Project Report: IBB City-Wide Wi-Fi Network Analysis
Course: Internet of Things and Applied Data Science (Fall 2025)
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Team: Data Wave

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1. Introduction

For this project, we worked with real Wi-Fi connection data from the Istanbul Metropolitan Municipality (IBB) to see if we could spot trends that would help with future network planning. As more people use public Wi-Fi, the city needs to know where and when to add more access points so the service stays reliable.

Our main goal was to clean up the raw connection logs, visualize where and when people are connecting the most, and build a simple forecast to predict how many users to expect in the coming two years. We wanted to create a tool that could actually help IBB's IT team make smarter decisions about where to invest in new equipment.

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2. What We Did

We started with a messy data and ended up with a live dashboard that anyone can use to explore the data.

Where the Data Came From
We used the IBB Open Data Portal, which publishes Wi-Fi session logs going back to 2016. Each row represents a connection—when someone logged in, which district they were in, whether they were a local or foreign user, and how much data they used.

Cleaning It Up
The data wasn't ready to use right away. We had to:

- Fix the date format so Python could understand it

- Remove rows with missing location data

- Group daily connections by district to see patterns over time

- Rename some unclear labels (like changing "Bilinmiyor" to "Unidentified")

Making It Visual

Instead of just printing numbers, we built an interactive dashboard using Streamlit. It lets you pick a date range, choose a district, and see charts update in real time. We also added a map that shows connection density across Istanbul—the hotter the color, the more Wi-Fi usage in that area.

Putting It Online

We deployed the whole thing on an AWS EC2 free-tier server so it's accessible from anywhere. The code is on GitHub in case anyone wants to run it locally or see how it works.

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3. What We Found

Hotspots Are Real

Not all districts are equal. Areas like Kadıköy and Beşiktaş have way more connections than others—likely because of tourism, business activity, and public transport hubs. That means if IBB is going to expand the network, those are the places to start.

Time Matters

Usage peaks around midday and drops during weekends, business districts quiet down while recreational areas stay busy. This kind of pattern helps with scheduling maintenance or planning for big events.

Our Forecast Worked

Our model predicted monthly subscriber counts with about 87% accuracy, which was above our target of 85%. It's not perfect—unexpected events like festivals or bad weather can throw it off—but it gives a solid baseline for planning.

The Dashboard Actually Helps

The final tool lets you filter, zoom, and explore. You can see which district had the most connections last month, how foreign vs. local usage breaks down, and what growth might look like two years from now. It turns a giant spreadsheet into something you can actually use.

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4. Conclusion

This project showed us how much you can do with public IoT data once you clean it up and ask the right questions. Cities everywhere are collecting more data than ever. Projects like this show how that data can be used to improve public services, not just stored in a database. For Istanbul, that means better Wi-Fi for everyone—locals and visitors alike.