

AI CUP 2010

IKM - AI

Giulio Valente
Stefano Pongelli
Thomas Selber



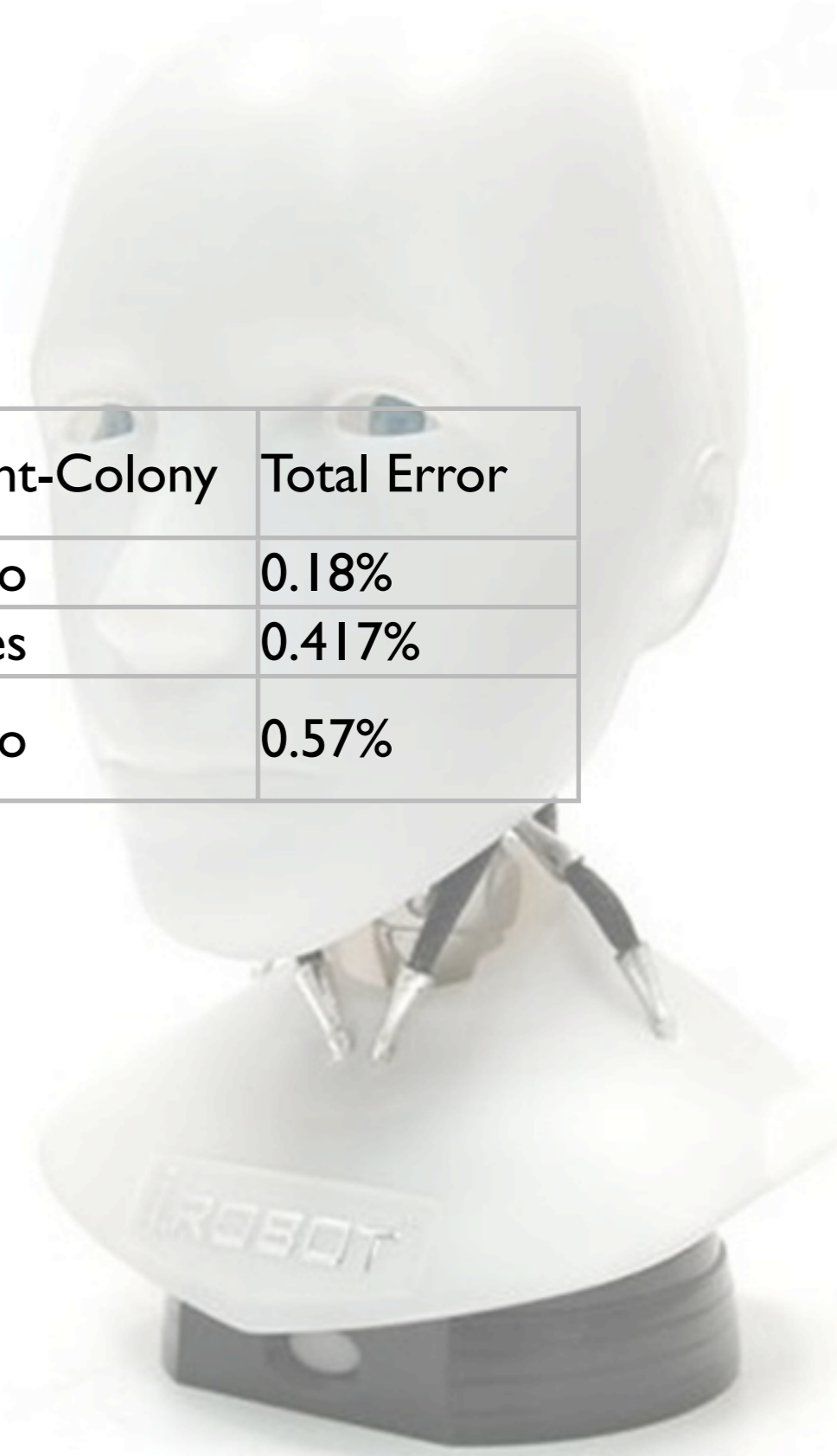
The Goal



- Try to solve problems from 76 to 1577 cities
- Applying algorithms we learned in class
- Only 3 cpu minutes for each problem
- Try to find the best solution
- Unlimited number of attempts
- Reproducible Solution

Implementations

Name	Nearest Neighbor	2-Opt	Best 2-Opt	Simulated Annealing	Ant-Colony	Total Error
Thomas	No	Yes	No	Yes	No	0.18%
Stefano	Yes	Yes	No	No	Yes	0.417%
Giulio	Yes	Yes	Yes	Yes	No	0.57%



Simulated Annealing

(Slide by Gambardella)

It is inspired by the annealing of metals.

It starts from an initial current solution.

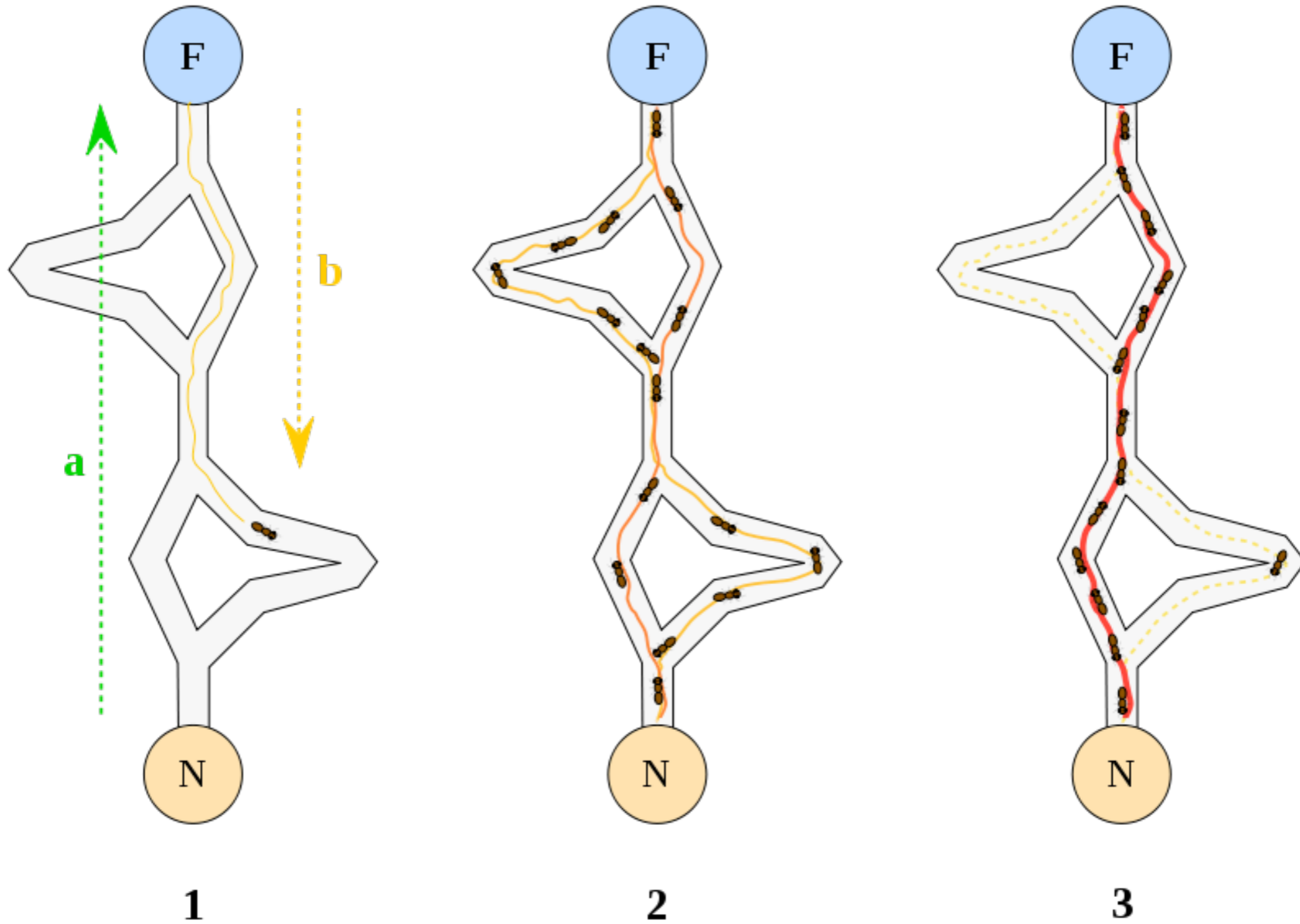
At each iteration a new solution next is randomly chosen from the neighborhoods of the current solution.

If $f(\text{next}) < f(\text{current})$ we start the next iteration from next.

Otherwise the choice between next and current is done in using a probabilistic function $e^{-\Delta E/T}$ that is based on $\Delta E = f(\text{next}) - f(\text{current})$ and on a parameter T (temperature) that decreases during the search.

Ant Colony

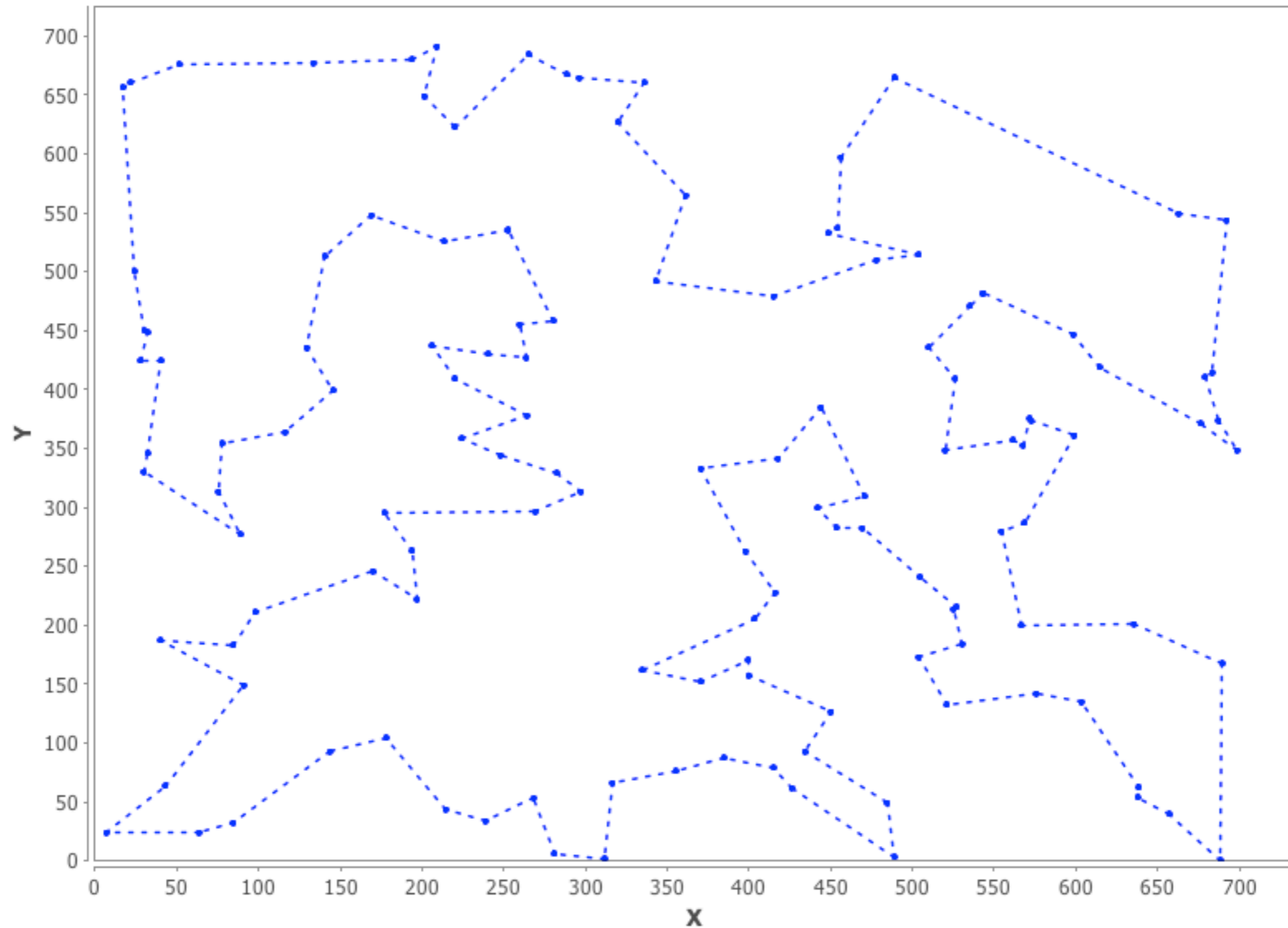
(Image from wikipedia)



An example solution

(credits to S. Pongelli)

ch130 (Len: 6110)



Thanks to

Luca Maria Gambardella
Mostafa Kelkha

And thank you for the attention.

