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|  | **Faculty of Industry and Energy Technology** |

**Decision Support System using C #. Net**

A capstone project submitted to faculty of Industry and Energy Technology, New Cairo Technological University, In partial fulfillment of the requirements for the Degree of Higher Diploma

**Information and Communications Technology**

**Submitted by**

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**Approval Sheet**

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**This capstone project has been approved by the examining committee:**

**Score:------------------**

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**DEDICATION**

*Dedicated to My Wonderful Mother for Her Love and Measureless Support from The Heaven.*

# ACKNOWLEDGMENT

First of all, I thank my *" God* " for helping me to achieve this work and giving me the ability to finish this thesis in that satisfactory form*.*

I would like to express my sincere appreciation to my supervisors: ***Dr.*** ***Ghada Maher and Eng. Roula Mohamed****.* I am very grateful for their strong effort, continuous support, and encouragement during the research study in this capstone project. They really influenced my way of thinking and developing the research ideas adopted in this thesis. Really, I can’t find the appropriate words to thank them. I am very grateful for their strong effort, continuous support, and encouragement during the research study in this capstone project.

I can’t forget my dearest ***Prof. Adly Tag Eldeen***, Head of Information and Communications Technology Department, the man who learn me not only how to make scientific research but also more diverse things in my practical life.

I would like also to express my deepest thanks *all the members* of my colleges for their cooperation during the period I spend with them

to prepare this work.

I am extremely grateful to *my* *family especially my father, mother*.

*Capstone Project Team*

# ABSTRACT

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| قواعد كتابة الملخص  .1حوالي 200 كلمة  .2يجب أن يتضمن الهدف من العمل والمشكلة العلمية  .3المنهجية المستخدمة لحل المشكلة العلمية  .4عرض أهم النتائج التي تم التوصل إليها  .5خلاصة تتضمن أهمية هذه النتائج |

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# LIST OF ABBREVIATIONS

|  |  |
| --- | --- |
| **Referenced Terms** | **Abbreviation** |
| Adaptive-Particle Swarm Optimization | A-PSO |
| Ant Colony Optimization | ACO |
| Artificial Bee Colony | ABC |
| Analytical Hierarchy Process | AHP |
| Analytical Hierarchy Process (AHP) and Multi-Objective Genetic Approach | AHP-MGA |
|  |  |
|  |  |

# NOMENCLATURES

|  |  |
| --- | --- |
| **Nomenclature** | **Referenced Terms** |
|  | Active activities at time |
|  | Make-span of project |

**CHAPTER I**

**INTRODUCTION**

# CHAPTER 1

## INTRODUCTION

This chapter provides an overview of the thesis's context, problem statement, capstone objective, capstone methodology, and the significance of thesis. Finally, the organization of this capstone project.

### **1 Overview**

A website called Duck's Row was created to make it easier for users to choose the perfect hangout based on their budget. Choosing the perfect place to interact may be difficult and time-consuming, especially if you have a limited budget. Duck's Row is aware of this. The website has a user-friendly interface that makes it simple for customers to navigate and discover the best solutions for their needs. Users may find new and interesting places to hang out because to its huge database of restaurants, cafes, parks, and other entertainment options.

### **2 Problem Statement**

### The problem is a lot of teenagers have a problem with choosing the best place to hang out, which often leads to the cancellation of their plans. With so many options available, teenagers are often overloaded and find it difficult to make a decision that satisfies everyone's opinions, budgets, and interests. This may cause time wase and missed opportunities for having fun, Therefore, there is a need for a solution that simplifies and streamlines the decision-making process for teenagers when it comes to choosing the best place to hang out.

### **3 Capstone Project Objective**

Our capstone project's main goal is to create a user-friendly website that offers customized recommendations for hangouts depending on a user's budget. Teenagers should have an enjoyable time with their friends and their decision-making should be made easier for them. Users of the website will be able to limit their search results based on their budget. The website will give a complete database of hangout areas, including restaurants, cafes, parks, and other entertainment options. To help users in selecting their hangouts, the website will also include interactive tools like user reviews and ratings. To know the user’s opinion on specific place.

### **4 Capstone Project Methodology**

The methodology of this research is summarized as follows:

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### **5 Significance of Proposed Capstone Project**

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### **6 Capstone Project Organization**

This thesis is organized as follows. Chapter 2 provides a literature review that investigates the available models and approaches that developed to solve the ---------------Problem. Chapter 3 introduces --------------

**CHAPTER 2**

**Literature Review**

# CHAPTER 2

## LITERATURE REVIEW

### **1 Introduction**

### The suggested approach uses a web-based application that enables users to look for locations that satisfy requirements including location, spending limit, and preferred activity. Users of the service can also compare costs, receive directions, and request estimates from various merchants. The approach appeals to those who are on a budget because it is simple, available, and free.

### **2 Information Systems**

An information system (IS) is a system that collects, stores, and processes data and information. ISs are used to support a wide range of activities, including planning, decision-making, and communication.

In the context of planning a hangout, an IS can be used to:

1. Collect information about potential hangout locations, such as their cost, location, and activities offered.
2. Store this information in a database so that it can be easily accessed and searched.
3. Process this information to generate recommendations for hangouts that meet the user's criteria.
4. Communicate this information to the user in a user-friendly way.

### **3 Decision Support System**

A decision support system (DSS) is an IS that helps users make decisions. DSSs typically include a database of information, a modeling capability, and a user interface.

In the context of planning a hangout, a DSS can be used to:

1. Help users identify the factors that are important to them when planning a hangout.
2. Help users weigh the importance of these factors.
3. Generate a list of potential hangouts that meet the user's criteria.
4. Help users compare the different hangouts and make a decision.

### **4 Solution Approaches**

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### **7 Conclusion**

We have proposed a method for solving the problem of planning a hangout with friends or alone, taking into account the user's budget and preferences. Our method takes into account the following factors:

* The amount of money the user has available
* The places the user would like to visit
* The distance between the places the user would like to visit
* The number of people the user is with

We have implemented our method as a website, which allows users to enter their preferences and budget and then receive a list of recommendations for hangouts that meet their criteria. We have evaluated our website with a user study and found that it is effective in helping users plan hangouts that meet their needs.

**CHAPTER 3**

**Multi-Criteria Decision Making**

# CHAPTER 3

## Multi-Criteria Decision Making.

### **1 Introduction**

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### **2 Problem Formulation**

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### 3 **The Applied Approach**

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### **4 Code of Capstone Project**

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**CHAPTER 4**

**REAL WORLD APPLICATION**

# CHAPTER 4

## 6 REAL WORLD APPLICATION

The method proposed in this capstone project can be applied to a variety of real-world situations. For example, it could be used by people who are planning a vacation, a day trip, or even just a night out with friends. The method could also be used by businesses to help their employees plan social events.

The method is easy to use and can be accessed by anyone with an internet connection. It is also free to use, making it a cost-effective option for people who are on a budget.

The following are some examples of how the method can be used in the real world:

* A couple is planning a vacation and wants to find a place that is within their budget and that has activities that they both enjoy. They can use the method to search for places that meet their criteria and to compare prices.
* A group of friends is planning a day trip and wants to find a place that is close to home and that has activities that everyone will enjoy. They can use the method to search for places that meet their criteria and to get directions.
* A business is planning a social event for its employees and wants to find a place that is affordable and that has enough space for everyone. They can use the method to search for places that meet their criteria and to get quotes from different vendors.

The method proposed in this capstone project is a valuable tool that can be used by people in a variety of real-world situations. It is easy to use, free to use, and effective in helping people plan hangouts that meet their needs and budget.

Here are some additional thoughts on the real world application of this method:

* The method could be used to help people plan hangouts in different cities or countries. This could be helpful for people who are planning a vacation or who are new to an area.
* The method could be used to help people plan hangouts for special occasions, such as birthdays, anniversaries, or holidays. This could help people to find unique and memorable activities to do with their friends and family.
* The method could be used to help people plan hangouts that are specific to their interests. For example, People who are interested in art could use the method to find art museums or galleries.

Overall, the method proposed in this capstone project is a valuable tool that can be used by people in a variety of real-world situations. It is easy to use, free to use, and effective in helping people plan hangouts that meet their needs and budget.

**CHAPTER 5**

**Conclusion and**

**Future Work**

# CHAPTER 5

## CONCLUSION AND FUTURE WORK

### **1 Conclusions**

In this chapter, we summarize the general conclusions of capstone project.

In this thesis, we have addressed the problem of planning a hangout with friends or alone, taking into account the user's budget and preferences. We have proposed a method for solving this problem as a combinatorial optimization problem with constraints. Our method takes into account the following factors:

* The amount of money the user has available
* The places the user would like to visit
* The distance between the places the user would like to visit
* The number of people the user is with

We have implemented our method as a website, which allows users to enter their preferences and budget and then receive a list of recommendations for hangouts that meet their criteria. We have evaluated our website with a user study and found that it is effective in helping users plan hangouts that meet their needs.

### **2 Future Work**

### Many different adaptations, tests, and experiments have been left for the future due to lack of time (i.e. the experiments with real data are usually very time consuming, requiring even days to finish a single run). Future work concerns the deeper analysis of particular mechanisms and new proposals to try different methods. There are a number of ways in which our website could be improved in the future. For example, we could:

### Improve the accuracy of our recommendations by incorporating more data about the places we recommend.

### Allow users to specify more detailed preferences, such as the type of food they would like to eat or the activities they would like to do.

### Integrate with transportation apps to provide users with more information about how to get to the places they are planning to visit.

### We believe that our website has the potential to be a valuable tool for people who are looking for ways to plan hangouts that meet their needs. We are excited to continue working on improving our website and making it even more useful for users.

**Bibliography**

# Bibliography

1. Project Management Institute*, "A Guide to the Project Management Body of Knowledge (PMBOK Guide)", Project Management Institute, 6th edition, 201*7
2. S. Dhiman H., Deb D. (2020), "*Multi-criteria Decision-Making: An Overview. In: Decision and Control in Hybrid Wind Farms. Studies in Systems*", Decision and Control, vol 253. Springer, Singapore. <https://doi.org/10.1007/978-981-15-0275-0_2>