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Abstract:

CLOUD COMPUTING AND EDGE COMPUTING PARADIGMS FOR MASSIVE ACCESS IN A CELL-FREE MASSIVE MIMO-BASED INTERNET OF THINGS (IOT) ABSTRACT: This re article examines the concept of massive access in the context of cell-free massive multi-input multi-output (MIMO)-based Internet of Things. It addresses the complex active user detection (AUD) and channel estimate (CE) and proposes solutions for these challenges. In order to optimize the uplink transmission process, we propose implementation of a sophisticated frame structure design aimed at minimizing access latency. Furthermore, the examination of two processing paradigms, namely cl computing and edge computing, is conducted in order to explore the potential benefits of incorporating the collaboration of all access points (APs) in the context of e access. In the context of cloud computing, it is common practice to establish a connection between all access points (APs) and a centralized processing unit (CPU). Thi arrangement allows for the centralized processing of signals received at each AP, which are subsequently handled by the CPU. In the context of edge computing, the c processing is delegated to specific access points (APs) that are equipped with distributed processing units. This enables the execution of tasks such as the AUD (Audic Detection) and CE (Centralized Execution) through a distributed processing strategy. In addition, we propose a novel technique called Structured Sparsity-based Gene Approximated Message Passing (SS-GAMP) for achieving reliable joint Audio Unmixing and Channel Estimation. Our algorithm takes into consideration the quantizati of the processed signals, while utilizing the structured sparsity of the channel matrix. A novel AUD and CE technique is proposed, building upon the SS-GAMP algorith aim of reducing access latency. This scheme incorporates sequential interference cancellation and operates within two paradigms. The simulation findings provide er evidence supporting the superiority of the suggested technique in comparison to the existing state-of-the-art baseline systems. Additionally, the findings indicate tha computing may attain comparable levels of performance in terms of enormous access when compared to cloud computing. Furthermore, edge computing has the ak alleviate CPU workload, exhibit faster reaction times for access, and provide more adaptable collaboration among access points.

Complete Specification

Description:Descriptions:
With the emergence of the Internet-of-Things (IoT) era, there has been a recognition of the crucial role played by massive machine-type communications (mMTC) in upcoming wireless networks. Given the aforementioned context, it is anticipated that next base stations (BSs) will facilitate extensive connectivity by accommodatin billions of user equipments (UEs). Nevertheless, the provision of dependable assistance for low-latency huge access in the context of mMTC remains a formidable ta inside existing wireless networks. One potential drawback of allocating orthogonal pilot sequences to every conceivable user equipment (UE) is that it would be imp for enormous access. Conversely, in the case of conventional grant-based random access protocols, the intricate exchange of signaling information results in a signi increase in access latency as the number of User Equipments (UEs) grows. Fortunately, one important attribute of massive Machine Type Communications (mMTC) i intermittent nature of user equipments' (UEs) traffic. This means that out of a huge group of UEs, only a small portion are active during a specific time period. There the grant-free random access protocol has been recently introduced as a potentially viable alternative. In this protocol, each active user equipment (UE) sends its sig and data simultaneously to the base station (BS) without prior scheduling. In the context of grant-free random access, the base station (BS) is required to employ th received pilot signals for the purpose of detecting the active user equipments (UEs) and estimating their respective channels. These channel estimations are crucial subsequent data detection process. However, the issue of active user detection (AUD) has become increasingly complex due to the disparity between the high num user equipments (UEs) and the limited radio resources available for huge access. Furthermore, due to the widespread distribution of power limited Internet of Thin user equipment (UEs), it is imperative for numerous base stations (BSs) to collaborate in order to enhance coverage and conserve the transmit power of UEs. In con the extensive accessibility observed in single-base station circumstances, the presence of many base stations introduces a novel challenge in the form of "multi-cell

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