View Review

Paper ID

1011

Paper Title

Context-Guided Active Domain Adaptation for Blended Target Domain

Track Name

ICASSP 2025 Main Tracks

REVIEW QUESTIONS

1. How confident are you in your evaluation of this paper?

2. Confident

2. Importance/Relevance

3. Of sufficient interest

4. Classify the type of paper

More empirical

5. Originality/Novelty

3. Moderately original; provides limited new insights or understanding

6. Justification of Originality/Novelty Score (required)

The importance of this paper lies in the fact that it proposes a new method called Context-Guided Active Domain Adaptation (CGDA), which is specifically used for adaptation tasks in multiple target domains, and in particular provides an innovative domain adaptation method in the context of image classification. This method not only fills the gap of traditional single-target domain adaptation in multi-target domain scenarios, but also proposes a solution to improve model performance in the case of incompletely labeled target domains. Therefore, the paper has high research value and practical application potential, and is suitable for in-depth discussion by researchers in the field.

7. Theoretical Development

3. Probably correct; provides limited new insights or understanding

8. Justification of Theoretical Development Score (required if score is 1 or 2).

The theoretical development in this paper is robust and well-structured. The authors propose the Context-Guided Active Domain Adaptation (CGDA) framework, introducing the Masked Image Aware (MIA) module and Blended Feature Augment (BFA) module, both essential for enabling blended target domain adaptation (BTDA). The justification for these modules is grounded in addressing blended domain challenges that traditional single-domain-focused ADA methods overlook. By emphasizing spatial and local contexts, the theoretical foundation directly supports the paper's objectives and is well-integrated into the methodology. No concerns regarding theoretical weaknesses were identified.

9. Experimental Validation

3. Limited but convincing

10. Justification of Experimental Validation Score (required if score is 1 or 2).

The authors validate their approach through extensive experiments on two well-established datasets, Office-Home and Office-31, comparing their CGDA method with various state-of-the-art approaches. The results consistently show the superior performance of CGDA across multiple BTDA settings, with detailed metrics provided in the tables and ablation studies. The experiments are thorough, examining not only performance but also the importance of individual components (MIA, BFA, and the selection criterion), which strengthens the credibility of the results. Additionally, visualizations via t-SNE plots further substantiate the effectiveness of CGDA in achieving better clustering and separability of target domain data.

11. Clarity of Presentation

3. Clear enough

12. Justification of Clarity of Presentation Score (required if score is 1 or 2).

The paper is clearly written, with a well-organized structure. The introduction and background provide sufficient context for the problem, and each section flows logically into the next. The diagrams, particularly Figure 1 outlining the CGDA framework, are effective in conveying complex processes. Equations and experimental results are presented with clarity, allowing readers to follow the methodology and validate the reasoning behind the results.

13. Reference to Prior Work

3. References adequate

14. Justification of Reference to Prior Work Score (required if score is 1 or 2).

The paper provides an extensive and relevant literature review, covering foundational work in active domain adaptation, blended-target domain adaptation, and context utilization. The references are comprehensive and include recent developments in the field, providing a solid theoretical basis for the proposed CGDA method. This suggests the authors have thoroughly reviewed and built upon prior research in this area.

15. Overall evaluation of this paper

3. Marginal accept

16. Justification of Overall evaluation of this paper (required)

This paper offers a significant contribution to the field of domain adaptation by introducing a novel method for blended-target domain adaptation using active learning. The CGDA approach not only addresses an underexplored area in domain adaptation but also demonstrates superior performance across various benchmarks and settings. The theoretical foundation is solid, and the experimental validation is extensive and convincing. Given the clarity of presentation, strong theoretical underpinnings, and empirical results, this paper merits acceptance.

17. Award Quality (only for papers marked "Definite accept")

2. Strong consideration for award

18. Award Quality (Justification)

The CGDA method offers a noteworthy contribution by advancing active domain adaptation for blended domains, with practical applicability in real-world, multi-domain environments.

While the work is impactful and shows promising results, further exploration or more diverse datasets might be beneficial to fully establish CGDA as the best overall paper. Nonetheless, it remains a strong contender.

19. Confidential Comments to technical program committee (will not be seen by authors):

The paper's methodology and validation are solid. However, future works could address other domain types or mixed-modality inputs. The CGDA framework's generalizability to more complex domain settings remains to be seen, but the foundation laid here is promising.

20. Additional comments to author(s): (Required if no other justification comments have been provided above.)

This paper is well-written and provides a significant contribution to active domain adaptation, specifically for blended target domains. Future work could explore CGDA's adaptability to other complex, multi-source domains. Additionally, considering scenarios with even smaller labeled datasets would further demonstrate CGDA's robustness in practical settings.

21. All reviewers must accept and agree to follow IEEE Policies. By submitting your review, you acknowledge that you have read and agree to IEEE's Privacy Policy (https://www.ieee.org/security-privacy.html).

Agreement accepted