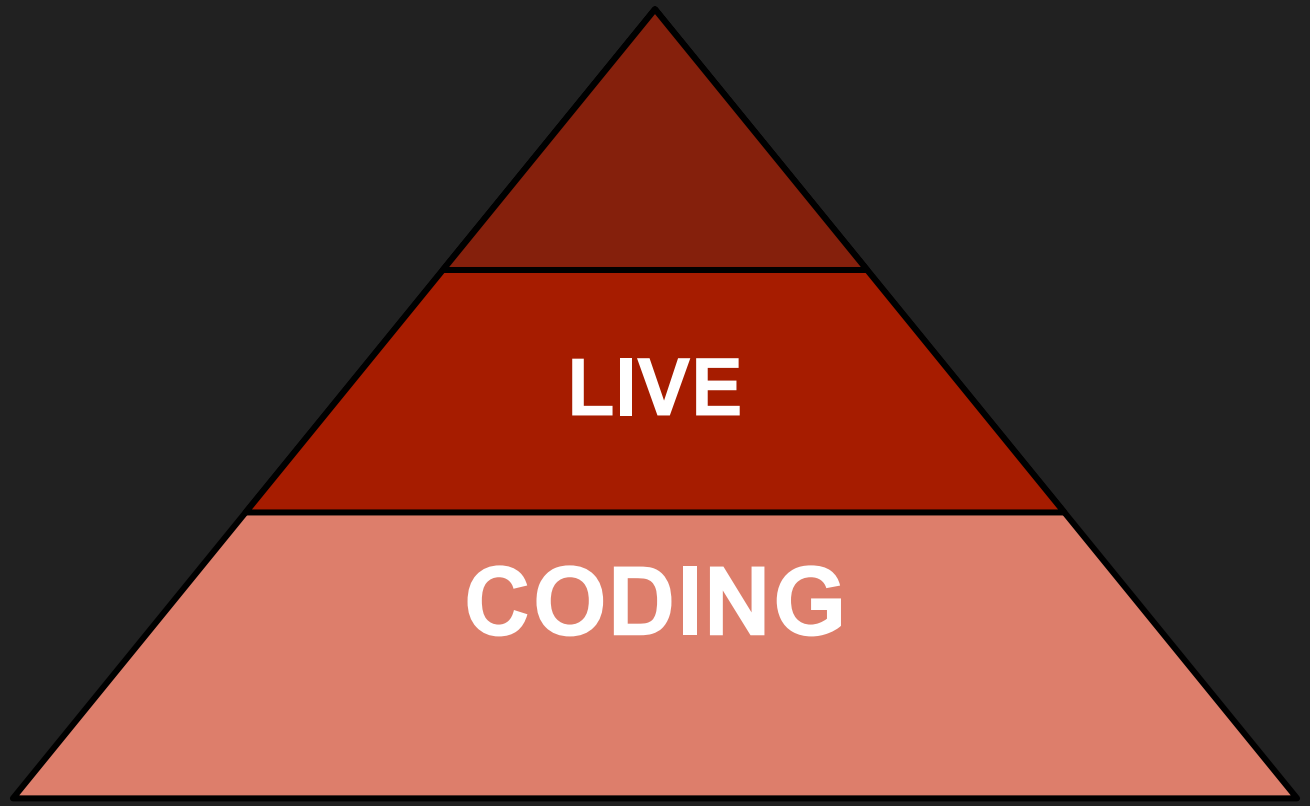

SOFT MAX
FULL
Dropout
L_1
FULL
Dropout
L_1
L2
Relu
CONV
No Pool
z Filters
Relu
CONV
Max Pool
y Filters
Relu
CONV
Max Pool
x Filters
INPUT
Train: SGD + Momentum




```
ls = MS.GradientDescent(lr = 0.01)
cost = MC.NegativeLogLikelihood()

i = ML.Input(28*28, name = 'InputLayer')

h = ML.Hidden(500,
    activation = MA.ReLU(),
    decorators = [MD.BinomialDropout(0.1)],
    regularizations = [ MR.L2(0.0001) ],
    name = "Hidden" )

o = ML.SoftmaxClassifier(10,
    learningScenario = ls,
    costObject = cost,
    regularizations = [ MR.L2(0.0001) ],
    name = "OutputLayer")

mlp = i > h > o
```




```
for epoch in xrange(100) :
    for i in xrange(0, len(train_set[0]), miniBatchSize) :
        score = MLP.train("OutputLayer",
            InputLayer = train_set[0][i : i +miniBatchSize],
            targets = train_set[1][i : i +miniBatchSize] )[0]

    valScore = MLP.test("OutputLayer",
        InputLayer = validation_set[0],
        targets = validation_set[1] )[0]
```


LIVE
CODING

Special Thanks

- Testers:
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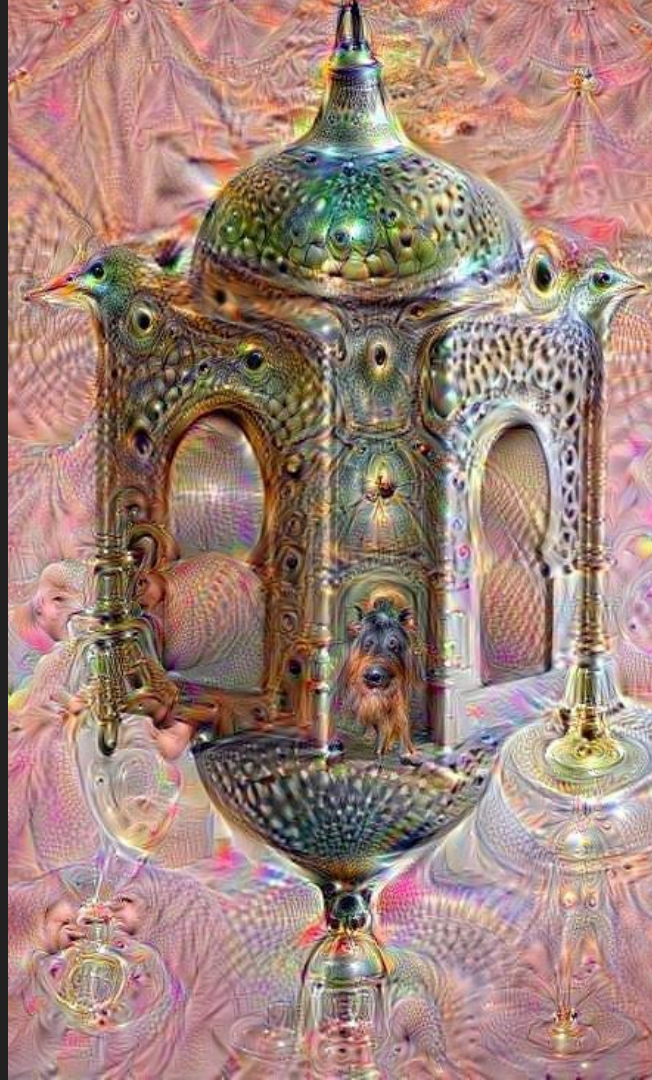
  - Assya Trofimov (IRIC, UdeM)
- Theano devs:
  - Frédéric Bastien (MILA, UdeM)
  - Pascal Lamblin (MILA, UdeM)
- Supervisors:
  - Claude Perreault (IRIC, UdeM)
  - Sébastien Lemieux (IRIC, UdeM)



Thank You!

- **Full Documentation**:
  - tariqdaouda.com

- **Code + Examples**
  - **Github**: tariqdaouda/Mariana