

# To what extent does domain adaptation of the retriever component improve NDCG@20 metrics in cross-domain RAG

Assignee Research

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## Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: To what extent does domain adaptation of the retriever component improve NDCG@20 metrics in cross-domain RAG evaluations between general web queries and specialized scientific documents. Batch normalization (BN) is widely used in modern deep neural networks, which has been shown to represent the domain-related knowledge, and thus is ineffective for cross-domain tasks like unsupervised domain adaptation (UDA). Existing BN variant methods aggregate source and. 16 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Reciprocal Normalization for Domain Adaptation. Research question: To what extent does domain adaptation of the retriever component improve NDCG@20 metrics in cross-domain RAG evaluations between general web queries and specialized scientific documents?.

## 2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.2/10.

### **3 Results**

14 papers retrieved. 16 claims extracted; 1 independently verified. Quality review score: 4.2/10.

### **4 Limitations**

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

## 5 Extracted Claims

Claim	Verified	Confidence
ImageCLEF-DA is a dataset with 12 classes shared by 3 domains: Caltech-256 (C), ILSVRC 2012 (I), and Pascal VOC 2012 (P)	×	0.03
Experiments on ImageCLEF-DA were conducted on all 6 transfer tasks.	×	0.04
Office-Home contains four domains: Art (Ar), Clip Art (Cl), Product (Pr), and Real-World (Rw).	×	0.04
Each domain in the Office-Home dataset contains 65 everyday object categories.	×	0.04
VisDA-C is a 12-class synthesis-to-real adaptation task.	×	0.03
The VisDA-C source domain contains 152K synthetic images generated by rendering 3D models.	×	0.03
The VisDA-C target domain contains 55K real object images.	×	0.07
The proposed method was run three times with different random seeds, and average results were recorded.	×	0.03
Four popular domain adaptation methods (DANN, CDAN, ETN, and BA3US) were adopted as test-beds.	×	0.09
The experiments used a ResNet-50 backbone network pretrained on ImageNet.	×	0.04
All Batch Normalization (BN) layers within different intermediate layers of the backbone were replaced with Reciprocal N	✓	0.19
The parameters of RA were initialized to unit vectors.	×	0.02
The weights of RA were constrained to be in the range [0.5, 1].	×	0.04
The substitution of BN with RN was performed without an additional pre-training procedure on the ImageNet dataset.	×	0.06
The RN module was implemented via PyTorch.	×	0.07
Training configurations (data pipeline, batch-size, learning rate, optimization algorithm) were kept identical to origin	×	0.06

## References

- <http://arxiv.org/abs/2112.10474v1>
- <http://arxiv.org/abs/2201.01002v1>
- <http://arxiv.org/abs/2404.07220v2>