Chapter 1

Introduction

1.1 Introduction

Revenue management (also known as yield management) has gained very high attention of the entrepreneurs who are selling their products in very competitive and highly segmented market [20]. This is mainly because of the complexity introduced to the market due to competition and high segmentation. That complexity in turn leaves no other room to earn additional revenue without properly dealing with the complexity. Properly managed complexity could result in previously unseen, huge growths in revenue. Revenue management has been tried, starting from 1970s in air line industry. According to the literature, after employing successful revenue management, American Airlines, has reported a $500million revenue increase per year and Delta air line, which adopted the same concepts using another system has generated additional $300million revenue per year [1]. With the arrival of internet oriented marketing, business organizations are now facing greater competition and sudden demand fluctuations which directly impacts their sales [4]. Hence, conventional revenue management techniques, which require regular human intervention is becoming time consuming because of the large volumes of data to be analyzed [6]. Because of that reason, what is produced in human involved revenue management quickly become outdated because of the subtle changes in demand for their products. Even though there are many software products are available in the market, even with the assistance of artificial intelligence techniques, mostly prediction and forecast is done by the software and decisions need to be taken by humans which again, introduce a delay to the actions [6]. Hence a solution is still required, which interconnects different components of a pricing and selling system, adapting to subtle market changes and acting autonomously.

1.2 Agent Approach

From the literature it is evident that multi agent technology used to model the complexity in business process management software [11]. This is because, features

like, autonomy in agents well suited to address issues in complexity. Inputs to the system are customer purchase requests for flights seats, relevant inventory with listed prices and price fluctuation levels. Outputs of the system would be if to accept customer purchase request at the requested prices, autonomous price adjustments to the inventory and most appropriate allocation of the inventory which generates the optimal revenue. In transforming input to the output, agents act autonomously trying to negotiate the best price for the customer while doing the optimal inventory allocation. Features of the system are adaptive negotiation, adaptive price adjustments and generating forecasts for customer request price and number of requests to come.

1.3 Aim and Objectives

Aim of this particular work is to build a multi agent system to model tour operator's business in such a way that human intervention is reduced while overall revenue is maintained and maximized. Following are the objectives.

- To study the revenue management techniques
- To study about multi agent techniques in modeling business process complexity
- To design and develop a solution
- To evaluate the solution
- To document the work

1.4 Resource Requirement

Implementation requires few desktop computers to model a distributed environment for agents to operate. This will resemble an online market place. Operating system software either Linux or Windows will be required to host the developed application. MADKit is used to develop the models of agents and XML based structures developed as Ontology for agents to operate. Internet access will not be required since agents are supposed to operate in a LAN (Local Area Network).

1.5 Structure of the thesis

Next on this thesis, chapter 2 is the chapter on current literature and unsolved issues. Chapter 3 presents technology implementing the software. Approach in developing

the solution is presented in chapter 4 which is followed by detailed design in chapter 5. Implementation is presented in chapter 6 which is followed by evaluation in chapter 7. Conclusion presented in chapter 8 ends the body of the thesis. Finally, List of references, and various appendices for design diagrams, screens of the developed system and test included.

1.6 Summary

This chapter introduced what revenue management is, the importance of managing revenues and why it still is a challenging task. Then it was briefly explained the approach taken to solve the particular problem. In doing that, the aim and objectives identified along with resource requirement were explained next. Finally the structure of the rest of the thesis was presented.

Next chapter presents the current work done in the literature in detail in the area of revenue management.