Researchers offer future 6G network concept
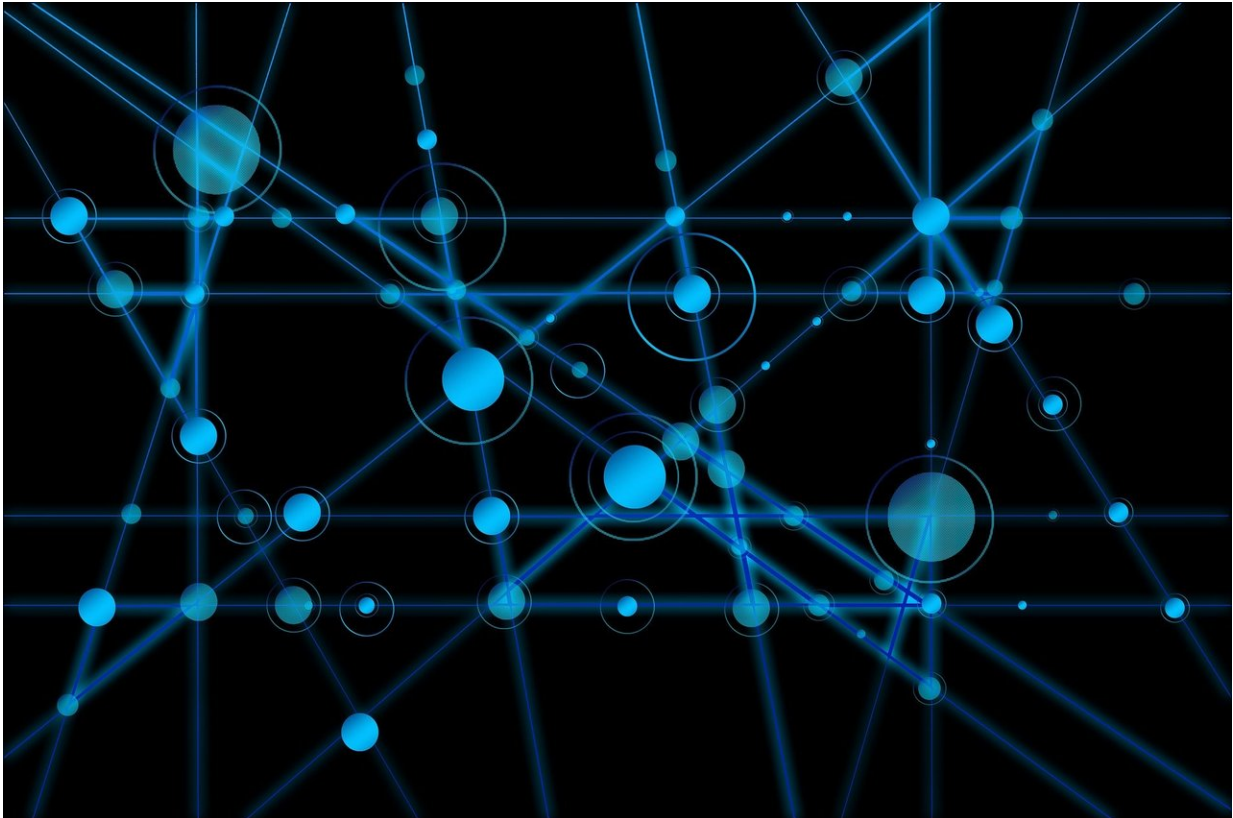
December 29 2021

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In 6G Cognitive Information Theory: A Mailbox Perspective, published by MDPI in *Big Data and Cognitive Computing* on October 16, 2021, NIST and international researchers propose a "cognitive" 6G network—significantly enhancing the 5G network that encodes and transmits data with their meaning or semantics.

With commercial 5G rapidly deploying, researchers have begun to look at 6G. Its key technologies for mobile communication networks are expected to become available as early as 2023, with 6G networks emerging in 2030, according to Saad et al. Compared to 5G, the 6G network will increase data rates by over 100 times, to one terabyte per second or more, enabling the inclusion of edge intelligent devices and computing. To move large amounts of data to where and when it is needed, 6G networks will need to customize services to meet demands, transmit valued data, and interact with users.

To meet these requirements, the paper offers a "mailbox theory" that envisions a 6G network characterized as a:

- Distributed Intelligent Network: This would have intelligent applications embedded throughout the network and be intelligent, managed and controlled. The network would be capable of transmission, storage, analysis of large-scale data, and providing personalized access at any time and place.
- Proactive Interactive Network: This would be a personalized, demand-centered network. Users would define network functions for on-demand resource scheduling. Moreover, the network would adjust in real time according to changes in user demand. Such a design requires artificial intelligence to adjust the network as well as protection for personal data.
- Cognitive Information Transmission: Compared to traditional communications, the 6G network would significantly reduce redundant transmissions and better ensure semantic meanings are mined, extracted, and sent.

Provided by National Institute of Standards and Technology