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Question Paper Code : 20039

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fourth Semester

Artificial Intelligence and Data Science

AD 8002 – HEALTH CARE ANALYSIS

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the various elements in a patient's HPI section in the chief complaint component.

2. Describe about SNOMED.CT

3. Define sensitivity and specificity. Why are they used?

4. Write a short note on one-hot encoding scheme for categorical variables.

5. List the benefits of NoSQL cloud databases compared with the traditional database management frameworks.

6. Illustrate histogram bin shifting.

7. State the various kinds of noise that affects ECG signal analysis.

8. What do you understand by morphological analysis in NLP?

9. Mention the components of the EGG signal.

10. Write a brief note on Poincare plot method.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the basic principles of probabilistic reasoning with Bayes theorem. Illustrate the use of Bayesian theorem in clinical settings with a suitable example.

Or

(b) Describe the various parts that comprise a clinical code in standardized clinical codesets. What are the major differences between ICD-9 and ICD-10 clinical coding standards?

12. (a) Mention the various techniques that can be used for exploring and visualizing different types of clinical data. Demonstrate any one popular method used to assess the variability and outliers in given binary/categorical data.

Or

(b) What is pandas DataFrame? Explain how the operations of label-based indexing and slicing can be performed on a DataFrame, with a suitable example.

13. (a) Discuss how Agent and Ontology-based Information Sharing (AOIS) Systems are designed and leveraged as a Healthcare Semantic Frameworks.

Or

(b) With a neat diagram, describe the components and working of a Knowledge based Clinical Decision Support System.

14. (a) How is the Pan-Tompkins Algorithm employed for real-time detection of QRS in biomedical signals? Demonstrate the process.

Or

(b) What is concept-based extraction in a clinical NLP system? Explain its purpose and working with detailed examples.

15. (a) Discuss the HAG program initiated for measuring inpatient care quality in hospitals. List the different hospital-acquired infections that are considered for the assessment.

Or

(b) Explain in brief the process of identifying patients who are at a high risk of all-cause mortality with the next 6 months, using available clinical data of the patients.

PART C — (1 × 15 = 15 marks)

16. (a) Describe the various parametric techniques used for Power Spectral Density analysis of ECG signals. Also, demonstrate how a PSD plot is generated for a patient with cardiac disease.

Or

(b) Discuss the common database security threats that may cause clinical database breaches. How can these be mitigated using a matrix block cipher system? Analyze the requirements and explain the process in detail with a neat diagram.

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