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youva

Q 6 A

Sol:

By Markov chain property

$P \{ \text{Dry, Rain, Rain, Dry} \}$

$$= P(\text{Dry} | \text{Rain}) \cdot P(\text{Rain} | \text{Rain}) \cdot P(\text{Rain} | \text{Dry}) \cdot P(\text{Dry})$$

$$= (0.7) \cdot (0.3) \cdot (0.2) \cdot (0.6)$$

$$= \underline{0.0252}$$

Q8A] Discuss the structure of RBFN and how it can be used to solve non-linearly separable pattern?

Ans:

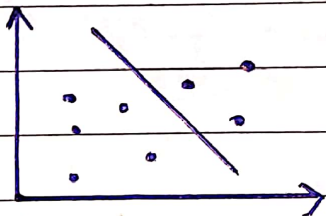
Kernel:

- A kernel is a similarity function.
- Some algorithms use a set of mathematical functions that are defined as the kernel.
- The function of the kernel is to take data as input and transform it into required form.
- It is a function provided to a machine learning algorithm.
- Example: Linear, Non-linear, Polynomial, Radial basis function.

Classifying non-linearly separable data:

- ① To predict if a dog is a particular breed we load millions of dog's information like type, height, skin color.
- ② In machine learning language these properties are referred as features.
- ③ A single entry of these lists of features is a data instance which the collection of everything is training data which forms the basis of your reduction.

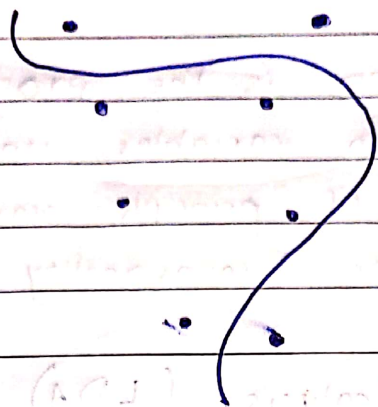
④ SVM



- ⑤ The hyperplane of a two dimensional space is a line dividing the red and blue balls.
- ⑥ Data (all breeds of dog) + features (skin color, health) → learning algorithm



- ⑦ If we want to solve following example in linear manner, it is not possible to separate by straight line.



- ① In machine learning, "kernel" is usually used to refer to the kernel trick, a method of using a linear classifier to solve a non-linear problem.
- ② It entails transforming linearly inseparable data like linearly separable ones.
- ③ The kernels' function is what is applied on each data instance to map the original non-linear observation into a higher dimensional space in which they become separable.
- ④ Using dog example, instead of defining a slew of features you define a single kernel function to compute similarity between breeds of dog.
- ⑤ You provide this to kernel, together with data and labels to the learning algorithm and outcomes a classifier.
- ⑥ Mathematical Function :  $k(x, y) = \langle f(x), f(y) \rangle$
- $k$  = kernel function
  - $x, y$  are  $n$  dimensional inputs
  - $f$  is a map from  $n$  dimensional to  $m$ -dimensional space (usually  $m > n$ ).

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Q 6 B PCA vs ICA

### Principal Component Analysis

- ① It reduces the dimensions to avoid the problem of overfitting.
- ② It deals with principal component.
- ③ It focuses on maximizing variance.
- ④ It focuses on mutual orthogonality property of principal components.
- ⑤ It does not focus on mutual independence of component.

### Independent Component Analysis

- ① It decompose the mixed signal into its independent source's signal.
- ② It deals with independent components.
- ③ It doesn't focus on the issue of variance among the data points.
- ④ It does not focus on the mutual orthogonality of components.
- ⑤ It focus on mutual independence of component.