Design and Implementation of a Hybrid Sensor Network for Milu Deer Monitoring

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Abstract—This paper presents a hybrid sensor network with both fixed nodes and mobile nodes for monitoring and protecting Milu Deer, a specific kind of rare animals in China. Our goal is to provide unprecedented fine-grained environmental and individual data for zoologists and explore potential problems in hybrid sensor networks. Total 116 nodes have been deployed up to now, which consists of 30 mobile nodes for monitoring Milu Deer’s behaviour, 16 fixed nodes for monitoring environments, 69 fixed nodes for data relay and 1 sink node (or base station) for data gathering. Environmental nodes and relay nodes construct the fixed network infrastructure, which transfer environmental data and individual data to the sink node and then the server efficiently and reliably. Network protocols were designed using popular components and tailored for particular application scenarios. System performance was evaluated by both simulations and field experiments, which demonstrated the effectiveness of our monitoring system.

Keywords—Hybrid Sensor Network, Milu Deer, Mobile Node, Habitat Monitoring, System Architecture, Network Protocol