Comparative Analysis of Wireless Networks Using MATLAB Simulation

(Focus on comparison between Wi-Fi 6, Wi-Fi 6E, and Wi-Fi 7 in smart campus environments)

1. Introduction / Problem

- Smart campus environments require high-performance wireless networks.
- Increasing number of users causes congestion and performance degradation.
- Different WI-Fi standards provide different performance levels.

2. Objective

- Compare the performance of WI-Fi 6, Wi-Fi 6E, and WI-Fi 7.
- Use MATLAB-based simulation for evaluation.
- Analyze Quality of Service (QoS) metrics.

3. Methodology

- MATLAB simulation environment.
- Multiple traffic scenarios.
- Different user densities.
- Comparison of IEEE 802.11ax (Wi-Fi 6 / 6E) and IEEE 802.11be (Wi-Fi 7).

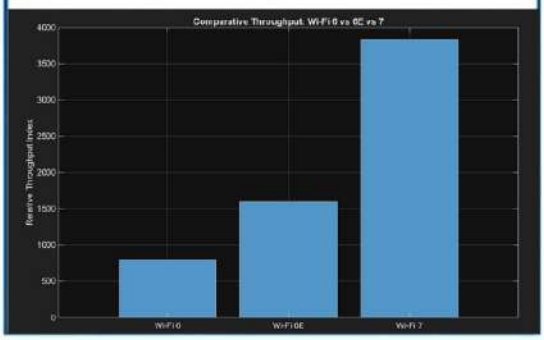
Input Parameters → MATLAB Simulation → Performance Metrics → Results

4. Performance Metrics

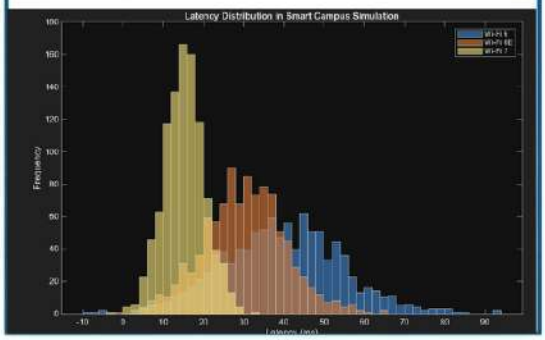
- Throughput.
- Latency.
- Jitter.
- Packet Loss.

5. Results (Visual Focus)

Wi-Fi 7 maintains higher throughput compared to Wi-Fi 6 and Wi-Fi 6E as user density increases.



Wi-Fi 7 exhibits lower latency under high traffic conditions.



6. Conclusion

- Comparative results show that Wi-Fi 7 outperforms WI-Fi 6 and Wi-Fi 6E.
- Wi-Fi 7 provides higher throughput and lower latency in high-density environments.
- MATLAB simulation validates the effectiveness of next-generation wireless networks.

7. Future Work

- Larger-scale smart campus simulations.
- Mobility models for moving users.
- Energy efficiency and advanced security evaluation.

Student Names: Mohammed Al Hussain, Ibarihim Alnaeem, Abdulaziz Albuthie