

SpectrumX Research Projects Interviews



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BACKGROUND

- The IDEA Center at the University of Notre Dame facilitates innovation, de-risking, and business growth via its focus on commercialization and entrepreneurship.
- Since September 2023, it has collaborated with SpectrumX to assess the applicability of researchers' wireless and 5G technologies to industry needs. This evaluation involves data collection to ascertain their effectiveness in addressing real challenges faced by companies in these sectors.

RESEARCH QUESTIONS

- Identify major spectrum/5G/wireless challenges faced by companies and their business impact.
- Assess relevance of SpectrumX's research projects in addressing these challenges and potential applications.
- Determine additional domains/problems companies want addressed in future research.

METHODS AND MATERIALS

- Target Participants: The study targets professionals with expertise in the spectrum area, specifically those working with 5G and wireless technologies.
- Data Collection: Data is gathered through virtual interviews conducted via video conferencing platforms (e.g., Zoom) or phone calls.
- Interview Format: Semi-structured with open-ended questions and follow-up probes.

RESULTS

- **Key challenges in the spectrum/5G/wireless domain, including:**
 - Hardware limitations for simultaneous transmit/receive systems hindering spectrum efficiency,
 - Persistent interference across frequencies with ineffective mitigation techniques, signal interference and throughput issues due to co-located sectors and high-density small cells,
 - Difficulties in assessing spectrum needs and navigating regulations,
 - Lack of rural coverage and infrastructure constraints for 5G deployment, and challenges in efficiently dividing frequencies among multiple devices.
- **Proposed solutions include:**
 - Efforts for advanced hardware, interference mitigation algorithms and low-noise electronics, deployment strategies like electrical tilting and MIMO for mmWave frequencies,
 - Strategic spectrum deployment with professional interference management and regulatory collaboration, initiatives for extended coverage through satellite networks and alternative technologies, as well as techniques such as "network slicing" and advanced frequency allocation for efficient device connectivity.

CONCLUSION

- Addressing the challenges in 5G and wireless technologies requires a multi-faceted approach including hardware development, advanced algorithms, strategic spectrum deployment, and innovative infrastructure solutions.
- Collaborative efforts between industry stakeholders and regulatory bodies are crucial to overcoming these challenges and realizing the full potential of 5G technology.

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REFERENCES

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