ML Questions

Lecture 1

1. _____ find the model that best explains the data: simple and fits well.
    a. Modeling
    b. **Estimation**
2. ____ choose the class of models that the learning algorithm will choose from.
    a. **Modeling**
    b. Estimation
3. _____ evaluate the learned model and compare to solution found using other model classes.
    a. **Validation**
    b. Testing
4. ____Training data includes desired outputs
    a. Supervised learning
    b. Unsupervised learning
5. ____Training data includes a few desired output
    a. Weakly supervised learning
    b. Semi-supervised learning
    c. **both**
6. The goal of Machine Learning is_____
    a. predict future data
    b. improve their performance of the task
    c. **both**
7. Dimensionality Reduction

a. **Discrete**

b. Continuous

8. Output y for each input x is the “supervision” that is given to the learning algorithms Can be **easy** to do (False)
9. Speech Recognition is the application of _____

    a. **Classification**

    b. Regression

10. ___they should normally be invariant

    a. **Robust**

    b. Discriminating

    c. Reliable

    d. Independent

11. _____separated and nonoverlapping

    a. Robust

    b. **Discriminating**

    c. Reliable

    d. Independent

12. ____all objects of the same class should have similar values

    a. Robust

    b. Discriminating

    c. **Reliable**

    d. Independent

13. _____is uncorrelated

    a. Robust

    b. Discriminating

    c. Reliable

d. **Independent**

14. _____ Given some set of features with corresponding labels, learn a function to predict the labels from the features
    a. **Learning a classifier**
    b. Testing a classifier
15. _____ is/are Model Class
    a. Random Forest
    b. Markov nets
    c. Model ensembles
    d. **All**
16. a core task of computer vision
    a. **Image Classification**
    b. Image Regression
17. Nearest Neighbor Classifier Function is
    a. train(train_images,train_labels)
    b. train(train_labels,train_images)
18. train(train_images,train_labels) used to
    a. **remember images**
    b. predict image
19. ____ is a kind of parameter that cannot be directly learned from the regular training process.
    a. “higher-level” properties
    b. hyperparameters
    c. **a, b**
    d. Super parameter

20. $= \sum_{p} |I_1^p - I_2^p|$

    1. **Manhattan distance**
    2. Euclidean distance

21. What is the best value of k in the Nearest Neighbor Algorithm?
    a. 5
    b. 10
    c. **none of that**

22. _____ output y has the form of one or more real numbers
    a. Classification
    b. **Regression**

23. Weather prediction is the Application for _____
    a. Classification
    b. **Regression**

24. Density estimation is the Example of _____
    a. Classification
    b. **Regression**

25. Map each data point to a discrete cluster can be
    a. flat
    b. hierarchical
    c. **both a,b**

26. Dimension reduction used for _____
    a. compression
    b. visualization

c. noise reduction

d. **All**

27. in Dimension reduction _____

    a. target value given

    b. **target value not given**

28. in Clustering _____

    a. target value given

    b. **target value not given**

29. Decompose images or texts into groups of regions or words that often co-occur (topics) is an example of

    a. Supervised Learning

    b. **Unsupervised Learning**

Lecture 2

1. Object _____ is recognize instance of category

    a. **Categorization**

    b. Identification

2. _____ exact pixels of the object

    a. Object Detection

    b. **Object segmentation**

3. _____ location of the object

    a. **Object Detection**

    b. Object segmentation

4. ____Construct a good decision boundary

    a. **Discriminative model**

    b. Generative model

5. _____need a target output
    a. Discriminative model
    b. Generative model
    c. **both**
6. _____separately model class conditional , prior
    a. Discriminative model
    b. Generative model
7. in NMS remove boxes with _____ overlap
    a. **high**
    b. low
8. A holistic description of image content can be
    a. grayscale
    b. colored
    c. **both**
9. ____ Feature extraction sensitive to a small shift
    a. **Pixel-based**
    b. Gradient-based
10. Gamma Compression is _____Performance Improvement
    a. High
    b. **small**
11. HOG is the example of Feature extraction _____
    a. Pixel-based
    b. **Gradient-based**
12. In SVM

$$: \quad w^T x_n + b \geq 0$$

    1. **Positive**
    2. Negative
13. **Support Vectors** are the nearest vector to the hyperplane
14. if features are, not 2d
    a. replace the line with a hyperplane
    b. use nonlinear SVM
    c. use kernel
    d. **All**
15. Margin Width =

$$\frac{2}{|w|}$$

16. ____ the equation to maximize margin

$$\Phi(w) = \frac{1}{2} w^t w$$

$$y_i(wx_i + b) \geq 1$$

    1. **minimize**
    2. maximize
17. Sliding Window is
    a. Low Computational Complexity
    b. **High Computational Complexity**

Lecture 3

1. activation function _____

a. **usually nonlinear**

b. usually Linear

2. neural network method of determining the weights on the connections called _____

   a. training

   b. learning

   c. algorithm

   d. **all**

3. rectified linear activation is **softplus** function, Binary Function is a **Heaviside**

4. a smooth approximation to the rectifier is a _____

   a. Binary step function

   b. sigmoid activation function

   c. hyperbolic tangent

   d. **rectified linear activation function**

5. ____is always positive function

   a. Binary step function

   b. **sigmoid activation function**

   c. hyperbolic tangent

   d. **rectified linear activation function**

6. Binary step function is a ___

   a. Heaviside function.

   b. threshold Function

   c. **both**

7. _____Single-Layer (Feedforward) Networks

   a. **output units are not connected to other input units**

   b. output units are connected to other input units

8. Example of Recurrent or feedback net

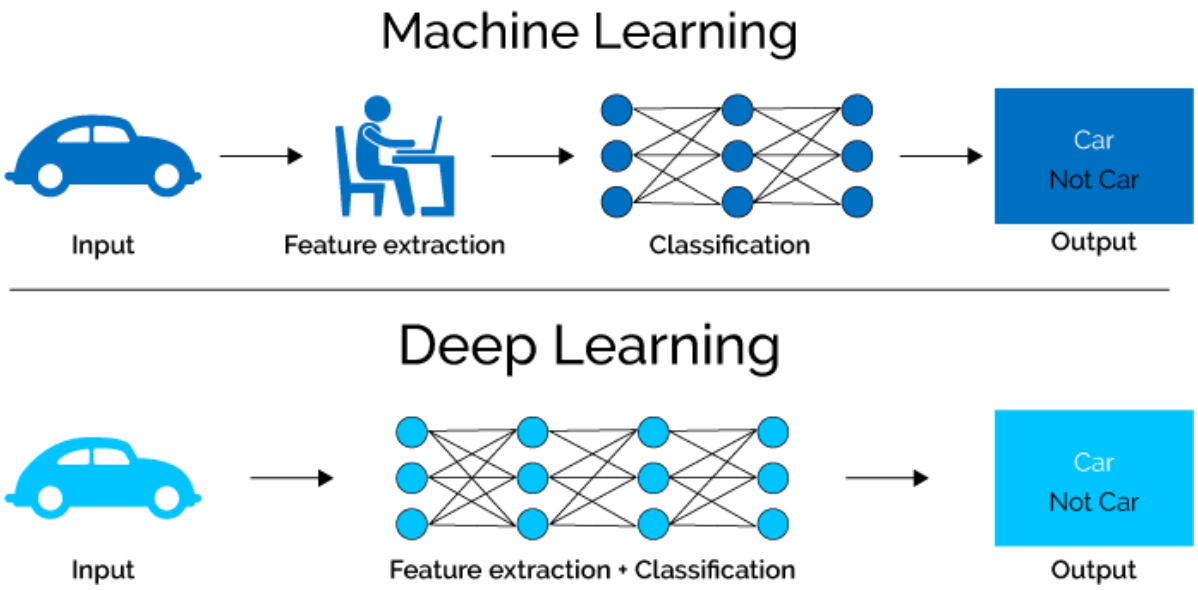
a. **RNN**

9. Softmax activation function
    a. positive
    b. used for multi-class classification
    c. **a,b**
    d. Negative
10. **visual cortex** is the part of the brain responsible for processing visual information that we get from our retina
11. receive information from other neurons through
    a. **dendrites**
    b. soma
    c. axon
    d. synapses
12. _____ is generated at neuron only if it receives enough (over some threshold) of the ‘‘right’’ pattern of _____ from other neurons
    a. **action potential ,spikes**
    b. spikes , action potential
13. the frequency of the spikes, called ____
    a. action potential
    b. **firing rate**
14. depending on the _____ , a neuron can either work to increase (excite) or decrease (inhibit) the firing rate of another neuron
    a. **dendrite and axon “الكبل اللي بنقل فيه والمستقبلات العصبيه”**
    b. soma , axon
15. like a synapse_____ “مين اللي هيخرج من السنابس ؟ اللي واخد اهميه اكبر”
    a. **weights**

16. activation function and bias like ____
    a. **cell body =soma اللي بيعمل بروسيس للحاجه**
17. activation corresponds to a ‘‘sort of ’’ firing rate

Lecture 4

1. _____learning of feature hierarchies representations in each layer of deep learning
    a. supervised
    b. unsupervised
    c. **a or b**
2. Deep learning methods have ____
    a. **nonlinear processing units.**
    b. linear processing units.
3. features in deep learning extracted _____



    1. before classification
    2. **with classification**

3. after classification

4. mid level extract features from low level **(true)**
5. Convolutional Neural Networks are designed to recognize ____patterns
    a. visual
    b. handwritten
    c. **both"اختار الاتنين لو مافيش visual" ⇒ عشان هو الهدف الاساسي**
6. feature map contain hidden units , cover different positions called
    a. **parameter share**
    b. local connectivity
7. reduces the number of hidden units in hidden layer
    a. parameter share
    b. local connectivity
    c. **Pooling**
8. Modify the pixels in an image based on some function in
    a. **Convolution layer**
    b. ReLU
9. ReLU layer
    a. **Non Linear**
    b. Linear
10. _____is the core building block of a CNN.
    a. **Convolution layer**
    b. ReLU
11. ______Better gradient propagation
    a. **ReLU**
    b. Sigmoid
12. ____ mean of of Sparse activation

a. only some of hidden units are activated

13. The network is trained by stochastic **gradient descent**
    a. **backpropagation**
    b. forward propagation
14. Batch Norm is a normalization technique done ____
    a. **between the layers of a Neural Network**
    b. in the raw data

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