JSPM UNIVERSITY PUNE
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Faculty of Science and Technology

School of Computational Sciences

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Assignment 2/ Question Bank

Pattern Recognition

M-Tech (DSAI)

Semester III

Course Code:230GCSM18_03

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1. **Define clustering. Differentiate between similarity and dissimilarity measures with suitable examples.**
2. **List and explain the key criteria used to evaluate the quality of clustering results.**
3. **What is meant by unique clustering? Provide an example where clustering results may not be unique.**
4. **Explain the minimum within-cluster distance criterion and discuss its significance in clustering.**
5. **Compare Euclidean distance, Manhattan distance, and Cosine similarity/distance in clustering applications. Highlight their strengths and limitations with examples.**

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6. **Explain the K-Means clustering algorithm step by step with the help of a simple example.**
7. **Describe the working principle of DBSCAN and explain how it identifies clusters of arbitrary shapes.**
8. **Discuss how DBSCAN handles noise and outliers differently compared to K-Means.**

9. **Define the problem of feature selection. Why is it important in machine learning applications?**
10. **Differentiate between sequential forward selection (SFS) and sequential backward selection (SBS) algorithms with a suitable example.**
11. **Explain how feature selection helps in reducing overfitting and improving model interpretability.**
12. **Discuss real-world applications where feature selection plays a critical role (e.g., healthcare, text mining, image recognition).**

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