UNDERGRADUATE THESIS

APPLICATION OF MULTISURF FOR FEATURE WEIGHTING AT THE RETRIEVAL STAGE OF CASE-BASED REASONING IN EARLY DETECTION OF TYPE 2 DIABETES MELLITUS

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APPROVAL SHEET

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STATEMENT OF ORIGINALITY

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Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

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Thus, I made this statement without any coercion from anyone and to be used as it should.

Surabaya, August 28 2026

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ABSTRACT

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Thesis Title :	APPLICATION OF MULTISURF FOR FEATURE WEIGHTING AT THE RETRIEVAL STAGE OF CASE-BASED REASONING IN EARLY DETECTION OF TYPE 2 DIABETES MELLITUS
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Type 2 Diabetes Mellitus is a chronic disease that develops slowly without obvious early symptoms, so early detection is crucial to prevent further complications. This study aims to apply the Case-Based Reasoning (CBR) method with feature weighting using the MultiSURF algorithm and Weighted Euclidean Distance-based similarity measurement at the retrieval stage to support the early detection of Type 2 Diabetes Mellitus, using the Pima Indians Diabetes Dataset of 768 patient data with eight clinical features. The results showed that the Glucose feature obtained the highest weight followed by BMI and Age, with the best configuration at n_neighbors = 3 and K = 9 which resulted in an Accuracy of 76.03%, Precision 65.87%, Recall 64.54%, and an F1-Score of 64.95%. Compared to the CBR model without weighting (Baseline), the MultiSURF-based Weighted CBR model has succeeded in improving Accuracy, Precision, and F1-Score, so that this method can be a viable alternative in supporting the early detection of Type 2 Diabetes Mellitus based on clinical data.

Keywords : Case-Based Reasoning, MultiSURF, Feature Weighting, Euclidean Distance, Type 2 Diabetes Mellitus

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In the process of preparing this thesis, the author realized that this thesis could not be composed properly without the help, support, guidance, motivation, and prayers of various parties. Therefore, with all humility, the author expresses his gratitude to all parties who have helped, both directly and indirectly, so that this thesis can be completed properly. In particular, the author would like to thank the:

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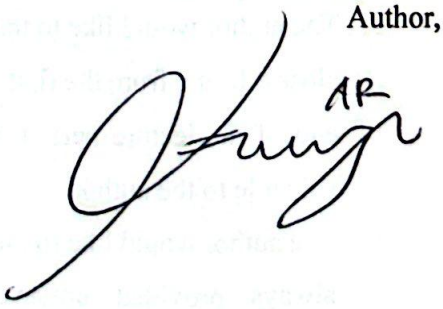
The author realizes that in the preparation of this thesis there are many shortcomings. For this reason, constructive criticism and suggestions from all parties are highly expected for the perfection of writing this thesis. Finally, with all the limitations that the author has, hopefully this report can be useful for all parties in general and writers in particular.

Surabaya, 10 July 2026
Author,



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