

## Long Questions

1. Discuss various community detection algorithms in social networks and compare their effectiveness.
2. Explain the importance of community detection in social network analysis with suitable examples.
3. Describe the modularity optimization method for community detection. What are its strengths and limitations?
4. How does the Louvain method work for community detection? Illustrate with an example.
5. Compare and contrast the Girvan-Newman algorithm and the Label Propagation algorithm for community detection.
6. Discuss the role of edge betweenness in community detection. How is it calculated?
7. Explain the concept of overlapping communities. How can they be detected in social networks?
8. Describe the hierarchical clustering approach to community detection. Provide an example of its application.
9. What is the significance of community evaluation in social networks? Discuss different metrics used for this purpose.
10. Explain the concept of normalized mutual information (NMI) in the context of community evaluation.
11. How can the modularity score be used to evaluate the quality of detected communities? Discuss its advantages and limitations.
12. Discuss the role of ground truth communities in evaluating community detection algorithms.
13. What are information diffusion models in social media? Explain with examples.
14. Describe the SIR model for epidemic spreading in social networks. How does it differ from the SIS model?
15. Explain the concept of herd behavior in social media. Provide examples of its impact.
16. Discuss the mechanisms behind information cascades. How can they be modeled in social networks?
17. What is the diffusion of innovations theory? How does it apply to social media platforms?
18. Analyze the factors that influence the spread of information in online social networks.

19. Discuss the role of influencers in the diffusion of information. How can their impact be measured?
20. Explain the concept of homophily in social networks. How does it affect information diffusion?
21. Discuss the relationship between influence and homophily. How can they be distinguished in social network analysis?
22. How can assortativity be measured in social networks? Discuss its implications for community structure.
23. Explain the concept of assortative mixing. How does it differ from disassortative mixing in social networks?
24. Discuss methods to measure influence in social media. Provide examples of their application.
25. How can homophily be quantified in a social network? Discuss different approaches.
26. Describe a method to distinguish between influence and homophily in social network analysis.
27. Discuss the challenges faced in making recommendations in social media environments.
28. Explain collaborative filtering techniques for recommendation systems. How do they work in social media?
29. Compare content-based and collaborative filtering approaches for recommendation systems.
30. Discuss the importance of incorporating social context in recommendation systems. Provide examples.
31. Explain the concept of social influence in recommendation systems. How can it be leveraged?
32. Discuss the use of graph-based algorithms in social media recommendations. Provide examples.
33. How can trust be incorporated into recommendation systems in social media?
34. Describe the matrix factorization technique for recommendations. How is it applied in social media?
35. Discuss the role of user profiling in social media recommendation systems.
36. Explain hybrid recommendation systems. How do they combine different approaches?
37. Discuss the challenges in evaluating recommendation systems in social media.

38. What metrics are used to evaluate the performance of recommendation systems? Explain with examples.
39. How can user feedback be used to improve recommendation systems in social media?
40. Discuss the impact of data sparsity on recommendation systems. How can it be addressed?
41. Explain the concept of cold start in recommendation systems. How can it be mitigated?
42. Discuss the use of machine learning in enhancing social media recommendation systems.
43. Explain the collaborative filtering approach for detecting communities in social networks.
44. How can sentiment analysis be integrated into recommendation systems for social media?
45. Discuss the ethical considerations in designing recommendation systems for social media platforms.
46. Explain how recommendation systems can handle dynamic changes in user preferences.
47. Discuss the role of privacy concerns in the design of social media recommendation systems.
48. How can temporal dynamics be incorporated into social media recommendation systems?
49. Explain the use of deep learning techniques in improving recommendation systems for social media.
50. Discuss the importance of explainability in recommendation systems. How can it be achieved?
51. How can network analysis techniques be applied to enhance recommendation systems?
52. Discuss the trade-offs between accuracy and diversity in recommendation systems.
53. Explain the concept of serendipity in recommendation systems. How can it be achieved?
54. How can recommendation systems be personalized for individual users in social media?
55. Discuss the challenges of scaling recommendation systems for large social media platforms.
56. Explain the concept of user-item interaction graphs in the context of recommendation systems.

57. Discuss the impact of social network structure on the effectiveness of recommendation systems.
58. How can collaborative tagging be used in social media recommendation systems?
59. Explain the role of social influence in shaping user preferences for recommendations.
60. Discuss methods for detecting fake influence in social media and its impact on recommendations.
61. How can the diversity of user interests be incorporated into recommendation systems?
62. Explain the role of trust networks in enhancing recommendation systems in social media.
63. Discuss the potential biases in recommendation systems and how they can be mitigated.
64. Explain how recommendation systems can adapt to changes in social media trends.
65. Discuss the use of reinforcement learning in recommendation systems for social media.
66. How can multi-criteria decision-making be applied to recommendation systems in social media?
67. Explain the concept of group recommendations in social media. How can they be generated?
68. Discuss the role of collaborative filtering in detecting influential nodes in social networks.
69. Explain how recommendation systems can enhance user engagement in social media.
70. Discuss the use of genetic algorithms in optimizing recommendation systems.
71. How can latent factor models be used in recommendation systems for social media?
72. Explain the impact of echo chambers on the effectiveness of recommendation systems in social media.
73. Discuss the role of community detection in improving the accuracy of recommendation systems.
74. Explain the use of network centrality measures in enhancing recommendation systems.
75. Discuss the potential of blockchain technology in addressing trust issues in social media recommendation systems.

