SVM-GA Framework

Data Process

Input		Input		Input
Rank	No → Top p%			Standard
Clean	Yes → max & min			ReOrder
Store		NEW boundary		Train & test
				SVM dataset

SVM 1

Original Dataset → Interanion 1 | Interanion 2 | Interanion 3 | Interanion 4

	Fold 1
test	Fold 2
train	Fold 3
	Fold 4

error 1 | error 2 | error 3 | error 4

$$\min_{g,c} MSE_{CV}, \text{ by grid search}$$

Grid Search | Random Search

SVM 2

$$\min_{g,c} MSE_{CV}, \text{ by grid search}$$

GA

- Initialization
- Selection
- Crossover
- Mutation
- Replacement
- Max Generation — No / Yes
- Save the optimal solution

Flow (left column)

- GA Phase 1 (Simulation)
- Data Process
- SVM Regression
- GA Phase 2 (Prediction)
- End

Average Convergence Plot

Simulation: 1150
Prediction: 150

run	error	run	error
1	0.00055	6	0.00165
2	0.00140	7	0.00268
3	0.00016	8	0.00217
4	0.00150	9	0.00118
5	0.00005	10	0.00105

Ave	0.00124
Std	0.00084
Best	0.00005
Worst	0.00268

Thermistor Network Temperature Curve

Optimal solution found by Mixed Integer GA solver:
R1 = 6800 ohms
R2 = 1100 ohms
R3 = 820 ohms
R4 = 680 ohms
TH1 = 33000 ohms, 3740 beta
TH2 = 50 ohms, 2750 beta

Ideal Curve
GA Solution