ALGORITHM TO REDUCE CITY TRAFFIC

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ABSTRACT
The function of this algorithm is to find the least number of personal cars to use, so the owners of them can go to work and in their way, pick up coworkers, so the number of cars in the city reduces, hence, the traffic. This algorithm takes in consideration others problems, like how far is the owner of the car to the coworkers and to their workplace, which is important to elaborate the best suitable algorithm so the owner of the car only pick up people living near him or on his/her way to their workplace, therefore this reduces their time in the road, and hence, the traffic in the city, and also contamination (which is not related to the problem but it is also important.)

1. INTRODUCTION
The reason behind the creation of this algorithm is the real life problems of traffic there is, not only in Medellin, but also in any other big city in Colombia and in the World. And this problem, started when cars started to be a more convenient tool for transportation, but with the mass production of cars, people stated to buy more and more and stopped thinking if they actually needed them for transportation or had other options.

2. PROBLEM
In the city of Medellin, or any big city in the country of Colombia, traffic is a constant problem every single day of the week, especially during workdays. And it is caused because a typical family house in the city may have a range of personal cars from one to three. Thus, creating a problem in a city, where statistically, there are more cars than people in it. The goal of this algorithm is to reduce the number of cars in a typical family house may use by creating and algorithm that tells the driver who the people to pick up so the best and fastest route to work is taken. And therefore, traffic is reduce, and also contamination by cars.

3. RELATED WORK

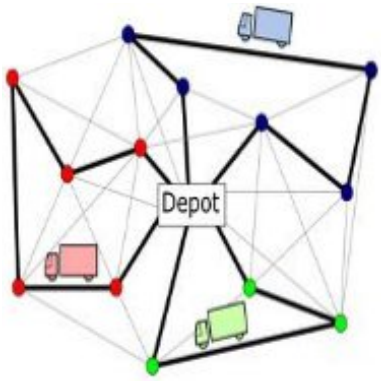
3.1 Muddy City Problem

This is a minimal spanning tree problem, which consists in a hypothetical city where the mayor wants to pave roads but doesn't want to spend extra money in the roads that aren't quite used.
A possible solution is the Kruskal's Algorithm, which finds a minimum spanning tree for an undirected weighted graph.

3.2 Vehicle Routing Problem

The Vehicle Routing Problem was first proposed by George Santzip and John Ramser in 1959 that asks the question "Which is the best set of routes for a fleet of vehicles in order to deliver to a given set of customers?, " in their paper "Truck Delivery Problem."

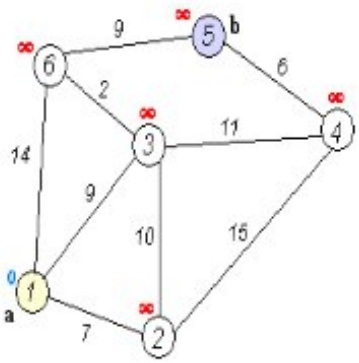
And a more optimal solution for this problem is Clarke and Wright's Savings Algorithm created in 1964.



3.3 Shortest Path Problem

This problem consists in finding the shortest path from one place to another in directed or undirected graph.

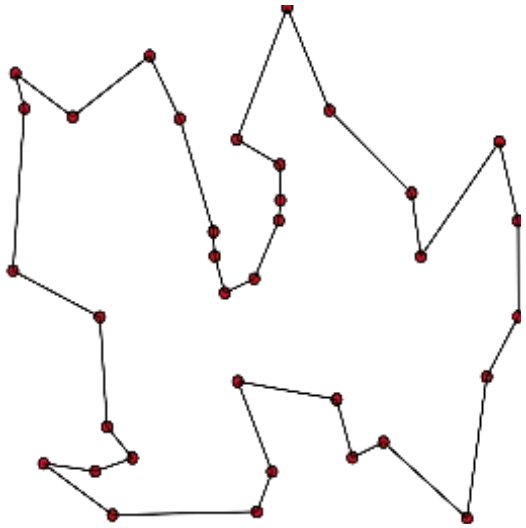
There are many solutions for this problem, the most known if Dijkstra's Algorithm, which finds the shortest pat by going through its vertex and finding the least cost possible combination to the desired point.



3.4 Traveling Salesman Problem

The problem consists that a salesman most travel through a sets of cities and finalizing his/her journey in his/her hometown (which is the starting point). But the salesman wants to minimize the total length of the trip. It was first formulated by W.R Hamilton and Thomas Kirkman in the 1800s.

The solution of this type of problems consists in dividing the problem in sub-problems, in which each sub-problem consists in an optimal route through the city.



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