Time-Series Forecasting

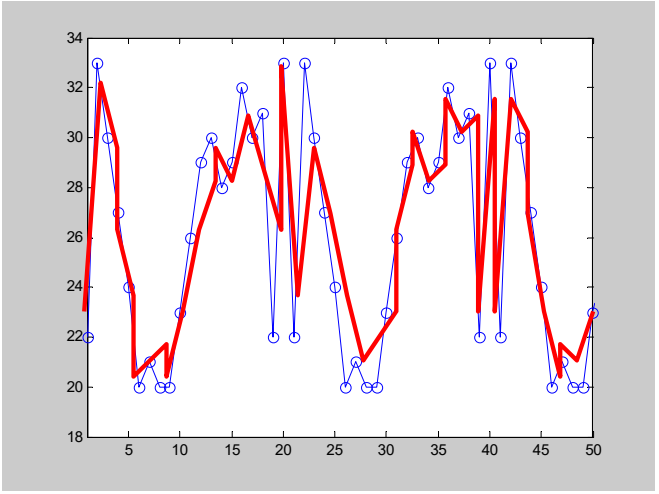
What Is It?

- Predicting some future outcomes from a set of historical events
- Stock prediction, Weather forecasting, Passenger prediction, etc.

Many Classical Methods Exist!

- Linear model approach: exp. smoothing, [illegible]
- Non-linear model approach: Threshold, GA[illegible]

Not so efficient!



Actually, it is not like this in real-coded domain!

GAs: linear model

GA Approach:

- Using a linear-type function: i.e., Future can be represented by a linear combination of past data.

$$x_{t+1} = \alpha_t x_t + \alpha_{t-1} x_{t-1} + \alpha_{t-2} x_{t-2} + \cdots + \alpha_{t-6} x_{t-6} = \sum_{k=0}^{6} \alpha_{t-k} x_{t-k}$$

	α_t	α_{t-1}	α_{t-2}	α_{t-3}	α_{t-4}	α_{t-5}	α_{t-6}
Encoding	0.83	0.57	0.25	0.92	0.23	0.41	0.55
	0.51	0.13	0.46	0.19	0.88	0.76	0.83
Crossover	0.83	0.57	0.46	0.19	0.88	0.76	0.55
	0.51	0.13	0.25	0.92	0.23	0.41	0.83
Mutation	0.51	0.13	0.25	0.92	0.16	0.41	0.83

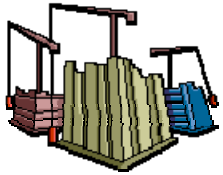
Traveling Salesman Problem

1

2

3

4



5

6

Encoding

Cutting points

City Num.	1	2	3	4	5	6	7	8
Chrom. A	3	5	7	2	1	6	4	8
Chrom. B	2	5	7	6	8	1	3	4

Order1 Crossover

5	8	7	2	1	6	3	4

Mutation (Reodering)

5	8	6	2	1	7	3	4