Dataset Generation for Device-to-Device Communication

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Objective & Research Question:

Our objective is to generate an extensive dataset comprising channel characteristics among a vast network of users. This dataset holds the potential to facilitate device-to-device communication, eliminating reliance on a base station for connectivity.

Background:

- Wireless communication traditionally relies on base stations to facilitate communication between devices.
- The development of a comprehensive dataset containing channel information enables the exploration of device-to-device communication without dependence on base stations.
- Efficient device-to-device communication can help minimizes reliance on base stations, reducing network overhead and enhancing overall system performance.
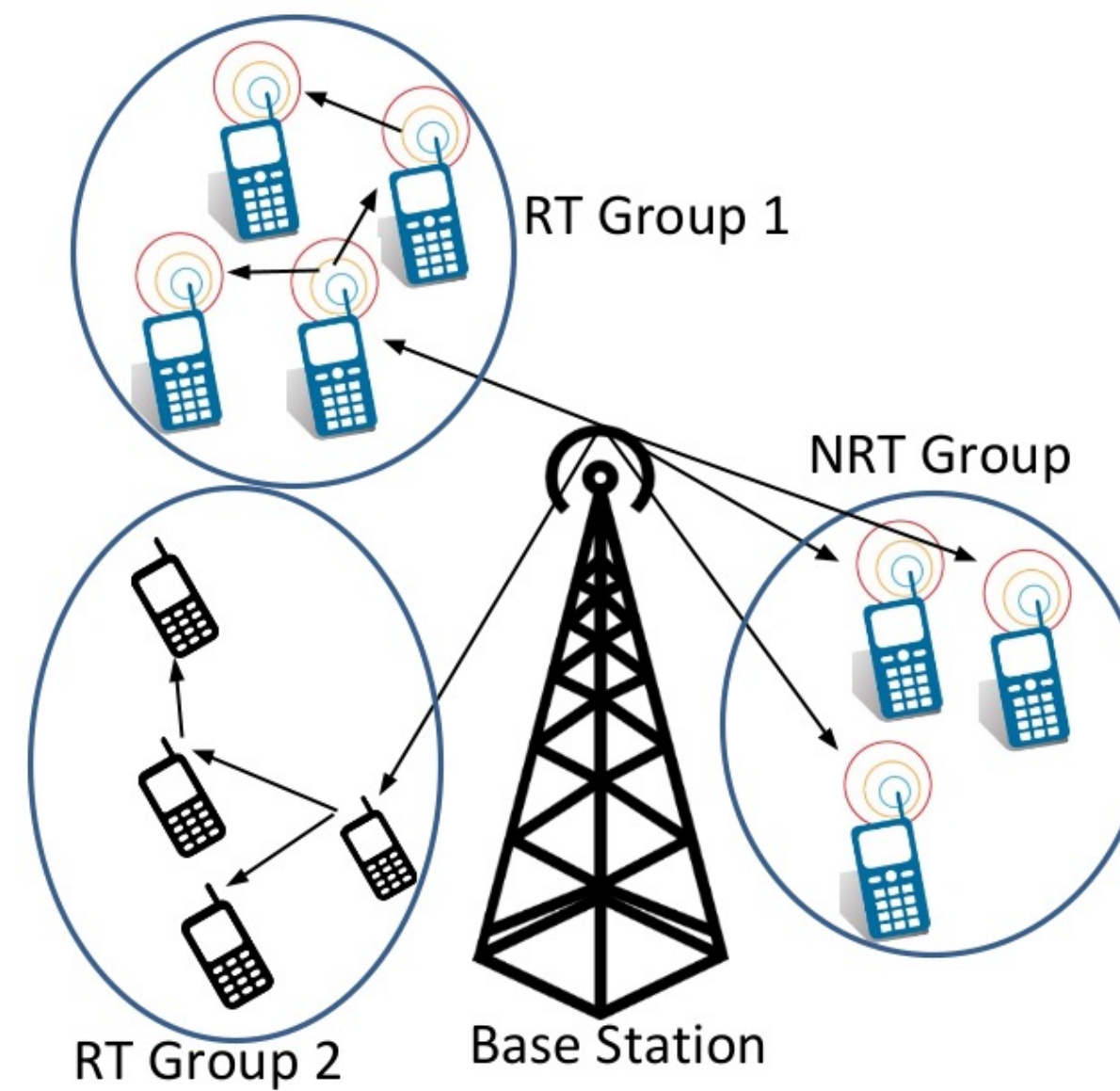

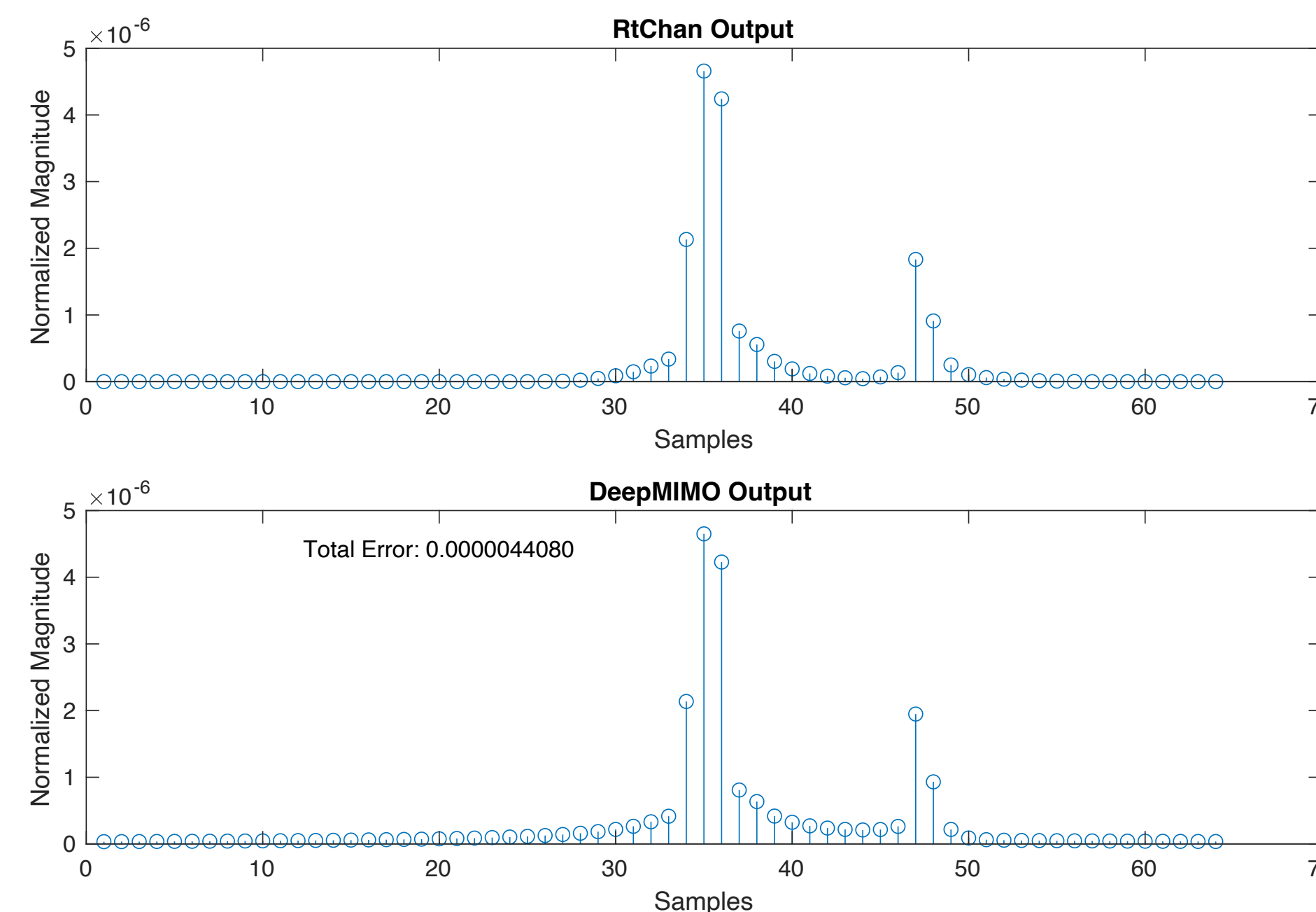**Figure 1:** Base station Communication

Figure 3: Raytracing Results

Methods:

- Employ MATLAB's communication toolboxes and raytracing to simulate a user grid.
- Understand the functionality of the toolboxes and how the raytracing is performed.
- Generate grid of users and gather essential channel data.
- Validate our results by comparing them with a well-established dataset, such as DeepMIMO, ensuring the accuracy and reliability of our approach.
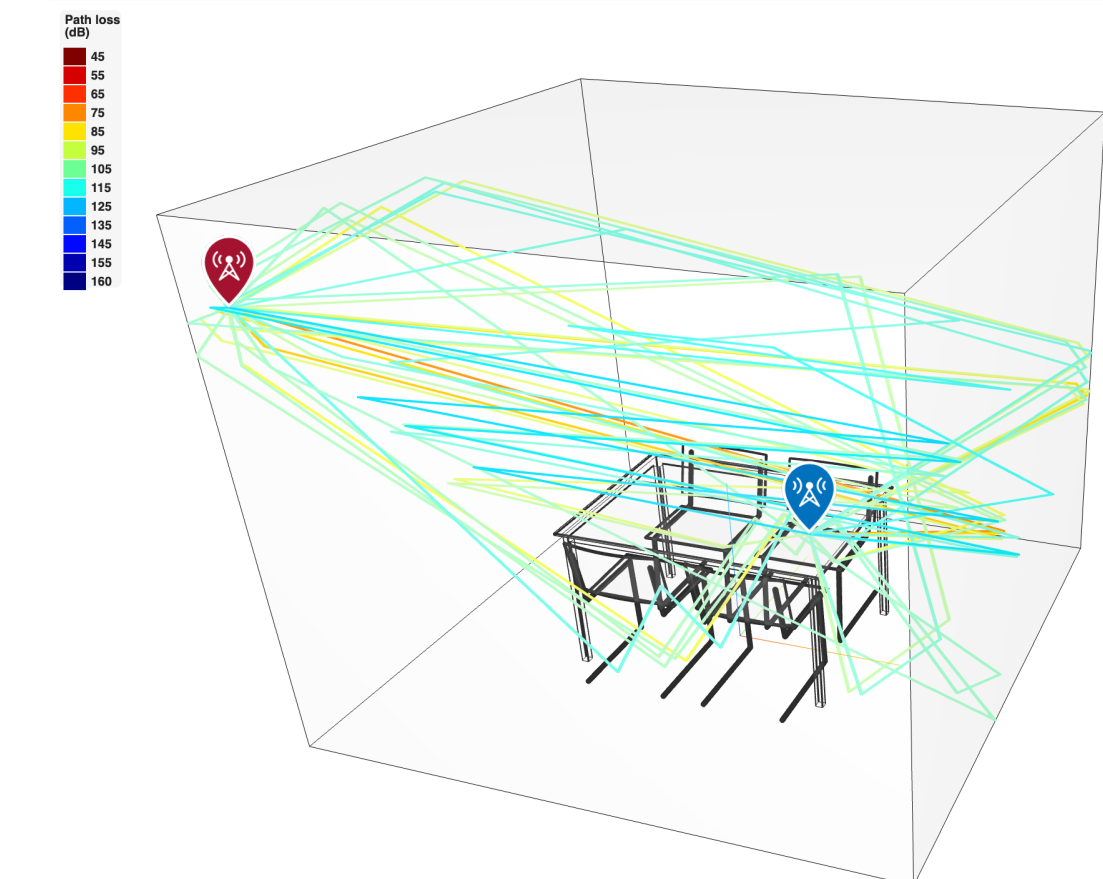

Figure 2: Raytracing Simulation

Results:

- Our simulations accurately replicate the outcomes achieved by DeepMIMO, demonstrating the fidelity of our methodology.
- Intiated the design process for the user grid, laying the foundation for further experimentation and analysis.

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