Implementation and In-Depth Analysis of Flight Optimization Systems for Travel Agencies: A Multi-Criteria Approach

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***Abstract*—This paper presents a multi-criteria flight optimization system for travel agencies, designed to recommend optimal flight routes by balancing cost, duration, and customer satisfaction. The proposed framework employs A, Dijkstra's, and Genetic Algorithms implemented in Python to evaluate flight data spanning 1993-2023 from U.S. domestic routes, sourced from a Kaggle dataset containing 245,955 entries with parameters such as fare, distance, carrier dominance, and airport coordinates. Key innovations include a hybrid approach combining heuristic pathfinding (using Haversine distance for A*) with genetic crossover operations to -¿ !!!!!! ¡- address multi-objective optimization. Eesults demonstrate the effectiveness of A* and Dijkstra's algorithms in minimizing travel costs and time, while genetic algorithm gives sufficient results it is much slover than mentioned algorithms without proper optimization techniques. The system currently provides personalized flight recommendations based on user preferences, with visualized outputs generated via the NetworkX library. This work contributes a scalable framework for enhancing decision-making in travel planning systems.**

I. INTRODUCTION

Your goal is to simulate the usual appearance of papers in an *IEEE conference proceedings*. Prepare your paper in full-size format, on US letter paper ($8\frac{1}{2}$ by 11 inches). For A4 paper, use the A4 settings.

A. Type Sizes and Typefaces

Follow the type sizes specified in Table I. Times New Roman is the preferred font.

TABLE I
TYPE SIZES FOR PAPERS

Type size (pts.)	Regular	Bold	Italic
6	Table captions		
8	Section titles		
9	Main text	Abstract	Subheading
10	Authors' names		
11	Paper title		

II. HELPFUL HINTS

A. Figures and Tables

Position figures and tables at the tops and bottoms of columns. Figure captions should be centered below the figures as shown in Fig. 1.

Fig. 1. Sample figure caption.

B. References

Number citations consecutively in square brackets [1]. Use "Ref. [3]" at the beginning of a sentence.

C. Equations

Number equations consecutively:

$$a+b=c \tag{1}$$

Symbols should be defined immediately following the equation.

III. UNITS

Use either SI (MKS) or CGS as primary units. Avoid combining SI and CGS units.

IV. SOME COMMON MISTAKES

The word "data" is plural. Use proper punctuation within quotation marks: "like this."

ACKNOWLEDGMENT

The preferred spelling is "acknowledgment" without an "e" after the "g."

REFERENCES

[1] G. Eason et al., "On certain integrals," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529-551, 1955.
[2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism. Oxford: Clarendon, 1892.