

Editor Comments

Associate Editor

Comments to the Author:

The reviewers were overall satisfied with the revised manuscript. However, Reviewer 1 identifies some mistakes and unclear statements, and Reviewer 2 requested some further changes that should be addressed in a further, minor, revision. Reviewer 2 also raises a valid point by mentioning that the author response contains a lot of information that is helpful for the understanding of the manuscript. I would encourage the authors to make an effort to include the most important points of this information into the main manuscript, e.g. by shortening parts of the introduction.

Reviewer Comments

Please note that some reviewers may have included additional comments in a separate file. If a review contains the note "see the attached file" under Section III A - Public Comments, you will need to log on to ScholarOne Manuscripts to view the file. After logging in to ScholarOne Manuscripts, select the Author Center. Then, click on "Submitted Manuscripts," find the correct paper, and click on "View Decision Letter." Scroll down to the bottom of the decision letter and click on the file attachment link. This will open the file that the reviewer(s) or the Associate Editor included for you along with their review.

Reviewer: 1

Recommendation: Accept With No Changes

Comments:

The manuscript reads very nicely now, it's great to see such a well-executed revision. My only comments are a few small typos, minor grammatical issues, and slight awkward phrasing for clean-up before print. I assume these sorts of things are normally cleaned up before publication, so I am choosing "Accept With No Changes" but pointing these out.

page 2, R13: there's a left parens without a matching right parens. Even more minor: I would suggest rewording this sentence slightly: "... this as a semi-supervised learning [59] problem: prototypes in each view are treated as labelled instances, and we exploit the manifold structure...

page 4, R15: it says $X \in \mathbb{R}^{n_s \times t}$ and says this is the low-level feature vector of all instances. If it's for all instances, should it be $(n_s + n_t) \times t$? Or should it be changed to say X_s and just the source instances?

page 6, section 4.1: it says "...so that that the subsequent computation is less insensitive to individual noisy nodes." Two small things: (1) "that" is repeated and (2) did you mean less *sensitive*? It seems that one would not want to be less insensitive, i.e. more sensitive, to noisy nodes.

page 7, L40: and the *subsequent* computation

page 7, L45: either *the* Gaussian distribution or Gaussian distribution*s* (since referring to two variables)

page 7, L58: not sure about how "hypergraph" is usually used grammatically, but I'm guessing it should be "With *a* hypergraph" or "With the hypergraph". I noticed this 3-4 times elsewhere as well, so perhaps it's intentional.

page 7, R27: "strength between hyperedge and query node*s"

page 8: L21: "gives rise to better convergence rate*s**"

page 8, L55: "and is explained *as a* random walk"

page 8, R25: "Animal*s* with Attribute*s**"

page 10, 6.2.1: "We compare our method (TMV-HLP) with some most recent" would be better as either "some of the most recent" or just "recent".

Additional Questions:

1. Which category describes this manuscript?: Research/Technology

2. How relevant is this manuscript to the readers of this periodical? If you answer Not very relevant or Irrelevant please explain your rating under Public Comments below.: Very Relevant

1. Please evaluate the significance of the manuscript's research contribution.: Good

2. Please explain how this manuscript advances this field of research and/or contributes something new to the literature. : The manuscript extends work published in ECCV that uses a combination of techniques to perform transductive zero-shot image classification in domains where semantic information is available for classes (class attributes, word vectors). They show impressive performance on the task relative to other methods using transduction, e.g. on the AWA (animals with attributes) data set. They introduce TMV-HLP, an algorithm for generating a hypergraph and propagating label information across it, which is key to getting good performance.

3. Is the manuscript technically sound? In the Public Comments section, please provide detailed explanations to support your assessment: Yes

4. How thorough is the experimental validation (where appropriate)? Please discuss any shortcomings in the Public Comments section.: Compelling experiments; clearly state of the art

1. Are the title, abstract, and keywords appropriate? If not, please comment in the Public Comments section.: Yes

2. Does the manuscript contain sufficient and appropriate references? Please comment and include additional suggested references in the Public Comments section.: References are sufficient and appropriate

3. Does the introduction state the objectives of the manuscript in terms that encourage the reader to read on? If not, please explain your answer in the Public Comments section.: Yes

4. How would you rate the organization of the manuscript? Is it focused? Please elaborate with suggestions for reorganization in the Public Comments section.: Satisfactory

5. Please rate the readability of the manuscript. Explain your rating under Public Comments below. : Easy to read

6. How is the length of the manuscript? If changes are suggested, please make explicit recommendations in the Public Comments section.: About right

7. Should the supplemental material be included? (Click on the Supplementary Files icon to view files): Yes, as part of the digital library for this submission if accepted

8. If yes to 7, should it be accepted: As is

Please rate the manuscript overall. Explain your choice.: Excellent

Reviewer: 2

Recommendation: Author Should Prepare A Minor Revision

Comments:

In this is revised manuscript and the response letter many of my questions and considerations are carefully taken into account. The additional experiments give a clearer insight into the proposed method and the working of it.

However, I'm more impressed by the authors response letter, than by the revised manuscript. I find it a pity that the authors have excluded so many of the insightful experiments and details, especially those where two reviewers had asked for.

Major minor comments:

- Personally, I find it strange that 16 is referred to in the introduction, and then out-of-the-blue comes back a few times. The current manuscript requires a good understanding of 16 to be able to see the differences and get a few important parts of this manuscript. It would be extremely helpful if the important parts of 16 can be included (eg section 5 and 6.3 seem an identical copy, then also include the main methods).

- The current structure of the experiments seem to focus more on comparison to other methods than in explaining/understanding the proposed method. I would suggest to turn this around and to include a most of the insightful experiments given in the response letter. To obtain the additional required space, the introduction (now over 2 pages) could be trimmed.

Remaining nitpicks / typos:

- Table 1: *** should be added to the proposed TMV-HLP method
- A few pages (at least 5 and 14) seem to have a weird compression layer.

Additional Questions:

1. Which category describes this manuscript?: Research/Technology

2. How relevant is this manuscript to the readers of this periodical? If you answer Not very relevant or Irrelevant please explain your rating under Public Comments below.: Relevant

1. Please evaluate the significance of the manuscript's research contribution.: Excellent

2. Please explain how this manuscript advances this field of research and/or contributes something new to the literature. : The idea of using a transductive setting for Zero-Shot is relevant.

3. Is the manuscript technically sound? In the Public Comments section, please provide detailed explanations to support your assessment: Appears to be - but didn't check completely

4. How thorough is the experimental validation (where appropriate)? Please discuss any shortcomings in the Public Comments section.: Lacking in some respects; some cases of interest not tested

1. Are the title, abstract, and keywords appropriate? If not, please comment in the Public Comments section.: Yes

2. Does the manuscript contain sufficient and appropriate references? Please comment and include additional suggested references in the Public Comments section.: References are sufficient and appropriate

3. Does the introduction state the objectives of the manuscript in terms that encourage the reader to read on? If not, please explain your answer in the Public Comments section.: Yes

4. How would you rate the organization of the manuscript? Is it focused? Please elaborate with suggestions for reorganization in the Public Comments section.: Satisfactory

5. Please rate the readability of the manuscript. Explain your rating under Public Comments below. : Readable - but requires some effort to understand

6. How is the length of the manuscript? If changes are suggested, please make explicit recommendations in the Public Comments section.: About right

7. Should the supplemental material be included? (Click on the Supplementary Files icon to view files): Yes, as part of the digital library for this submission if accepted

8. If yes to 7, should it be accepted: As is

Please rate the manuscript overall. Explain your choice.: Good

Reviewer: 3

Recommendation: Accept With No Changes

Comments:

I enjoyed reading the new version of this paper and the rebuttal. I think the authors made a very good job in answering all the reviewers questions. This work will draw attention to some aspects of zero-shot and attribute learning that have not been considered before and it has the potential to attract a lot of citations.

Additional Questions:

1. Which category describes this manuscript?: Research/Technology

2. How relevant is this manuscript to the readers of this periodical? If you answer Not very relevant or Irrelevant please explain your rating under Public Comments below.: Relevant

1. Please evaluate the significance of the manuscript's research contribution.: Good

2. Please explain how this manuscript advances this field of research and/or contributes something new to the literature. : This work focuses on zero shot learning and sheds light on the existence of a shift between the intermediate semantic representation learned over the labelled auxiliary classes and the corresponding representation for the unlabelled target classes. The paper proposes a transductive method to overcome this projection shift and combines it with a label propagation approach to annotate the target samples. The label propagation is executed over an heterogeneous hypergraph which connects and exploits multiple semantic representations.

After the revision the paper contains many more details and it is much clearer in several parts. By nature it is technically dense which makes it a little bit difficult to read in some point, but this does not decrease the value of the work.

3. Is the manuscript technically sound? In the Public Comments section, please provide detailed explanations to support your assessment: Yes

4. How thorough is the experimental validation (where appropriate)? Please discuss any shortcomings in the Public Comments section.: Compelling experiments; clearly state of the art

1. Are the title, abstract, and keywords appropriate? If not, please comment in the Public Comments section.: Yes

2. Does the manuscript contain sufficient and appropriate references? Please comment and include additional suggested references in the Public Comments section.: References are sufficient and appropriate

3. Does the introduction state the objectives of the manuscript in terms that encourage the reader to read on? If not, please explain your answer in the Public Comments section.: Yes

4. How would you rate the organization of the manuscript? Is it focused? Please elaborate with suggestions for reorganization in the Public Comments section.: Satisfactory

5. Please rate the readability of the manuscript. Explain your rating under Public Comments below. : Readable - but requires some effort to understand

6. How is the length of the manuscript? If changes are suggested, please make explicit recommendations in the Public Comments section.: About right

7. Should the supplemental material be included? (Click on the Supplementary Files icon to view files): Yes, as part of the digital library for this submission if accepted

8. If yes to 7, should it be accepted: As is

Please rate the manuscript overall. Explain your choice.: Good