

AI in Healthcare - End Sem Exam Revision Sheet

TOP PRIORITY TOPICS

1. Types of Machine Learning:

- Supervised Learning: Classification, Regression (with examples)
- Unsupervised Learning: Clustering, Association
- Semi-Supervised Learning: Combo of labeled + unlabeled data
- Reinforcement Learning: Feedback-based learning, rewards/punishments

2. Decision Tree:

- Nodes, branches, entropy, information gain
- Pros: Simple, interpretable; Cons: Overfitting, instability

3. Regression:

- Predicts continuous output (e.g., weight, blood sugar)
- Simple, Multiple, Non-linear regression
- Overfitting vs Underfitting, Outliers

4. Bayesian Classifier:

- Uses Bayes Theorem for probabilistic prediction
- Good for disease likelihood prediction

APPLICATIONS OF AI IN HEALTHCARE (Use these for 10-15 mark answers)

1. Disease Detection: IBM Watson
2. Drug Discovery: Microsoft Project Hanover
3. Imaging Diagnosis: CheXNet, Google DeepMind

4. Personalized Medicine: IBM Watson Oncology
5. Behavior Monitoring: Somatix
6. Smart Health Records: Google Cloud Vision, MIT
7. Clinical Trials: IQVIA cost-saving, patient targeting
8. Crowdsourced Data: Apple ResearchKit
9. Radiotherapy Support: Google DeepMind
10. Outbreak Prediction: ProMED-Mail

Medical Imaging Use Cases:

- CNN for Skin cancer (Esteva)
- Deep learning for Breast Cancer (McKinney)
- Retinopathy via CNN (Arcadu)
- Alzheimers via DBNs (Faturrahman)
- Pneumonia via X-ray CNN (Rajpurkar)

Electronic Health Records:

- Used for chronic disease prediction (LSTM, CNN)
- Mortality in ICU patients (SRML model)
- Post-stroke pneumonia prediction (AUC 92.8%)

Genetic Engineering:

- CRISPR + ML for off-target prediction
- Vaccine prediction (Malone et al.)
- Random forest in gene editing (CUNE)
- Tacrolimus dose prediction (renal transplant)

Consumerism via AI:

- ChatGPT, Copilot: Personalization, Shopping Assistants
- Content creation via AI
- Global trend analysis, purchase behavior change

AI in Supply Chain (Steps & Benefits):

Steps: Assess Goals Data Tools Train Pilot Scale Monitor

Benefits: Forecasting, Inventory optimization, Route efficiency, Cost saving, Customer satisfaction