## IJARSCT



International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 1, December 2024

## **Power Line Communication System**

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**Abstract:** Power Line Communication System (PLCS) is an emerging technology that utilizes existing electrical power infrastructure for data transmission. Devices can exchange data and access communication via the power grid thanks to its ability to provide communication across power lines. This approach has many benefits, including as cost-effectiveness, quick implementation, and broad availability without out the need for additional cabling. Smart grid management, home automation, industrial control systems, and Internet of Things connectivity are just a few of the fields in which PLC has found use This abstract provides an overview of PLCS, highlighting its benefits, challenges, and key technologies. It also discusses the potential of PLCS in transforming power distribution net-works into intelligent and interconnected systems. Additionally, emerging trends and future directions for PLCS research and development are explored, emphasizing the potential for enhanced reliability, speed, and efficiency in data transmission over power lines. This paper proposed a two-way communication from source to load sides using BPSK (Binary phase-shift keying) and QPSK (Quadrature phase-shift keying) modulation techniques. Monte Carlo simulation is used to predict the transformer theoretical channel AWGN (Additive White Gaussian Noise) and compare the efficiency of the proposed methods. To compare the performance curve, randomly chosen data with sizes ranging from 10 k to 50 k are employed.

Keywords: Transformer, Transmission line, Arduino nano, ATmega328p

