

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

subject to :

Nonnegative weights

Number of primary points

Set of sensors

Coverage Constraint

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

Energy Constraint

Remaining energy of sensor j

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

Determine the activation of sensor j in the sensing round t

Amount of energy required to be alive during one round.

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

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

Number of rounds

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

Undercoverage variable of the primary point p during round t

Overcoverage variable of the primary point p during round t