**AI-Driven Monitoring and Analysis for Microsoft Teams Call Quality Dashboard (CQD)**

**1. Introduction**

This report highlights how Artificial Intelligence (AI) can enhance the monitoring and analysis of Microsoft Teams Call Quality Metrics using CQD data. By integrating AI models, organizations can proactively detect issues, predict call degradations, and improve overall service quality.

**2. Benefits of AI in CQD Monitoring**

**2.1 Proactive Detection & Alerting**

* Detect anomalous behaviors (e.g., high jitter, packet loss) using Isolation Forest or AutoEncoder.
* Auto-identify problematic subnets, IP ranges, or buildings without manual intervention.
* Real-time notifications to administrators via Microsoft Teams or email.

**2.2 User Experience Prediction**

* Predict potential call degradations based on historical usage patterns.
* Forecast high-risk time windows or regions using time-series models (Prophet).

**2.3 Feedback Correlation & Sentiment Analysis**

* Use NLP (BERT, Azure Cognitive Services) to analyze user feedback.
* Detect negative sentiment clusters linked to specific devices, networks, or client versions.
* Correlate subjective feedback with objective CQD measures (MOS, Jitter).

**2.4 Device Performance Analysis**

* Identify underperforming device models or versions using classification or association mining.
* Recommend device replacements or updates based on detected patterns.

**2.5 Network Optimization**

* Recommend adjustments to network configurations (VLAN, QoS) based on model findings.
* Visualize high-risk subnets or network paths.

**2.6 Root Cause Analysis**

* Automate root cause identification (user, network, or device) per poor call session.
* Provide regional or departmental issue breakdowns.

**2.7 Cost Optimization & Resource Allocation**

* Predict regions requiring infrastructure scaling.
* Prioritize IT support resources using AI-driven insights.

**3. AI Use Cases Overview**

| **Use Case** | **Description** | **AI Model / Technique** |
| --- | --- | --- |
| Subnet Anomaly Detection | Identify recurring subnet issues | Isolation Forest, AutoEncoder |
| Problematic User Prediction | Predict users likely to face call problems | XGBoost, KMeans Clustering |
| Real-Time Quality Alerting | Alert on sudden network/call quality drops | One-Class SVM, Prophet Forecasting |
| Device Impact Assessment | Detect underperforming devices | Association Rule Mining (Apriori) |
| Feedback Sentiment Mapping | Correlate feedback text with technical issues | BERT, Azure Cognitive Services |

**4. Recommended Tools & Technologies**

* **Data Processing**: Azure Data Factory, Synapse Analytics
* **Model Development**: Python (Scikit-Learn, PyOD, TensorFlow, Keras), Azure ML
* **Sentiment Analysis**: Azure Cognitive Services, BERT (Huggingface)
* **Visualization**: Power BI, Azure Monitor
* **Automation & Deployment**: Azure ML Pipelines, Power Automate

**5. Conclusion**

AI brings significant value to CQD data analysis by enabling predictive insights, proactive anomaly detection, and actionable recommendations. Leveraging these models and technologies can greatly enhance call quality monitoring and operational efficiency.

**6. Next Steps**

* Develop Python-based ML models for anomaly detection.
* Deploy sentiment analysis for feedback correlation.
* Integrate real-time alerting with Power BI and Teams notifications.
* Automate model training and deployment via Azure ML Pipelines.

*Prepared for Microsoft Teams CQD Monitoring Enhancement Project.*