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Inventor					
Name	Address			Country	Nat
Dr.Kousik Roy	Professor, C/o-Anjali Roy, Amtala, Goda, Post-Rajbati, Dist-Purba Bardhaman, Pin: 713104, West Bengal, India.			India	Ind
Mr.Nagarjuna Pitty	Principal Research Scientist, Indian Institute of Science (Bengaluru), CV Raman Rd, Bengaluru, Pin: 560012, Karnataka, India.			India	Ind
Mrs.L. Pavithra	Assistant Professor, Christ the King Engineering College, Cecilia gardens, 158/3, Onnipalayam road, Karamadai, Coimbatore, Pin: 641104, Tamilnadu, India.			India	Ind
Munisankar. M	Assistant Professor, Department of ECE, School of Engineering & Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Pin: 517502, Andhra Pradesh, India.			India	Ind
Ms. Uma Devi C	Assistant Professor, Christ the King Engineering College, Cecilia Gardens, 158/3, Onnipalayam Road, Karamadai, Coimbatore, Pin: 641104, Tamil Nadu, India.			India	Ind
Dr.Shikha Tayal	Associate Professor, Department of CSE, Tula's Institute, Dehradun, Pin:248001, Uttarakhand, India.			India	Ind
Mr. B Santhosh Kumar	Assistant Professor, Department of Cyber Security, Institute of Aeronautical Engineering, Dundigal, Hyderabad, Pin:500043, Telangana, India.			India	Ind
Mrs. B. Lakshmipraba	Assistant Professor, D.Y. Patil International University, Pune, Pin: 411044, Maharashtra, India.			India	Ind
Prof. Gunasekaran K	Assistant Professor, AMC Engineering college, Bannerghatta, Bangalore, Pin: 560073, Karnataka, India.			India	Ind
Nandhini B	Assistant Professor, Dr.SNS Rajalakshmi College of Arts and Science, Coimbatore, Pin: 641049, Tamilnadu, India.			India	Ind
Dr.Harikumar Pallathadka	Director and Professor, Manipur International University, Ghari, Imphal, Imphal West, Pin: 795140, Manipur, India.			India	Ind
Applicant					

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Dr.Kousik Roy	Professor, C/o-Anjali Roy, Amtala, Goda, Post-Rajbati, Dist-Purba Bardhaman, Pin: 713104, West Bengal, India.	India	Indi
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Nandhini B	Assistant Professor, Dr.SNS Rajalakshmi College of Arts and Science, Coimbatore, Pin: 641049, Tamilnadu, India.	India	Indi
Dr.Harikumar Pallathadka	Director and Professor, Manipur International University, Ghari, Imphal, Imphal West, Pin: 795140, Manipur, India.	India	Indi

Abstract:

The present invention provides an intelligent beamforming solution for enhancing 5G network performance through dynamic and adaptive beam pattern adjustments. The system utilizes a central controller equipped with advanced machine learning and deep learning algorithms to analyze real-time environmental data and user feedback. It allows for the precise optimization of signal direction and strength, addressing the limitations of traditional beamforming methods. The invention features a sophisticated antenna array capable of multi-dimensional beamforming, and incorporates edge computing nodes to further reduce latency and improve responsiveness. Additionally, a centric interface allows for real-time feedback, which is integrated into the system to ensure optimal connectivity. This intelligent beamforming solution significantly improves data throughput, coverage, and network efficiency, making it ideal for dense urban environments and complex scenarios.

Complete Specification

Description: The embodiments of the present invention relate to the field of wireless communication systems, specifically to advanced beamforming techniques designed to enhance the performance, efficiency, and reliability of next-generation 5G networks. The invention leverages intelligent algorithms and machine learning to dynamically adjust beam patterns, addressing the challenges posed by dense urban environments, mobility, and varying user demands, thereby optimizing signal direction, strength, and overall network capacity.

BACKGROUND OF THE INVENTION

The following description of related art is intended to provide background information pertaining to the field of the disclosure. This section may include certain aspects of the art that may be related to various features of the present disclosure. However, it should be appreciated that this section be used only to enhance the understanding of the reader with respect to the present disclosure, and not as admissions of prior art.

The advent of 5G technology marks a significant leap forward in wireless communication, promising substantial improvements in data rates, latency, and connectivity compared to previous generations. As the demand for high-speed, reliable wireless communication continues to grow, the need for efficient and robust network solutions becomes increasingly critical. Traditional beamforming techniques, while effective in many scenarios, often struggle to meet the dynamic and complex requirements of modern wireless environments, particularly in dense urban areas where signal interference and obstructions are prevalent.

Conventional beamforming relies on fixed algorithms and static beam patterns, which can lead to suboptimal performance in environments with high mobility or varying

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