



**STUDI EMPIRIS TENTANG KINERJA CROSS-PROJECT DAN
WITHIN-PROJECT DALAM MODEL PREDIKSI CACAT
SOFTWARE**

SKRIPSI

**Untuk Memenuhi Persyaratan
Dalam Menyelesaikan Strata-1 Ilmu Komputer**

Oleh

RAIDRA ZENIANANTO

NIM 2111016210026

**PROGRAM STUDI S-1 ILMU KOMPUTER
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS LAMBUNG MANGKURAT
BANJARBARU**

JULI 2025



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Telah dipertahankan di depan Dosen Penguji pada tanggal 2 Juli 2025.

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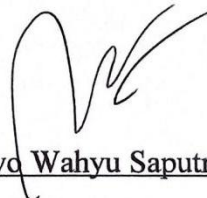
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PRAKATA

Puji dan syukur penulis panjatkan ke hadirat Allah SWT, karena atas rahmat dan karunia-Nya, penulisan skripsi yang berjudul **“STUDI EMPIRIS TENTANG KINERJA CROSS-PROJECT DAN WITHIN-PROJECT DALAM MODEL PREDIKSI CACAT SOFTWARE”** ini dapat diselesaikan dengan baik. Skripsi ini disusun untuk memenuhi syarat untuk memperoleh gelar sarjana di program studi Strata-1 Ilmu Komputer, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Lambung Mangkurat.

Dalam proses penyusunan skripsi ini, penulis menyadari bahwa keberhasilan ini tidak terlepas dari bantuan, bimbingan, dan dukungan dari berbagai pihak, Oleh karena itu dengan rasa hormat, penulis ingin menyampaikan terima kasih sebesar-besarnya kepada:

1. Allah SWT atas segala rahmat, karunia, hidayah, dan ridho-Nya yang telah memungkinkan penulis menyelesaikan skripsi ini.
2. Ayah, ibu, serta saudara penulis yang selalu memberikan doa, kasih sayang, dan dukungan tanpa henti, sehingga penulis memiliki semangat untuk menyelesaikan skripsi ini.
3. Bapak Rudy Herteno, S.Kom., M.Kom, dan Bapak Radityo Adi Nugroho, S.T., M.Kom. selaku dosen pembimbing utama dan pendamping, yang telah memberikan bimbingan, arahan, dan masukan yang sangat berharga selama proses penyusunan skripsi ini.
4. Ibu Dwi Kartini, S.Kom., M.Kom, selaku ketua program studi Ilmu Komputer, beserta seluruh dosen dan staf Fakultas MIPA Universitas Lambung Mangkurat atas bantuan yang diberikan selama penulis mengikuti studi.
5. Teman-teman IOT; Gina, Fauzan, Tajali, Iky, Yosia, Alif, Nazar, dan Michael yang selalu mendukung dalam berbagai hal.
6. Sahabat COS, “Calon Orang Sukses”, yang selalu menemani dalam perjalanan masa perkuliahan; Danan dan Jose.
7. Teman-teman seperjuangan di Ilmu Komputer angkatan 2021 serta sahabat-sahabat yang selalu memberikan semangat dan dukungan selama masa perkuliahan.
8. Semua pihak yang telah membantu penulis dalam menyelesaikan skripsi ini, yang tidak dapat disebutkan satu per satu.

Penulis menyadari bahwa skripsi ini masih jauh dari sempurna. Oleh karena itu, penulis membuka diri terhadap kritik dan saran yang membangun demi penyempurnaan karya ini. Akhir kata, semoga skripsi ini dapat bermanfaat bagi pembaca dan menjadi kontribusi kecil dalam pengembangan ilmu pengetahuan.

Banjarbaru, 1 Juli 2025



Raidra Zenianto

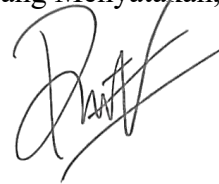
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PERNYATAAN

Dengan ini saya menyatakan bahwa didalam skripsi ini tidak terdapat karya yang pernah diajukan untuk memperoleh gelar kesarjanaan di suatu perguruan tinggi, dan sepanjang pengetahuan saya juga tidak terdapat karya atau pendapat yang pernah ditulis atau diterbitkan oleh orang lain, kecuali yang secara tertulis diacu didalam naskah ini dan disebutkan dalam daftar pustaka.

Banjarbaru, 1 Juli 2025

Yang Menyatakan,



Raidra Zeniananto

NIM. 2111016210026



**KEMENTERIAN PENDIDIKAN TINGGI, SAINS,
DAN TEKNOLOGI
UNIVERSITAS LAMBUNG MANGKURAT
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
PROGRAM STUDI ILMU KOMPUTER**

Jl. A.Yani Km 36, Banjarbaru, Kalimantan Selatan 70714 Telp/Fax. (0511) 4773112/4782899

**BERITA ACARA
PERSETUJUAN REKOGNISI KEGIATAN PENGGANTI SKRIPSI**

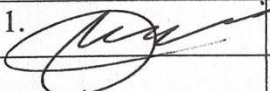
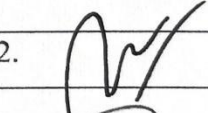
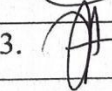
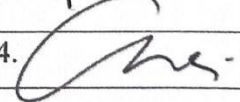
Pada hari ini, Kamis Tanggal 3 Juli 2025, telah dilakukan evaluasi kelengkapan dokumen pengganti kegiatan skripsi mahasiswa S1 Ilmu Komputer Fakultas MIPA ULM

Nama : Raidra Zeniananto
NIM : 2111016210026
Jenis Kegiatan : Jurnal Nasional
Kualifikasi Jurnal/Seminar : Sinta 2
Judul Publikasi : An Empirical Study of Cross-Project and Within-Project Performance in Software Defect Prediction Models Using Tree-Based and Boosting Classifiers
Nama Jurnal/Penyelenggara : Indonesian Journal of Electronics, Electromedical Engineering, and Medical Informatics
Tanggal Publikasi/Presentasi : Agustus 2025

Dokumen yang diajukan dinyatakan :

Memenuhi syarat untuk diterima sebagai REKOGNISI PENGGANTI KEGIATAN SKRIPSI dan DINYATAKAN LULUS SKRIPSI.

Demikian Berita Acara ini dibuat untuk digunakan sebagaimana mestinya.

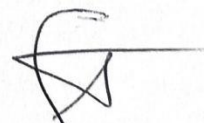
No	Nama	Tanda Tangan	
1.	Andi Farmadi, S.Si., M.T.	1. 	
2.	Setyo Wahyu Saputro, S.Kom., M.Kom.		2. 
3.	Rudy Herteno, S.Kom, M.Kom.	3. 	
4.	Radityo Adi Nugroho, S.T., M.Kom.		4. 

Ketua PS Ilmu Komputer,



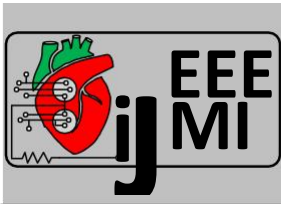
Dwi Kartini, S.Kom., M.Kom.
NIP. 198704212012122003

Panitia Skripsi,



Friska Abadi, S.Kom., M.Kom.
NIP. 198809132023211010

LoA



Dear,
Raidra Zeniananto, et al.

LETTER of ACCEPTANCE (LOA)

It's a great pleasure to inform you that, after the initial peer review process, the scientific committee agree that the **manuscript is accepted** for publication in **Indonesian Journal of Electronics, Electromedical Engineering, and Medical Informatics** and manuscript will be published in **Vol. 7 No. 3 (August 2025)**.

Title	An Empirical Study of Cross-Project and Within-Project Performance in Software Defect Prediction Models Using Tree-Based and Boosting Classifiers
Authors	Raidra Zeniananto, Rudy Herteno, Radityo Adi, Andi Farmadi, Setyo Wahyu Saputro
Article Publication Charge*	Rp. 2.500.000 (Account Name: Triwiyanto; Bank: BNI; Account No: 0266 5645 77). Note: please attach the payment proof in the discussion menu (OJS)
Payment Status	PAID

Thank you for your contribution to the **Indonesian Journal of Electronics, Electromedical Engineering, and Medical Informatics** and we look forward to receiving further submissions from you.

Sincerely,

Associate Professor Dr. Triwiyanto

Editor-in-chief

Indonesian Journal of Electronics, Electromedical Engineering, and Medical Informatics

[Email]: dr.triwiyanto@gmail.com : [Profile]: [Scopus](#): [Publon](#)

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Accreditation Decree: 72/E/KPT/2024, Date: 1 April 2024 ([Decree/ SK Document](#)) Editorial:

Department of Medical Electronics Technology, Poltekkes Kemenkes Surabaya

Jl. Pucang Jajar Timur No. 10, Surabaya, Indonesia

Form Review

Reviewer 1:

Recommendation: Revisions Required

read comments and suggestion as follows:

1. The paper mentions the use of identical preprocessing steps for both WP-SDP and CP-SDP but lacks specific details. Please provide a comprehensive description of the preprocessing procedures, including feature engineering, normalization or standardization techniques, handling missing values, and the criteria for feature selection to ensure reproducibility.
2. While the impact of resampling techniques (no sampling, oversampling, undersampling) is discussed, the methodology behind their implementation remains vague. Specify the algorithms or libraries used, parameters set for methods like SMOTE or random undersampling, and the rationale behind choosing these particular techniques in your experimental setup.
3. The selection of classifiers (SVM, Random Forest, Gradient Boosting, XGBoost, LightGBM) should be justified in the context of defect prediction. Please elaborate on why these algorithms were chosen over others and whether hyperparameter tuning was performed for each to optimize performance. Including details of tuning processes would strengthen the methodological rigor.
4. The data partitioning process mentions a 70-30 split for training and testing but does not specify if this split was random, stratified, or based on specific project attributes. Clarify how the splitting was performed, especially across multiple projects, to confirm that the evaluation reflects realistic scenarios and avoids data leakage.
5. Given the importance of addressing class imbalance, detail the specific techniques used in oversampling (e.g., SMOTE variants, ADASYN) and undersampling methods. Also, explain if any class weighting or cost-sensitive learning strategies were applied in the classifiers and how these choices influence the results.
6. The methodology lacks information about hyperparameter tuning processes. Clarify whether grid search, random search, or other optimization methods were utilized, which hyperparameters were tuned, the ranges or values tested, and how the optimal parameters were selected to ensure the classifiers' best performance.
7. While AUC and accuracy are used for evaluation, expand on the statistical significance testing methods applied to compare different models (e.g., t-tests, Wilcoxon signed-rank). This will help in assessing whether observed performance differences are statistically meaningful.
8. Mention whether seed values were set for stochastic processes like resampling and model training to facilitate reproducibility. Providing information about software versions, hardware environment, and code availability (if applicable) would also enhance the transparency of your methodology.
9. Describe how the training data for CP-SDP was selected from projects other than the target. Specify whether projects were grouped based on similarity measures, and if any feature alignment or normalization was performed to account for inter-project heterogeneity, which is critical for cross-project transferability.
10. The paper references a research flowchart but does not provide detailed steps within the method section. Including a detailed, step-by-step description of the entire experimental process from data collection, preprocessing, splitting, resampling, classifier training, to evaluation would significantly improve clarity and reproducibility for readers and researchers alike.

Reviewer 2:

Recommendation: Revisions Required

In this study, author conducted a comprehensive evaluation of two widely employed SDP approaches, Within-Project Software Defect Prediction (WP-SDP) and Cross-Project Software Defect Prediction (CP-SDP), using identical preprocessing steps to ensure an objective comparison. We utilized the NASA MDP dataset, where each project was split into 70% training and 30% testing data, and applied three distinct resampling strategies no sampling, oversampling, and undersampling to address the challenge of class imbalance. Five classification algorithms were examined, including Support Vector Machine (SVM), Random Forest (RF), Gradient Boosting (GB), XGBoost (XGB), and LightGBM (LGBM).

Address following comments:

- The results indicate that WP-SDP generally outperforms CP-SDP, but the discussion lacks an in-depth analysis of the factors contributing to this variability across different projects. Please elaborate on the dataset characteristics, such as project size or complexity, that influence the effectiveness of each approach to provide clearer insights.
- While performance metrics like AUC and accuracy are reported, there is no mention of whether the observed differences are statistically significant. Incorporate appropriate statistical tests, such as paired t-tests or Wilcoxon signed-rank tests, to validate the significance of the performance improvements claimed.
- The discussion highlights the benefits of oversampling and undersampling but does not sufficiently analyze how these strategies specifically affected the results. Include a comparative analysis or visualization, such as box plots or performance distributions, to better illustrate their impact on model stability and performance.
- The discussion would benefit from acknowledging potential limitations, such as dataset size, project heterogeneity, or the generalizability of the findings. Discuss how these limitations might influence the interpretation of results and suggest possible ways to mitigate them in future research.
- Although the paper mentions the use of several classifiers, it does not analyze or discuss the interpretability of the models' predictions. Consider adding discussion on feature importance or SHAP values, particularly for Random Forest or Gradient Boosting models, to enhance understanding of the decision-making process.
- The discussion states that WP-SDP generally performs better, but it should explore specific reasons behind this trend, such as data distribution or project similarity. Also, analyze cases where CP-SDP performs well, especially in smaller projects, to provide nuanced guidance on approach selection.
- The results section offers valuable insights but lacks emphasis on practical implications for software practitioners. Discuss how these findings can inform real-world defect prediction activities, including recommendations for choosing between WP-SDP and CP-SDP based on project context and available data.
- Enhance the discussion with visual aids such as heatmaps, bar charts, or scatter plots to summarize the performance across different projects, classifiers, and resampling methods. Visual representations can make the comparisons clearer and more impactful for readers.
- The discussion should include an assessment of model stability across multiple runs or folds, especially since techniques like resampling can introduce variability. Address whether the reported results are consistent and how confidence intervals or standard deviations support the robustness of your findings.
- The discussion hints at the potential of transfer learning and hybrid methods but does not extensively connect these ideas to your findings. Expand on how the observed results, especially the successes and failures of different approaches, inform future research avenues or the development of more advanced defect prediction models.

Bukti Pembayaran

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