CRONOS-2024 AREA 1 (PO:NAKAO)

Development of Ultimate Wireless Systems Beyond Classical Design

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Grand Challenge and Goal:

With groundbreaking leaps in technologies like machine learning and quantum computing, we revisit traditional engineering design principles of wireless communications. Our goal is to realize ultimate wireless systems with revolutionary improvements in throughput, latency, and reliability, while addressing the spectrum scarcity issue.

Summary:

- The design of current wireless systems is based on simplifications, as shown in the figure on the right, considering implementation.
- Our proposal aims to break the boundaries of the classical design by leveraging emerging technologies such as machine learning, quantum computing, and Bayesian inference and aims to resolve issues related to reliability, latency, and throughput, while addressing the spectrum scarcity.
- In our proposed system, a large number of distributed antennas are deployed, and all wireless resources are optimized based on user demands, forming virtual cells, referred to as 'tailored cells,' for each user.
- Ambitious project that fundamentally overturns system design based on emerging technologies is unprecedented and possesses high originality.

Social Impact:

- Beyond the best-effort design that has persisted for over 100 years, our proposed design will enable new services.
- Our approach will address the fundamental issue of spectrum scarcity, driving technological advancement and creating new business opportunities.





