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**TITLE : Resource Scheduling in Edge computing**

1. **How do interoperability and cyber security challenges affect edge deployment metrics in healthcare?**

As we know, healthcare is a crucial field nowadays (where technology can be widely used for great benefits) . Interoperability – meaning different systems working together and cyber security – meaning protecting the shared data by different systems. Here we will see how they affect edge deployment metrics in healthcare –

Lack of sending, receiving patient’s data causes delays which impacts edge computing performance which can suffer increased latency . Due to increased latency the delay time will increase which can increase processing time by 40%.

Interoperability (in aspect of interoperable exchange of health information) can cause duplication of patient records and data which can either be not accurate or incomplete.

Some of the hospitals do not give back the patient details which result in lack of metrics

this is where edge systems cannot access full patient details leading to ineffectiveness.

In case of cyber security impacts :-

Health care cyber security threats are increasing year by year. Data theft for financial gain purposes and ransomware which can heist data and release it for ransom which can result in decreasing edge metrics such as MTTR (Mean time to recover). MTTR increases then system uptime and availability both will be critical for continuous monitoring.

1. **Which performance indicators are crucial to capture the edge computing impact on healthcare with regards to latency and accuracy?**

In this case latency says how fast systems notify about critical health changes while accuracy refers to diagnoses and alerts. Real Time data analysis in case of healthcare includes devices such as patient monitors, wearable bands that acts as tracking devices, MRI machines which captures. These are all enabled by edge computing which provides low latency and fast access.

Performance indicators include

End to End response time : It refers to the time when a medical emergency occurs to the time when an action has taken. Example – data is sent to cloud servers to get the result .

Diagnostic Accuracy : Measures how accurately it has identified the patients condition. Result in negative and positive which sometimes can lead to false positives

Real Time processing Ratio : In ICU patients need continuous monitoring without any lag.

Anomaly Detection Time and accuracy : Determines how quickly and accurately a system can detect abnormalities in health data. This prevents complications.

Data Validation speed and precision : Before analysis, the incoming data must be validated. Corrupt data can lead to missed detections in health care

1. **What benchmarks are used to measure the reliability of edge AI algorithms in patient diagnostics ?**

Edge AI system usually operate across three layers:

1. Client-side devices (Eg. ICU bedside monitors)
2. Edge computing layer (local AI processing near the patient)
3. Cloud servers (used for training and storage)

Diagnostic Accuracy – It tells how accurately the AI models identifies medical conditions

Latency – measures how quickly the Ai model gives the diagnosis.

Uptime and failover mechanism – how long the system works.

For example lets take an AI healthcare based example : -

ICU patient Monitor- As we know it is a place for serious situation patients. Therefore its main aim is to notify the doctors in emergency situations as soon as possible. The input will be patient from ICU monitors( client side).

AI model will be processing on edge devices for real time diseases.

Cloud servers – used for training and storage. They confirm the system is reliable for critical support.

1. **Also discuss the importance of metrics such as latency, throughput, accuracy of diagnostics, uptime, reliability, compliance with privacy standards, and cost effectiveness.**

**Latency** : when data gets transmit from end devices to edge , or from edge to cloud or edge-edge the amount of delay time it takes is know as latency.

Example : ICU monitoring – patients require full time monitoring and notifying doctors in less than a second for emergencies. These situations require instant data transmission.

**Throughput :-** It refers to the rate at which data is successfully transmitted by edge devices.

Example :- patient Data rate : 2000-10000 samples/second

**Diagnostic Accuracy :**- Refers to a test which determines whether a condition is present or absent include false negatives and false positives. Example- missed alerts can lead to wring treatments

**Uptime :** Refers to the period when system is available. Example – medical systems should run 24/7 due to continuous monitoring of the patients.

**Reliability :** Systems ability to perform consistently and correctly over time. Example – Intermediate faults can lead to accidents

**Compliance with privacy standards : -** This refers to adhering to laws and regulations

Processing only necessary information cause health care involves highly sensitive data

**Cost effectiveness :-** Transmitting data and implementation costs. Hospitals aim to optimize resources.