DATE :- 22-05-2025

NAME :- ASHA SANDEEP CONTACT NO-8802692476

Q-1 What metrics would you monitor to assess the performance and stability of a deployed model?

Ans:- I used confusion matrix for deployed model. Confusion matrix we get metrics

Metric Name	Formula	Use-Case in Healthcare
Accuracy	(TP+TN)/(TP+TN+FP+FN)	Overall correctness
~~Bession~~ Precision	TP/(TP+FP)	measures Howmuch predicts positive
Recall (Sensitivity)	TP/(TP+FN)	Measures the model's ability to correctly identify patient
Specificity	TN/(TN+FP)	Measures how well the model identifies non patients
F1 score	2*(Presion*Recall)/(~~Prediction~~ Precision+Recall)	Balance ~~between~~ between Precision and Recall, especially important in imbalanced data

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Q-2 How would you detect data drift and concept drift in production?

Ans:- To detect data and concept drift in production we need to establish a feedback loop between business outcomes and data features and define robust performance metrics.

1. Data Drift Detection:
- monitoring feature Distributions, Statistical Tests, visualization, metrics, Tools - machine learning, ML-Based Approach use machine learning models to detect drift between populations

2. Concept drift Detection:
Performance - Based monitoring, correlation Analysis, Specialized Algorithms, Anomaly Detection, Model Quality metrics.

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Q-3) What alerting mechanisms would you use to notify the team when performance degrade

Ans :- To effectively alert the team about performance degradation, a multi-layered approach utilizing various channels and tools is recommended. This includes setting up performance monitoring alerts with customized thresholds, utilizing service level objective (SLO) alerts, and integrating these alerts with communication tools like Slack, email, or PagerDuty for immediate notifications.

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Q-4) Describe how tools such as Prometheus Grafana, Evidently AI, or MLFlow can support model monitoring?

Ans:-

Tool	Main Role	Key monitoring capabilities
Prometheus	Collect realtime metrics	Accuracy, Latency request count, error rate
Grafna	Visualize metrics	Live Dashboard alerts, graph historical data
evidentlyAI	Detect data drift	Drift detection data quality reports, model performance alerts
MLFlow	Track models & metrics	model versioning metrics logging experiment comparision.

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Q-5 What role do logging and audit trails play in healthcare AI system, and how would you implement them?

Ans:- ① Prediction logs, User Activity logs, Data logs, Error logs, Audit trails.

② Audit trail Table Schema

Field Name	Type	Description
timestamp	datetime	When the event occured
user_id	string	user Performance the action
patient_id	string	patient involved (if any)
action type	string	prediction, data_access, login

Diagram ⇒
AI - Prediction API
↓
Structured
Logging code
↓
Audit trail Database
↓
Compliance Dashboard
(Grafana / Kibana)