Data Preservation in Robotic Sensor Network : Covering Salesman Approach

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Abstract- **Wireless Sensor Networks (WSNs) are integral to data collection in various domains, from environmental monitoring to precision agriculture, owing to their distributed and versatile nature. In this context, existing approaches often rely on conventional base stations, which may encounter challenges in optimizing data collection efficiency and minimizing associated costs within networks. Our proposed approach introduces a paradigm shift, envisioning a WSN where each sensor node operates within a designated communication range. Data transfer seamlessly occurs when a mobile sink/robot enters a node's communication range, revolutionizing the traditional data collection model. To augment efficiency, we introduce the concept of "collection points" strategically positioned to intersect communication ranges, offering an innovative solution to maximize data collection while minimizing traversal costs. We will incorporate this approach in two different Greedy Algorithms and Reinforcement Learning algorithms. To demonstrate the effectiveness of our approach, we will compare it with baseline approaches where the robot conventionally visits each sensor node location. This proposed methodology represents a significant departure from conventional WSN architectures, presenting a promising avenue for redefining the landscape of data collection in distributed sensor networks. As we explore this novel approach, we anticipate transformative outcomes in terms of enhanced data collection efficiency and minimized operational costs, paving the way for further exploration and validation in real-world applications.**