

E-Commerce & Retail

Customer Analytics

1. How would you design a customer churn prediction system? Explain the end-to-end approach.
2. What would be the churn definition? 30 days, 60 days, 90 days no activity?
3. What features would be important in churn prediction?
4. What business recommendations would you give to reduce high churn rate?
5. How would you predict Customer Lifetime Value (CLV)?
6. What factors would you consider in CLV calculation?
7. How would you perform customer segmentation? Which algorithms would you use?
8. What is RFM analysis? (Recency, Frequency, Monetary)
9. What would be your approach to identify high-value customers?
10. What ML solution would you propose to reduce cart abandonment?

Product Inventory

11. Design a demand forecasting system. What features would you use?
12. How would you incorporate seasonal trends in demand forecasting?
13. How would you build a product recommendation system? (Collaborative vs Content-based)
14. How would you solve the cold start problem in recommendation systems?
15. What is your approach to identify cross-sell and up-sell opportunities?
16. How would you implement a dynamic pricing strategy using ML?
17. How would you solve the inventory optimization problem?
18. How would you balance out-of-stock vs overstock situations?
19. How would you generate product bundling recommendations?
20. How would you predict new product success before launch?

Marketing Growth

21. How would you measure marketing campaign effectiveness?
 22. Design an AB test for an email marketing campaign.
 23. What is your ML approach to reduce customer acquisition cost (CAC)?
 24. How would you optimize marketing budget allocation across channels?
 25. How would you design a next best action recommendation system?
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Finance & Banking

Fraud Detection

- 26. Design a credit card fraud detection system end-to-end.
- 27. How would you implement real-time fraud detection?
- 28. What is your approach to reduce false positives in fraud detection?
- 29. How would you handle imbalanced data (0.1% fraud)?
- 30. What would be your model update strategy as fraud patterns evolve?
- 31. How would you engineer features from transaction amount, location, and time?
- 32. Why is explainability important in fraud detection?
- 33. How would you design a hybrid approach combining rule-based systems and ML models?

Credit Risk & Lending

- 34. How would you build a credit scoring model?
- 35. What features are most important in default prediction?
- 36. How would you recommend credit limits for new customers?
- 37. Design a loan approval automation system.
- 38. How would you ensure fair lending practices and avoid bias?
- 39. How would you build an alternative scoring system to FICO score using ML?
- 40. Design an early warning system for loan defaults.

Trading & Investment

- 41. Is stock price prediction realistic? What are the challenges?
- 42. How would you develop an algorithmic trading strategy using ML?
- 43. How would you solve the portfolio optimization problem?
- 44. Design a risk assessment model for investment portfolios.
- 45. How is sentiment analysis used in stock market prediction?
- 46. What is the role of ML in high-frequency trading?
- 47. How would you build a market anomaly detection system?

Insurance

- 48. How would you perform insurance claim fraud detection?
 - 49. How would you optimize premium pricing using ML?
 - 50. How would you perform customer risk profiling in insurance?
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Healthcare & Pharma

Disease Prediction & Diagnosis

51. Design a disease prediction model. Where would you get the data?
52. How would you perform disease detection from medical imaging (X-ray, MRI)?
53. Why are false negatives critical in disease detection?
54. Why is model explainability necessary in the medical domain?
55. How would you solve the data scarcity problem in rare disease detection?
56. How would you build a patient readmission prediction system?
57. What business recommendations would you give to reduce hospital readmission?
58. Design an early warning system for ICU patients.

Drug Discovery & Treatment

59. How would you predict clinical trial success?
60. How would you predict drug-drug interactions using ML?
61. How would you generate personalized treatment recommendations?
62. What would be your approach to predict patient response to treatment?
63. How would you predict side effects of new drugs?

Operations & Resource Management

64. How would you optimize hospital resource allocation?
65. How would you solve the staff scheduling problem using ML?
66. What would be your ML approach to reduce patient wait time?
67. How would you predict no-show appointments?
68. Design a bed occupancy forecast system.
69. How would you predict emergency room patient volume?
70. How would you implement predictive maintenance for medical equipment?

Public Health

71. How would you design a disease outbreak prediction system?
 72. What is the role of ML in epidemiological modeling?
 73. How would you optimize vaccination campaigns?
 74. How would you predict health insurance costs?
 75. Design a population health management system.
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Technology & Social Media

Content Feed Optimization

- 76. Design a news feed ranking algorithm (Facebook/Instagram style).
- 77. What would be your approach to maximize user engagement?
- 78. How would you build a content recommendation system?
- 79. How would you predict viral content?
- 80. Design a fake news detection system.
- 81. How would you detect hate speech and toxic comments?
- 82. How would you automate content moderation?
- 83. What are the challenges in image and video content moderation?

User Experience & Engagement

- 84. What is your ML approach to increase user session length?
- 85. How would you predict feature adoption for new features?
- 86. How would you optimize user journey?
- 87. Design a notification optimization system (timing, frequency).
- 88. How would you reduce push notification fatigue?
- 89. What would be your approach for user segmentation based on behavior?

Advertising & Monetization

- 90. How would you build a click-through rate (CTR) prediction model?
- 91. Design an ad relevance scoring system.
- 92. How would you solve the bid optimization problem (ad auctions)?
- 93. How would you detect ad fraud?
- 94. How would you predict viewability—whether an ad was actually viewed?
- 95. What is your approach for revenue optimization across different ad formats?

Search & Discovery

- 96. How would you improve a search ranking algorithm?
 - 97. How would you perform query understanding and intent detection?
 - 98. Design an autocomplete/autosuggest system.
 - 99. How would you implement semantic search?
 - 100. How would you provide personalized search results?
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Transportation & Logistics

Ride-sharing & Delivery

101. How would you design Uber/Ola's surge pricing algorithm?
102. How would you optimize driver–rider matching?
103. How would you predict ETA (Estimated Time of Arrival)?
104. How would you solve the route optimization problem?
105. How would you predict demand at different locations?
106. How would you dynamically optimize driver supply?
107. Design a cancellation prediction system (driver or rider).
108. How would you accurately estimate food delivery time?
109. How would you optimize delivery routes for multiple orders?
110. How would you perform restaurant–delivery partner matching?

Fleet Management

111. How would you build a vehicle maintenance prediction system?
112. How would you optimize fuel consumption?
113. What is your approach to maximize fleet utilization?
114. How would you predict accident risk for drivers?
115. How would you solve the warehouse location optimization problem?

Supply Chain

116. How would you predict supply chain disruptions?
117. What is your approach for inventory optimization across multiple warehouses?
118. Design a supplier reliability scoring system.
119. How would you predict lead time?
120. How would you optimize last-mile delivery?

Entertainment & Media

Streaming Services

121. How would you build a Netflix/Hotstar style recommendation engine?
122. How would you solve the cold start problem in content recommendation?
123. How would you predict binge-watching behavior?
124. What are the unique challenges in churn prediction for streaming services?

- 125. How would you automate content quality assessment?
- 126. How would you personalize thumbnails (different users see different thumbnails)?
- 127. How would you optimize watch time?
- 128. How would you support content acquisition decisions using ML?

Music & Audio

- 129. Design a music recommendation system (Spotify style).
- 130. How would you automate playlist generation?
- 131. How would you predict song popularity?
- 132. What is audio fingerprinting? How is it used in copyright detection?
- 133. What are the challenges in podcast recommendation?

Gaming

- 134. How would you perform player churn prediction in gaming?
 - 135. How would you predict in-game purchases?
 - 136. How would you implement difficulty level personalization?
 - 137. Design a cheating detection system for multiplayer games.
 - 138. How would you optimize player matching (matchmaking)?
 - 139. How would you automate game testing using ML?
 - 140. How would you balance a virtual economy (in-game currency)?
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General Business Problems

AB Testing & Experimentation

- 141. Design an AB test for a website redesign. How would you calculate sample size?
- 142. You need to test multiple variants (A/B/C/D) - what would be your approach?
- 143. Statistical significance is not achieved - what would you do?
- 144. How would you handle novelty effect and seasonality in AB testing?
- 145. What are the challenges when network effects are present in AB testing?
- 146. How would you present AB test results to business stakeholders?
- 147. How would you decide test duration?
- 148. What is minimum detectable effect (MDE)?

Pricing & Revenue Optimization

- 149. Design a dynamic pricing strategy for hotel bookings.

- 150. How would you estimate price elasticity?
- 151. How would you find the optimal price point for a new product?
- 152. How would you measure discount effectiveness?
- 153. Design a revenue management system (airline style).
- 154. How would you gather competitor pricing intelligence using ML?

HR & Talent Analytics

- 155. How would you build an employee attrition prediction system?
- 156. What is your approach to identify high-performing employees?
- 157. How would you automate resume screening?
- 158. How would you predict interview success?
- 159. Design a salary recommendation system.
- 160. How would you predict employee engagement scores?
- 161. How would you measure training effectiveness?
- 162. What is your ML approach to reduce bias in hiring?

Operations Optimization

- 163. How would you predict call center volume?
- 164. How would you solve the staffing optimization problem?
- 165. How would you automate customer service ticket routing?
- 166. How would you optimize response time?
- 167. What is your approach for energy consumption prediction in a building?
- 168. Design a predictive maintenance system for manufacturing.
- 169. How would you automate quality control defect detection?
- 170. How would you optimize production planning?

Sales & Lead Scoring

- 171. How would you build a lead scoring model for B2B sales?
- 172. Design a sales forecasting system. What features would you include?
- 173. How would you predict win probability of sales deals?
- 174. What would be your approach for next best product to sell to an existing customer?
- 175. How would you optimize territory assignment for a sales team?

Advanced Case Studies

Multi-stakeholder Problems

- 176. Uber Eats scenario: How would you optimize for restaurant, customer, and delivery partner simultaneously?
- 177. Marketplace problem: How would you satisfy both buyers and sellers (Airbnb, eBay)?
- 178. Two-sided marketplace cold start: Would you initially focus on supply or demand?

Real-time Systems

- 179. Design a real-time bidding system (ad tech).
- 180. How would you perform real-time fraud detection with latency <100ms?
- 181. What are the scalability challenges in real-time recommendation systems?
- 182. How would you perform model training on streaming data?

Ethical & Fairness

- 183. How would you detect bias in a loan approval model?
- 184. Design a fair ranking system (avoid bias in job postings).
- 185. What steps would you take to avoid discrimination?
- 186. How would you ensure model explainability for regulatory compliance?
- 187. How would you implement privacy-preserving ML (federated learning)?

Scalability & Production

- 188. How would your model handle 1 million requests/second?
- 189. Design a model retraining pipeline (how often? when?).
- 190. How would you set up a model monitoring system in production?
- 191. How would you detect model degradation?
- 192. Design an AB testing infrastructure for ML models.
- 193. What is a feature store? Why is it used?
- 194. How would you manage model versioning?

Data Challenges

- 195. You have limited labeled data (100 examples) - what would be your approach?
- 196. You have data quality issues (70% noisy labels) - how would you handle it?
- 197. You need to combine multiple data sources - what are the challenges?
- 198. You need to extract data from legacy systems - what is your approach?
- 199. How would you combine real-time data and batch data?
- 200. How would you build an ML system while complying with data privacy laws (GDPR)?