Fleet Volume Assignment
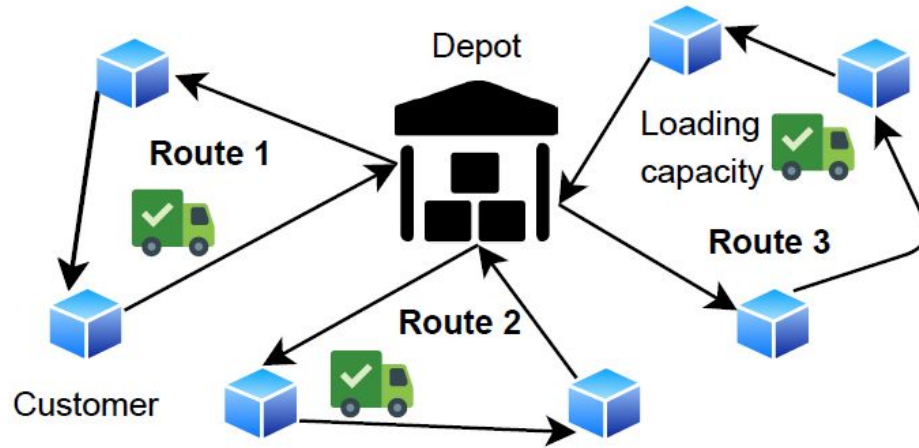
Mattia Neroni

Agenda

Inspiration
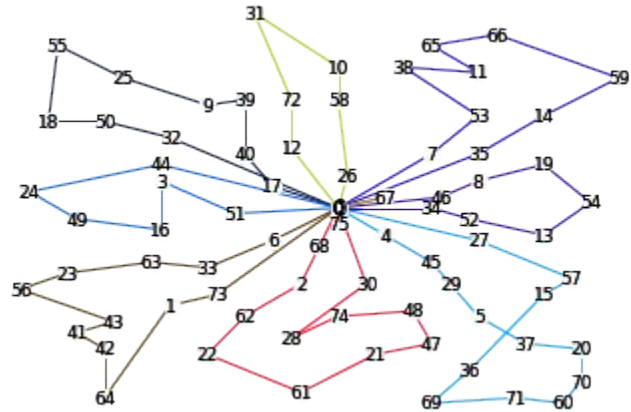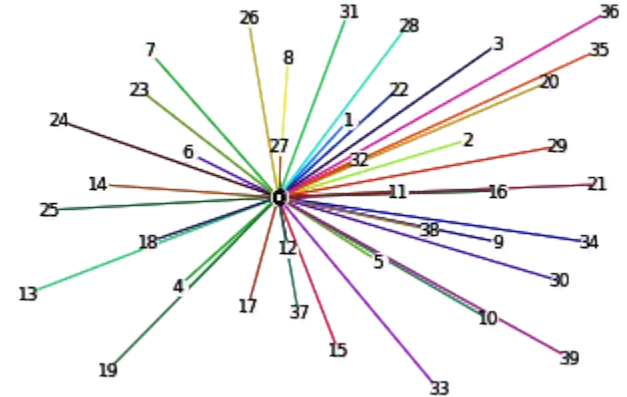
Heuristic Algorithm

Multi-Start Algorithm

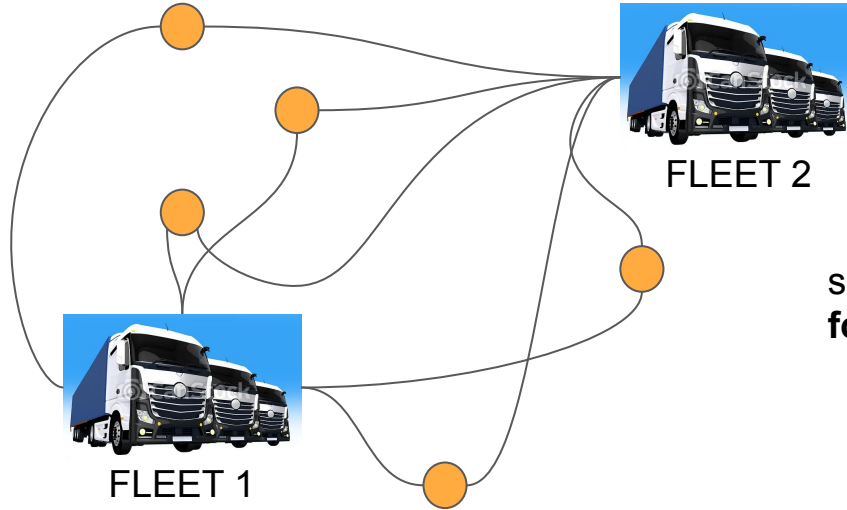Volume Constraints

Results (Notebook)

Inspiration

G. Clarke and J. W. Wright (1964). Scheduling of vehicles from a central depot to a number of delivery points. Operations research, 12(4):568-581.

Heuristic Algorithm


```
savings_list = sorted(edges, key=value, reverse=True)
for edge in savings_list
    fleet  = edge.fleet; customer = edge.customer;
    if customer already assigned
        continue
    end if
    if fleet.level + customer.demand < fleet.capacity
        assign customer to fleet
    end if
end for
```

Heuristic Algorithm

FLEET 2

FLEET 1

FLEET 3

Green capacity

Delay

VALUE

Cost / pack

Success rate

Productivity

Value = α E(success rate) + β E(productivity) + γ E(green) - δ E(delay) - ζ E(cost)

Heuristic Algorithm

P = 4

FLEET 2

P = 3.2

P = 3

FLEET 1

FLEET 3

Green capacity

Delay

VALUE

Cost / pack

Success rate

Productivity
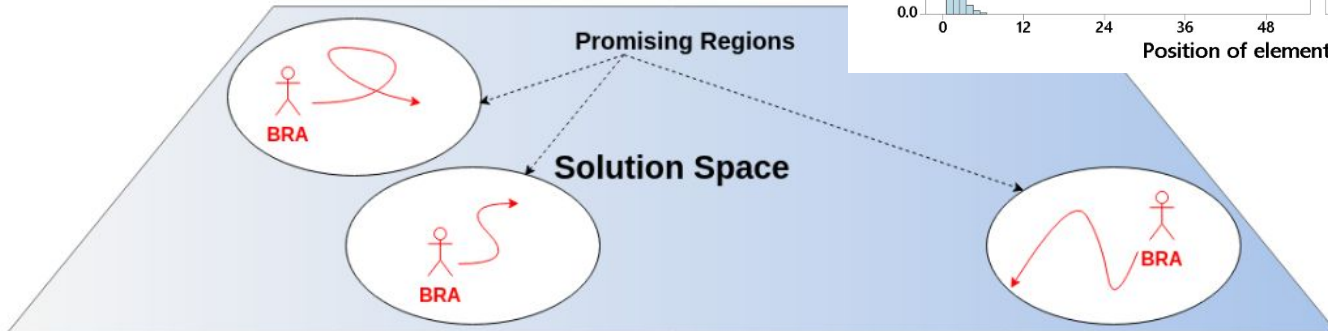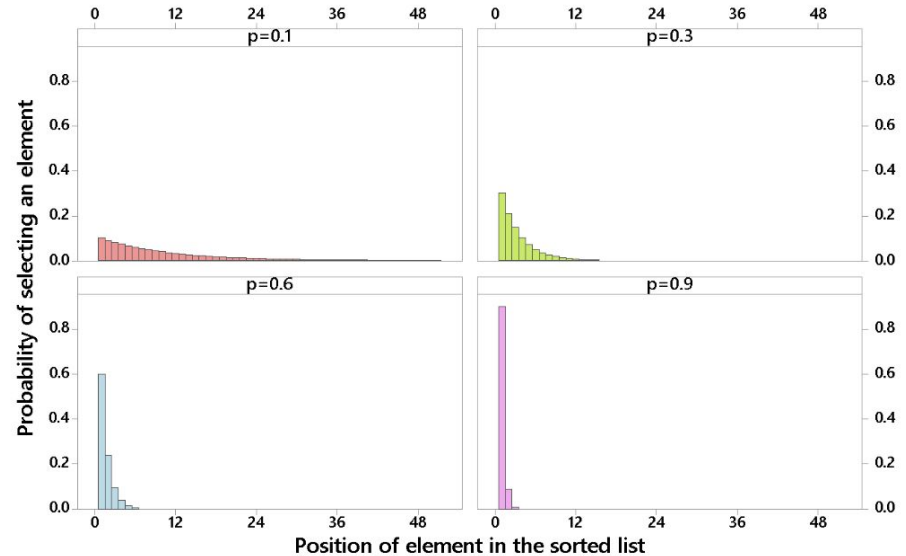
E(productivity)[Customer - Fleet2] = 4 / 3.2

Marginal value

Multi-Start Algorithm

while available time not exceeded
   newsol = **new** Solution()
   if profit(newsol) > **profit**(bestsol)
     bestsol = newsol
   end if
end loop

Volume Constraints

```
savings_list = sorted(edges, key=value, reverse=True)
for fleet in fleets
    for edge in savings_list
        if edge.fleet == fleet and fleet.level < fleet.minvol and customer.assigned_qty < customer.demand
            assigned_qty = min(customer.demand - customer.assigned_qty, fleet.minvol - fleet.level)
            assign assigned_qty from customer to fleet
        end if
    end for
end for
for edge in savings_list
    fleet  = edge.fleet; customer = edge.customer;
    if customer.assigned_qty == customer.demand
        continue
    end if
    if fleet.level < fleet.capacity
        assigned_qty = min(customer.demand - customer.assigned_qty, fleet.capacity - fleet.level)
        assign assigned_qty from customer to fleet
    end if
end for
```