

**CHENNAI – PONDICHERRY**

**Wireless Charger Placement and Power Allocation for Maximizing Charging Quality**

**Abstract:**

Wireless power transfer is a promising technology used to extend the lifetime of, and thus enhance the usability of, energyhungry battery-powered devices. It enables energy to be wirelessly transmitted from power chargers to energy-receiving devices. Existing studies have mainly focused on maximizing network lifetime, optimizing charging efficiency, minimizing charging delay, etc. In this paper, we consider wireless charging service provision in a two-dimensional target area and focus on optimizing charging quality, where the power of each charger is adjustable. We first consider the charger Placement and Power allocation Problem with Stationary rechargeable devices (SP3): Given a set of stationary devices and a set of candidate locations for placing chargers, find a charger placement and a corresponding power allocation to maximize the charging quality, subject to a power budget. We prove that SP3 is NP-complete, and propose an approximation algorithm. We also show how to deal with mobile devices (MP3), cost-constrained power reconfiguration (CRP), and optimization with more candidate locations. Extensive simulation results show that, the proposed algorithms perform very closely to the optimum (the gap is no more than 4.5%, 4.4%, and 5.0% of OPT in SP3, MP3, and CRP, respectively), and outperforms the baseline algorithms.

**Existing System:**

Wireless power transfer provides a promising alternative that has attracted significant attention from both academia and industry. Kurs *et al.* experimentally demonstrated that energy can be efficiently transmitted between magnetically resonant objects without any interconnecting conductors.

This technology has led to the development of several commercial products, *e.g.*, Intel developed the wireless identification and sensing platform (WISP) for battery-free monitoring; more than 30 types of popular phones are beginning to embrace wireless charging; and even vehicles and unmanned planes are now supporting wireless charging.

Existing studies regarding this issue have mainly focused on maximizing the lifetime of the underlying network, optimizing the efficiency of charging scheduling, energy provisioning, collaboration between chargers, minimizing total charging delay, minimizing maximum radiation point.

**Proposed System:**

To the best of our knowledge, we are the first to study the joint optimization of charger placement and power allocation problem. We present a formal problem statement and prove that it is NP-complete.

We propose an approximation algorithm, *i.e.*, TCA, for SP3. Based on TCA, we provide solutions for mobile devices, cost-constrained reconfiguration, and more candidate locations.

Evaluations are conducted to confirm the effectiveness and advantages of the proposed algorithms.