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Dilema Sierra Madre: Optimasi Pengorbanan Inventaris untuk Maksimasi Profit Emas Menggunakan Algoritma Randomized Sampling, Branch and Bound, dan Greedy (Studi Kasus: Fallout New Vegas - Dead Money)

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Abstract

*Misi akhir "Heist of the Centuries" dalam DLC Dead Money untuk game Fallout: New Vegas menghadapkan pemain pada dilema optimasi yang krusial: bagaimana memaksimalkan perolehan emas batangan bernilai tinggi dari Sierra Madre Vault dengan kapasitas bawa yang sangat terbatas, yang seringkali menuntut pengorbanan item-item berharga dari inventaris pemain. Permasalahan ini dapat dimodelkan sebagai varian kompleks dari Knapsack Problem, di mana tujuannya adalah memaksimalkan profit bersih (nilai total emas yang diambil dikurangi nilai total item yang dikorbankan). Makalah ini bertujuan untuk menganalisis dan membandingkan efektivitas tiga pendekatan algoritma Greedy, Branch and Bound, dan Randomized Sampling dalam menentukan kombinasi item optimal yang harus dikorbankan untuk mencapai profit bersih tertinggi. Algoritma Greedy menawarkan solusi cepat dengan membuat keputusan lokal optimal berdasarkan heuristik tertentu (misalnya, mengorbankan item dengan rasio nilai/berat terendah). Branch and Bound akan secara sistematis mengeksplorasi ruang solusi untuk menjamin perolehan profit bersih optimal global, meskipun dengan potensi kompleksitas waktu yang lebih tinggi. Sementara itu, Randomized Sampling akan menghasilkan dan mengevaluasi sejumlah besar skenario pengorbanan acak untuk menemukan solusi yang mendekati optimal. Analisis komparatif akan difokuskan pada kualitas profit bersih yang dicapai dan efisiensi komputasional masing-masing algoritma, memberikan wawasan mendalam terhadap strategi "letting go" yang paling menguntungkan dalam skenario pengambilan harta karun yang ikonik ini.****Keywords** : Fallout: New Vegas Dead Money, Knapsack Problem varian, Algoritma Greedy, Branch and Bound, Randomized Sampling*

1 Introduction

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The Introduction should contain general background, state-of-the-art review, gap analysis or scientific novelty statement, the research problem or hypothesis, and the research objective. The problem background should be adequately provided, but not excessively; The existing solutions / state-of-the-art studies (including literature review, related works) should be concisely presented; The gap analysis should be adequately explained. This gap may explain the main limitation or differentiation of approach from the previous research. It may show the scientific novelty of the proposed study. Example of novelty statement or the gap analysis statement at the end of the Introduction section (after the state of the art of previous research survey): "........ (short summary of background)....... A few researchers focused on .... There have been limited studies concerned on .... Therefore, this research intends to .... The objectives of this research are ....".

The study aim should be stated precisely and explicitly. This aim should be related to the research gap; The literature review or related works should be included in the Introduction chapter, not as a separate chapter. This discussion of related works can be presented as the literature review. However, It should not be presented as the review of the author-by-author results but should be grouped by their methods or topics.

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The manuscript should be written on A4-sized paper with a minimum length of 7 pages and a maximum of 20 pages for a single column. The manuscript should be written in Times New Roman font, size 12, with a line spacing of 1.15 pt. The top and bottom margins should be 2.5 cm, and the right and left margins should be 1.9 cm. The file should be created using Microsoft Word.

The manuscript should be written in English. The writing of terms, words that require particular emphasis, and the use of foreign or regional languages are recommended to be in italics and not underlined.

Literature should contain the theories or related research used, especially in justifying the novelty or key findings in the research. Related research could be written after the Introduction. Related research should be discussed in Research Methods or Discussions chapter to make it easier to highlight the main findings. It is not recommended to write general theories or knowledge in the fields covered by JMASIF

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Ensure that the use and writing of decimals include a value of 0 before the decimal point: "0.25" and not ".25". Writing numbers/quantities followed by units should be separated by a space, for example: "0.2 cm", "7.34 s". In multiplication between dimensions, the units that follow should also be fully written for each quantity. An example of the correct dimensional multiplication is: "0.1 cm × 0.2 cm", while "0.1 × 0.2 cm2" is an incorrect form.

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The research methods must contain the research procedure, used method/algorithm/model, datasets (including the amount and methods to obtain them), tool/platform/software, and test design. The review articles need not have this chapter. The research procedure or framework describes the stages of research/development undertaken to achieve the research's objectives/outputs; It should describe the methods/algorithms and models (including analysis or statistical) used in the study; If provided, the datasets explanation should be adequately provided, including their number, types, and gain methods; It may inform the materials/platforms used in the study, including the materials and the tools/software/hardware/platforms; It should describe the test design to obtain the result data and their analysis.

When writing equations in the manuscript, it is recommended to use the Microsoft Equation Editor available in Microsoft Word (Insert | Object | Create New | Microsoft Equation) or the Math Type add-on (http://www.mathtype.com). The written equations can include exponent functions, slashes, or other punctuation marks that may be relevant to use.

Ensure that each symbol included in the equation is defined sequentially, either before or after it. Here is an example of writing an equation using the Equation Editor:

$$\int_0^r \quad F(r,\phi)drd\phi = [\sigma r_2/(2\mu_0)].\int \qquad exp\, exp\,(-\lambda|z_j - z_i|)\lambda^{-1}J_1(\lambda r_2)J_0(\lambda r_1)d\lambda \tag{1}$$

In some paper writings, graphs and tables are often included as complementary explanations related to the material presented. Graphs included in the manuscript should be bordered to define the area. Graphs included in the manuscript should be saved in Tagged Image File Format (.TIFF). The description related to the graph should be included at the bottom of the graph/image with a line spacing of 1 and a font size matching the manuscript content, size 10. Labels on the graph should be written with the label name and the following unit, for example: "Time (s)", "Speed (m/s)", "Speed (km/s)", or "Speed (10^3 m/s)". Further settings on the graph should be adjusted according to the manuscript content proportion.

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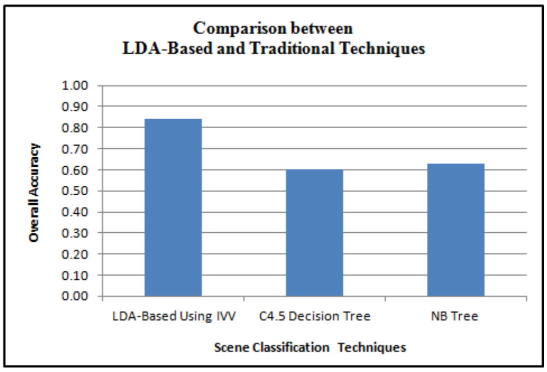

Figure 1 Comparison of Various Scene Classification Techniques

Table 1 Power Flow on the Bus using the Genetic Algorithm Method

Bus No.	Genetic Algorithm Method		
	Voltage Magnitude	P (p.u)	Q (p.u)
1	0.9986	3.1222	1.2131
2	1.0118	23.1023	2.2342
3	0.8985	1.8923	-0.2324
4	0.9030	-22.4425	-0.2634
5	0.9324	1.4235	-0.0893

4 Results and Discussion

In this section, the results of the experiments conducted and various analyses related to the obtained experimental results are presented. It is recommended to use visual illustrations in this section to better support the information being conveyed.

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The conclusion should answer the objectives of the study concisely. It should provide a clear scientific justification for the study; It should not repeat the abstract or the experimental results; It may give an indication of possible applications, extensions, and future experiments suggestions.

Acknowledgement

The acknowledgement should contain thanks to all individuals and institutions that have contributed to the research, the work, and the writing of the manuscript.

Bibliography

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[1]J. Castro and M.Delgado, “Fuzzy Systems with Defuzzification are Universal Approximators”, IEEE Trans. Syst., Man, Cybern., 26, pp.149-152,1996, doi: xx/xx.

[2]T. Takagi and M.Sugeno, “Fuzzy identification of systems and its application to modeling and control, IEEE Trans. Syst., Man, Cybern., Vol.15, pp. 116-132,1985, doi: xx/xx