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TECHNOLOGY LICENCING OPPORTUNITY

Method of obtaining channel state information in wireless communication network having artificial wave transformer

Technology Details

Reconfigurable Intelligent Surfaces (RIS) represent an innovative technology designed to optimize wireless signal propagation. In a scenario where a RIS solely employs passive elements, accurately estimating individual links in the channel poses a significant challenge. This is due to the inability of the RIS to directly observe pilot signals between the RIS and the base station (RIS-BS) and user equipment (UE)-RIS. In uplink transmissions, channel estimation relies solely on the reflected signals received at the base station (BS).

Researchers at the University of Manitoba have introduced a novel and patented solution through the development of a learning algorithm. This algorithm enables the separate estimation of both channels, leveraging only uplink training pilots. It employs a variational inference approach to approximate the posterior distribution of the channels based on the received pilot signals at the BS. The patent's uniqueness lies in its ability to tackle the joint channel estimation challenge within fully passive RIS-assisted single-input multiple-output systems, using exclusively uplink training signals. Importantly, this method is versatile and adaptable to various channel types.

Applications

RIS holds promise in radar and satellite communication, increasing resolution and link quality. Furthermore, they find utility in aerospace and maritime industries, improving in-flight Wi-Fi and maritime communication. Additionally, RIS contributes to energy-efficient wireless systems by refining signal paths and reducing losses. This adaptable technology is a game-changer, ensuring seamless connectivity and data exchange across diverse domains, from smart cities to healthcare and defense applications.

Technology Benefits

This technology solves the joint channel estimation problem in a fully passive RIS-aided single-input multiple-output system using only the uplink training signal. The proposed method is generic and can be adapted to different type of channels. The proposed method expands the RIS applications such as sensing and user localization, enhancing the efficiency and deployability of the RIS. These advantages are achieved at a low deployment cost of the passive RIS and low time complexity leveraging the capabilities of Artificial Intelligence.

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