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AIDS Sem 7

23/06/2022

Theory Most Repeated (10M)

- * Defuzzification Methods (5/10M)
 - ↳ Centroid method
- * CNN architecture (10M)
- * Cognitive Computing (10M) (used in Healthcare application)
- * ANN architecture (10M)
- * What is Multi-Modal application? Explain the data Science for multimodal applications (10M)
- * Short note on Trends in Data Science for audio (10M)
- * Bayesian Belief Network (10M)
- * What is Markov Decision system? List primary components
- * Illustrate autoencoder with architecture diagram
- * How to improve the classification accuracy of
- * Imbalanced data. Explain with examples
- * Using XOR function explain using McCulloch-Pitts (binary)
- * Explain Random forest? Does Random forest need pruning, explain in detail.
- * Ensemble Methods & describe any one
- * Illustrate usage of taxonomies & ontologies for knowledge representation in cognitive system.
- * Case Study on book recommendation sys / video recommendation sys
- * State & elaborate applications of deep learning
- * Properties of fuzzy sets with example

Repeated 3 times (May 25, May 24, May 23)

* Using Mamdani Fuzzy model design a fuzzy logic controller

to determine the wash time of domestic washing machine

Assume inputs are dirt & grease on clothes. Use 3

descriptors for each input variable & five descriptor

for output variables. Derive necessary membership

functions & required fuzzy rules for applications

* List 3 Industries where data science is extensively used

and briefly describe one application in each industry

* Describe NLP in support of Cognitive sys

* Explain LSTM

* Explain different types of membership functions used

in fuzzy logic with example

Differentiate crisp set & fuzzy set based on

structure, interpretation & applicability in real-world

* Explain any 4 metrics for evaluating classifier performance

Discuss any two cross-validation methods.

How Bagging and Boosting handle bias-variance trade-off differently, and analyze their effectiveness in dealing with noisy data and overfitting. Explain with algorithmic such as Random Forest and AdaBoost.

Explain the role of machine learning in multimodal applications. Discuss how different data modalities (text, audio, image, and video) are integrated to improve the performance and user experience of these systems with real time applications.

Short notes

Time 2011A

(100%) 100% 100% 100% 100%

- 1) Implement AND function using Mc-Culloch Pits
- 2) Limitations of deterministic approaches & how probabilistic reasoning addresses the limitations.
- 3) Different activation function in neural network
- 4) ANN vs RNN
- 5) Role of utility & expected utility in decision Theory
- 6) Fuzzyness vs Probability
- 7) Baye's Theorem
- 8) Mc-Culloch Pits neuron
- 9) Bootstrap for sampling
- 10) Bagging vs Boosting
- 11) From a standard deck of playing cards a single card is drawn. The probability that a card is King is $1/52$.
(To calculate posterior probability: $P(\text{King} | \text{Face})$, which means the drawn card is face card and is King card)
- 12) Defuzzifications.
- 13) Significance of ROC curves
- 14) Holdout method & Random Subsampling
- 15) Design Principle of Cognitive Systems
- 16) Application of data science for text

100% 100% 100% 100% 100%

Numericals

- ① Numerical on fuzzy sets
- ② Accuracy, Precision, Recall, Sensitivity & Specificity, F1-Score
- ③ Confusion Matrix
- ③ Toothache & cavity Probability