

Number of rounds T Number of primary points P

$$\min \sum_{t=1}^T \sum_{p=1}^P (W_\theta * \Theta_{t,p} + W_U * U_{t,p})$$

Nonnegative weights

Subject to

$$\sum_{j=1}^{|J|} \alpha_{j,p} * X_{t,j} = \Theta_{t,p} - U_{t,p} + 1 \quad \forall p \in P, t = 1, \dots, T$$

Coverage Constraint

Coverage Constraint

Energy Constraint

$$\sum_{t=1}^T X_{t,j} \leq \lfloor RE_j / E_{th} \rfloor \quad \forall j \in J, t = 1, \dots, T$$

Remaining energy of sensor j .

Amount of energy required to be alive during one round.

determine the activation of sensor j in the sensing round t .

$$X_{t,j} \in \{0, 1\}, \quad \forall j \in J, t = 1, \dots, T$$

Undercoverage variable of the primary point p during round t .

$$U_{t,p} \in \{0, 1\}, \quad \forall p \in P, t = 1, \dots, T$$

Overcoverage variable of the primary point p during round t .

$$\Theta_{t,p} \geq 0 \quad \forall p \in P, t = 1, \dots, T$$