SELECTION DIVERSITY IN DISTRIBUTED MIMO FOR 6G USING USRPS

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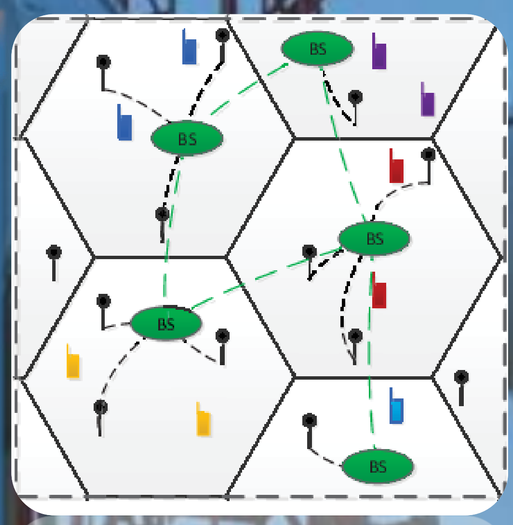
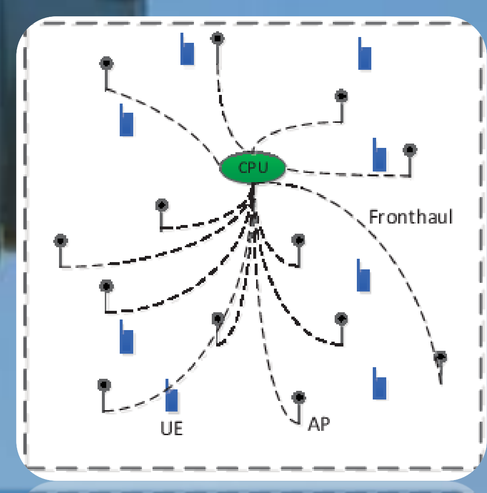
INTRODUCTION

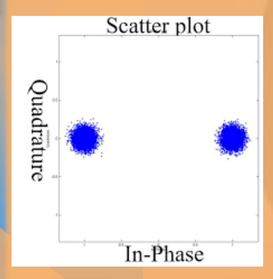
- Upcoming new wireless communication technology 6G aims for omnipresent and limitless connectivity by providing high data rate and ultra-low latency. To achieve these goals of 6G, new structures and techniques are considered.
- One of the considered structures is Distributed MIMO (D-MIMO) structure which consists of geographically distributed Access Points (APs) to increase the coverage and connectivity in an area.
- This project aims to examine and test the performance of Selection Diversity, which is one of the considered method for signal processing and data flow control at CPU in D-MIMO systems. This method selects the Access Point (AP) with the best channel condition for communication so that the connection with best quality is maintained.





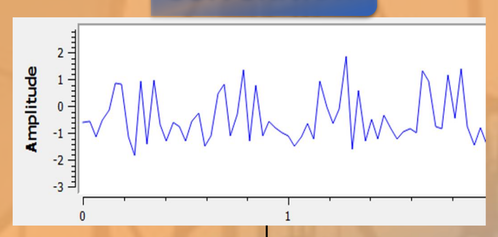
SOLUTION METODOLOGY

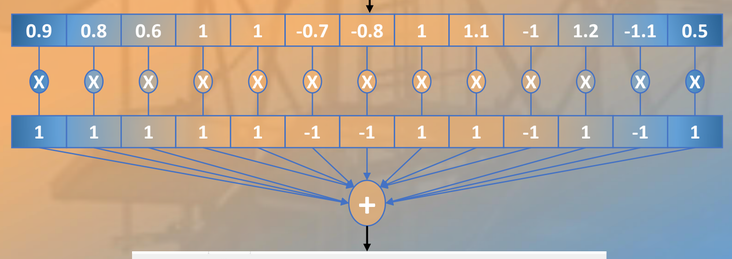
- For this project, RSSI driven Selection Diversity is preferred due to its less cost and complexity and tolerance to instantaneous changes in the channel.
- For AP-UE communication, a packet structure is designed which consists of dummy data, dummy header and a 13-bit Barker coded preamble for packet synchronization and detection. The peak correlation of Barker code is also used as a CSI value for selection algorithm.
- The system is designed as one UE and two APs connected to the CPU via USB cables. Selection Diversity property is tested in uplink operation where UE is the transmitter and APs are the receivers.
- The signal transmitted by UE is recovered and correlated to obtain the CSI of each AP. Then, a threshold is applied to the CSI outputs; the resulting CSI values after this operation are used in selection algorithm which uses a hysteresis loop for selection.

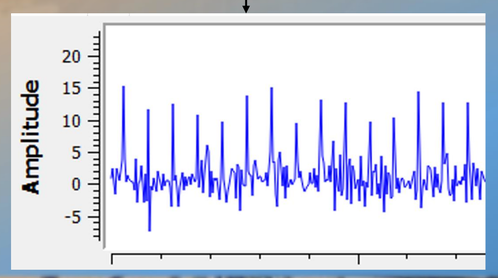


Recovered Symbols

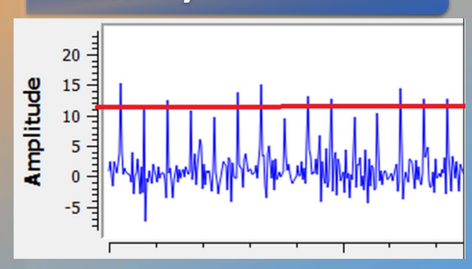
Correlation



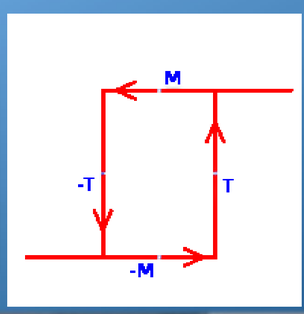




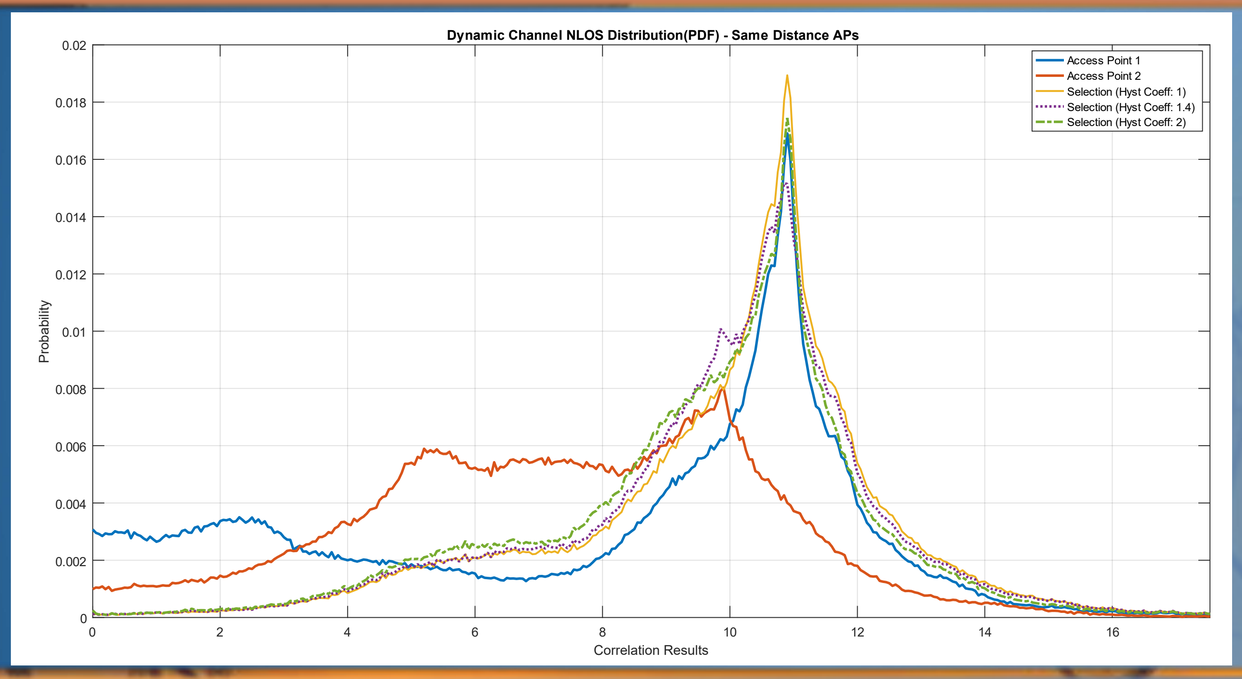
Packet Synchronization

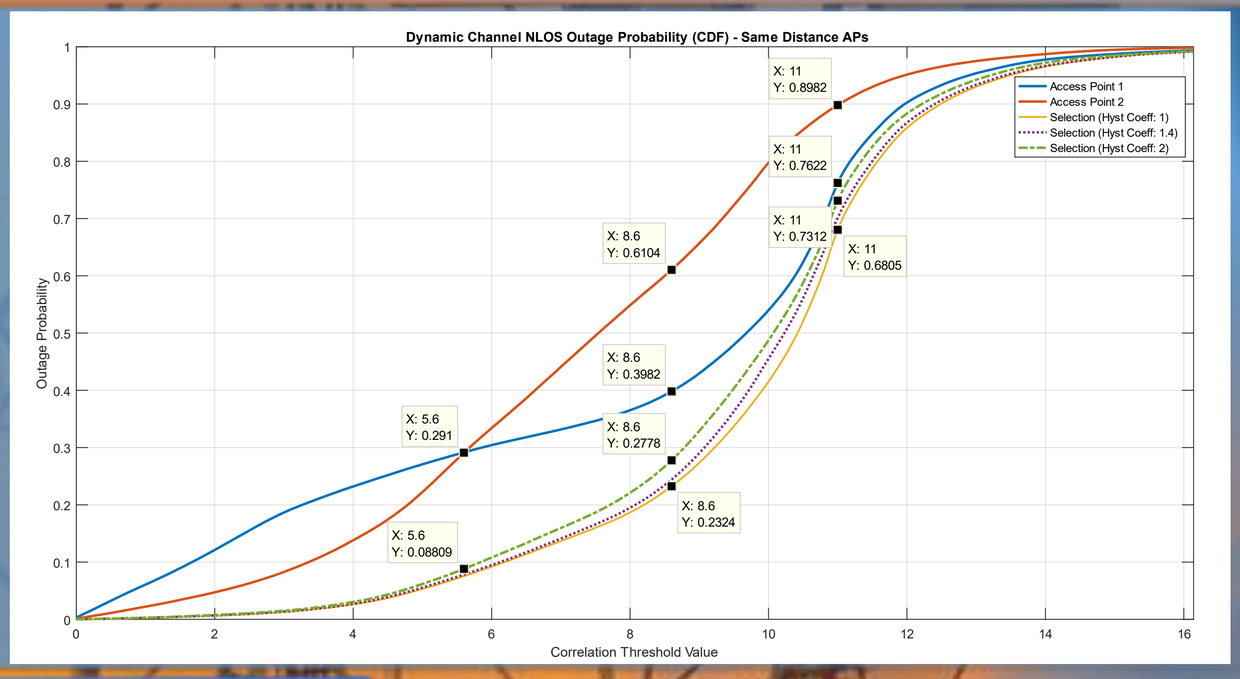


AP Selection Using Hysteresis Algorithm



RESULTS





ACKNOWLEDGEMENTS

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