Week 1 Comprehensive

TOTAL POINTS 10

1. Which of the following are necessary for supervised machine learning? (Choose all that are correct) 1 point

- [x] Labeled training data
- [x] Learning from data
- [ ] Human to teach the machine
- [x] A model

2. What decision boundary can logistic regression provide? 1 point

- (•) Linear
- ( ) Jagged edges
- ( ) Arbitrarily complex functions
- ( ) Smooth curves

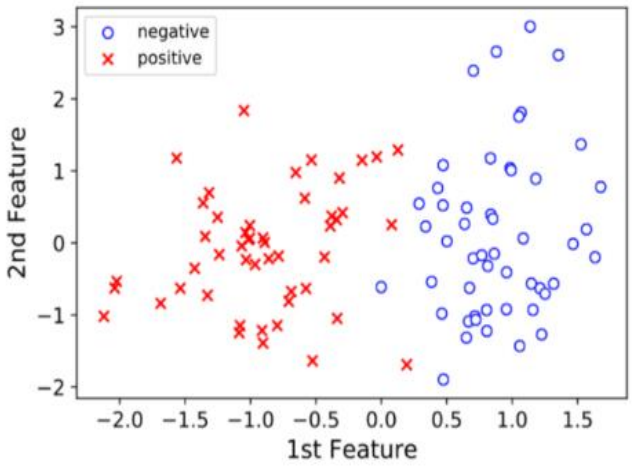
3. What is the primary advantage of using multiple filters? 1 point

- ( ) More complexity is always better.
- ( ) This requires less compute power.
- (•) This allows the model to look for subtypes of the classification.
- ( ) This is simpler to implement.

4. Which one of the following best describes transfer learning in the context of document analysis? 1 point

- ( ) All parameters of the model are different between individuals.
- ( ) Parameters at the top of the model are transferable across all people and documents, while the parameters at the bottom are different between individuals.
- ( ) All parameters of the model are transferable across all people and documents.
- (•) Parameters at the bottom of the model are transferable across all people and documents, while the parameters at the top are different between individuals.

5. Given the following image of data classifications, which of the following models would you choose? 1 point



- (•) Logistic regression
- ( ) Multilayer perceptron

6. What new feature did neural networks acquire in 2010? 1 point

- ( ) A new computational platform: the GPU
- ( ) A new operation: convolution
- ( ) A new application: image search
- (•) A new name: Deep Learning

7. Which of the following is convolved with layer 2 features, or sub-motifs? 1 point

- ( ) Layer 2 feature map
- ( ) Layer 3 feature map
- (•) Layer 1 feature map

8. Which of the following gives the best conceptual meaning of convolution? 1 point

- ( ) Stacking a collection of feature maps.
- ( ) Surveying a feature map for high-level motif.
- (•) Shifting a filter to every location in an image.
- ( ) Selecting an atomic element from an image.

9. What does transfer learning mean in the context of medical imaging? 1 point

- ( ) Once the convolutional layers are learned from labeled medical images, the top layers can be inferred from the parameters found with data from ImageNet.
- ( ) Just as assigning categories to images in ImageNet required millions of images, so too does analyzing medical images require millions of labeled medical images.
- (•) Weights of convolutional layers learned from ImageNet transfer to medical images, so we only need learn new parameters at the top of the network.
- ( ) Sufficient labeled radiological images can be used to learn all of the model parameters, so they can be used for ophthalmological or dermatological images.

10. What is the primary advantage of having a deep architecture? 1 point

- ( ) The parameters of a deep architecture are less expensive to compute.
- ( ) There is a higher probability that each motif is used in the classifier.
- (•) The model shares knowledge between motifs through their shared substructures.
- ( ) A model can learn each top-level motif in isolation.