

## Artificial Intelligence, Graphs and Traveling Salesman Problem

Sometimes called Machine Intelligence, is the way that we can program a device or a computer to “think about something”, and how can we do that? Actually, exist several paradigms: “Functional, Logical, Imperative, Object Oriented and Declarative” but that story is for another time.

The most common paradigm method used to create Artificial Intelligence is Functional, because you need to create the search space and sometimes the depth of that process (it could mean time in some cases) and built the range of responses when someone ask about something. Have you ever thought about what does it happens when you search on Google?  
How does it work?

### The secret:

Entropy of Language: Is the probability of use a letter or a word in a text, and that’s different for each language.

“If you want to know something, google it”.

Have you ever thought about “how can the delivery companies send packages on time and saving money in transportation cost?”

Maybe they think:

“I’ll get my computer to solve my problem”:

“If I can’t solve something fast, my computer can do it”.

That has an interesting name: “Traveling Salesman Problem”

Currently, we have lots of methods to solve it, but neither of those methods are the perfect solution and I want to show you my favorite solution with a simple graph.

When we use Neural Networks, we need to create Edges and Nodes, the Nodes have an “ID” and the Edges have a “weight” or “cost of using them”, same for Neural Networks, Trees and Graphs.

A Graph is a set of nodes and edges but without outputs, that’s the difference with neural networks, it has filters to give you an answer, a Graph create the answer searching the best option, both can be used to solve the same problems.

That’s a piece of cake, now we can say:

“If I had known artificial intelligence before, I could solve my problems faster”

For example, if we want to buy a ticket to travel from Pereira to Miami, the nodes are Pereira and Miami, so far, and we have different prices for that tickets, the prices are the edges, but we can find prices that involve other nodes, for us a trip with multiple stops before arrive to reach your destination, in this case might be Bogota, Medellin or Cali, after create that edges and nodes, we get a simple neural network, that helps you to choose the best option to buy a ticket.