

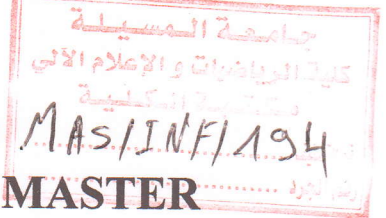


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SUJET

**Geolocation web application for vehicule routing
problem based on genetic algorithms**

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GENERAL INTRODUCTION

In business today companies are undergoing a revolution in terms of implementing new operations strategies and technologies in response to the challenges and demands of the twenty-first century. Businesses have to overcome the challenges of satisfying the demand of customer for products. Customers have become increasingly demanding, expecting ever-higher levels of product and service performance. Gradually, in industry after industry, customers are coming to expect greater customization of products and services to their individual needs.

Increasing competition, complexity, and geographical scope in the business world have led to the supply chain management and continuing improvements in the capabilities of the personal computer have made the optimization of supply chain performance possible. Electronic mail and the Internet have revolutionized communication and data exchange, facilitating the necessary flow of information between the companies in the supply chain.

Supply chain management is a broadened management focus that considers the combined impact of all the companies involved in the production of goods and services, from suppliers to manufacturers to wholesalers to retailers to final consumers and beyond to disposal and recycling.

most companies focused their supply chain initiatives on reengineering supply chain cost structures. These initiatives were driven primarily by corporate restructuring and internal improvement as company strategies responded to the accelerated opening of global markets. Companies that practice supply chain management report significant cost and cycle time reductions. For example, Wal-Mart Stores Inc. announced increases in inventory turns, decreases in out-of-stock occurrences, and a replenishment cycle that has moved from weeks to days to hours

The challenging strategy in the field of supply chain management and logistics industry is to optimize the product delivery from suppliers to customers thus satisfying constraints. the major industry players manage systems to create ever greater value, the decision-making quality is largely related to the ability to solve combined complex problems. Such problems are known

as Vehicle Routing Problems (VRP), in which the vehicles leave the depot, serve customers assigned and upon completion of their routes return to the depot. Each customer is characterized by their own demand. Since the problem is related with only one depot, the VRP is also named Single-depot VRP. In cases with more than one depot, VRPs are known as multi-depot VRPs (MDVRP). VRP problems enhanced with additional features or constraints, dedicated to tactical choices as routing issues over an extended time horizon (. Francis et al 2008); or greater fidelity to reality: legal constraints on driving time (. Goel 2010, Prescott-Gagnon et al 2010), transport axis congestion (. Malandraki and Daskin 1992 Ichoua et al 2003), or finally explicit placement of objects in the load (Iori and Martello 2010).

In VRP exact methods are not suitable to obtain optimal solutions. heuristic algorithms have been adopted to solve the VRPs at a faster rate thus providing computationally efficient solutions. yet, very few methods are now able to solve general way a relatively large set of variants of the VRP. The objective of the problem is aimed at minimizing the total cost of combined routes for a fleet of vehicles. Since cost is associated with distance, in general, the goal is to minimize the distance travelled.

In this thesis, we will try to solve VRP by applying the bio-inspired Genetic Algorithm. After that the solution is implemented through a web application and to increase the challenges we will create an android application for the management of our system .

This thesis constitute a steps to solve vehicle routing problem. The structure of this thesis is the following:

in chapter 1 we present general concepts on web and Android applications. in Chapter 2 we introduce the definition of VRP, its mechanism then the approximate and exact methods. In chapter 03 we propose our solution to VRP algorithm, in addition we present our web and Android application, and the tools used for the implementation. Finally, We conclude by a general conclusion that encapsulate results and difficulties encountered

GENERAL CONCLUSION

The vehicle routing problems are an integral part of deciders and planners daily life. It's about determine the vehicles fleet tours to deliver a clients list, or make interventions tours (maintenance, repair, controls) or visits (medical visits, commercial, etc.).

As part of this thesis, we are interested in a variant important to these problems which is the problem of transport on demand in several vehicles with a limited capacity, and time window in the static case; it means that all the clients requests are known beforehand. this consists in determining the tours and schedules for vehicles that carry out the users transport on their demand, in order to determine the shortest path.

We proposed our approach to solving the VRP, it is mainly based on the genetic algorithm with a new technique which consists in doing crossing and mutation not on the individual as a whole, but only on the order succession of query execution.

The testing has shown that our approach is a good combination between the transport total cost and the transport time for each client.

For the real data, the developed genetic algorithm has proven its effectiveness by:

- _ the minimization of transport time.
- _ the minimization of transportation cost.
- _ the minimization of the vehicles path.

This work is concerned for one seller seen as an administrator, in a prospect of improvement; we propose that an infinite number of sellers can register on this site or application and exploit it, also clients can pay for their purchases with electronic payment. We also propose to increase the challenge and try to solve Multi-Depot Vehicle Routing Problem.

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Abstract

In the industry field The challenging strategy of supply chain management and logistics is to optimize the product delivery from suppliers to customers thus satisfying constraints. Such problems are known as Vehicle Routing Problems (VRP), in which the vehicles leave the depot, serve customers assigned and upon completion of their routes return to the depot. In this thesis, our goal is to minimize the distance travelled by applying the bio-inspired Genetic Algorithms. After that our solution is implemented through a web application and to increase the challenges we will create an android application for the management of our system .

Key words: Vehicle Routing Problems, optimization, Genetic Algorithms

Résumé

Dans le domaine de l'industrie, le défi dans la gestion de la chaîne logistique d'approvisionnement est d'optimiser la livraison des produits des fournisseurs aux clients ainsi satisfaire les contraintes. De tels problèmes sont connus comme des problèmes d'acheminement des véhicules, dans lequel les véhicules quittent le dépôt pour satisfaire les clients puis retournent au dépôt. Dans cette thèse, notre objectif est de réduire au minimum la distance parcourue par l'application des algorithmes génétiques. Après notre solution est mise en œuvre par le biais d'une application Web et pour augmenter les défis nous allons créer une application Android pour la gestion de notre système.

Mots clés: problèmes d'acheminement des véhicules, optimisation, algorithmes génétiques.

ملخص

في مجال الصناعة أكبر تحدي في استراتيجية إدارة سلسلة التوريد والخدمات اللوجستية هي تحسين تسليم المنتجات من الموردين للعملاء بوجود قيود و شروط ومن المعروف أن مثل هذه المشاكل تعرف باسم مشاكل توجيه المركبات، حيث تغادر المركبات المستودع، متوجهة بالسلع للعملاء ، وعند الانتهاء تعود إلى المستودع. هدفنا في هذه الأطروحة، هو تقليل المسافة التي تقطعها مركبات بتطبيق الخوارزميات الجينية. بعد ذلك توفير حلنا من خلال تطبيق ويب ولزيادة التحديات قمنا بإنشاء تطبيق اندرويد لإدارة نظامنا.

الكلمات المفتاحية: مشاكل توجيه المركبات، التحسين، الخوارزميات الجينية