ICCV2015
International Conference on Computer Vision 2015
December 11-18, Santiago, Chile

Reviews For Paper

Paper ID	1474
Title	Discrimination of ADHD children based on Deep Bayesian Network

Masked Reviewer ID: Assigned_Reviewer_13
Review:

Question	
Paper Summary. Please summarize in your own words what the paper is about.	Paper proposes a method for identifying children suffering from ADHD using deep methods.
Paper Strengths. Please discuss the positive aspects of the paper. Be sure to comment on the paper's novelty, technical correctness, clarity and experimental evaluation. Notice that different papers may need different levels of evaluation: a theoretical paper may need no experiments, while a paper presenting a new approach to a known problem may require thorough comparisons to existing methods. Also, please make sure to justify your comments in great detail. For example, if you think the paper is novel, not only say so, but also	None.

explain in detail why you think this is the case.	
Paper Weaknesses. Please discuss the negative aspects of the paper: lack of novelty or clarity, technical errors, insufficient experimental evaluation, etc. Please justify your comments in great detail. If you think the paper is not novel, explain why and give a reference to prior work. Do not ask the authors to cite your own work. If you think this is essential, write it in the confidential comments to the AC. If you think there is an error in the paper, explain in detail why it is an error. If you think the experimental evaluation is insufficient, remember that theoretical results/ideas are essential to ICCV and that a theoretical paper need not have experiments. It is not ok to reject a paper because it did not outperform other existing algorithms, especially if the theory is novel and interesting. It	I have multiple concerns with this paper. Major Concerns: 1. This is not a computer vision paper, but rather a learning paper. It is more suitable for learning conferences like ICML, NIPS, ICLR etc. I don't think this paper is of direct interest to computer vision community. 2. The paper proposes the use of deep networks for dimensionality reduction, bayesian network for constructing features and svm for learning a classifier. However, there are no concrete justifications of why such machinery is necessary. For eg, what about a simple baseline: a) Perform PCA on voxel activity within each Brodmann area. b) Concatenate low-dimensional representations of each brodmann area into a single feature vector. c) Train a SVM (potentially non-linear) on this feature vector. Now, in this baseline setups things can be made more complex, one step at a time. For eg, PCA can be replaced by RBMs as used in the work. Now, the difference between this model and the baseline model will show how useful RBMs are compared to PCA. No such analysis is provided in the paper. 3. It is unclear how the proposed method performs as compared to other methods. For eg, in Line 62 - authors write that previous work achieves 81% accuracy. While in table 2 - they report their methods achieving sub 70% accuracy and in Line 512 they claim sub-60% accuracy for previous state of art. Based on this they claim - that they are the new state of art. This is really confusing - because authors themselves cite papers (like in line 62) which achieve 81% accuracy. Minor concerns: 1. Abbreviation have not been expanded - for eg - what is CUR? (line 70) 2. Line 73: "it will encounter .... mass of data and data redundancy." Author seems to be concluding that simpler techniques (compared to Deep Learning) cannot be used due to large amounts of data. This is not true. 3. The paper is hard to read, is written badly and the english is broken (for instance - line 258: ".. which will cause intolerable time consuming." There are a lot of other such examples of broken English.

is also not ok to ask for comparisons with unpublished papers and papers published after the ICCV deadline. Last but not least, remember to be polite and constructive.

Preliminary Rating. Please rate the paper according to the following choices. Oral: these are papers whose quality is in the top 10% of the papers at ICCV. Examples include a theoretical breakthrough with no experiments; an interesting solution to a new problem; a novel solution to an existing problem with solid experiments; or an incremental paper that leads to dramatic improvements in performance. Oral/Poster: these are very strong papers, which may have one weakness that makes you unsure as to whether they should be oral or poster. Poster: these are strong papers, which have more than one weakness. For example, a well-written paper with solid	Strong Reject

experiments, but incremental; a paper on a well studied problem with solid theory, but weak experiments; or a novel paper with good experiments, but poorly written. Weak Reject: these are papers that have some promise, but they would be better off by being revised and resubmitted. Strong Reject: these are papers that have major flaws, or have been done before.	
Preliminary Evaluation. Please indicate to the AC, your fellow reviewers, and the authors your current opinion on the paper. Please summarize the key things you would like the authors to include in their rebuttals to facilitate your decision making. There is no need to summarize the paper.	I donot think this paper is appropriate for ICCV. I would suggest the authors to revise and resubmit their work to a learning conference. The revisions I suggest are: 1. Clarify the comparison between the results of the proposed method and the previous state of the art. It seems that the proposed method is suboptimal to Eloyan et al and Wang et al. on ADHD-200 competition. Therefore I donot follow how the authors claim their method to be superior. 2. There is no technical innovation in the paper and the method is based on combining a bunch of learning modules (like RBM, Bayesian networks). This would have been fine, if: a) The results were impressive. b) And, a proper ablation was provided showing the importance of each module. For eg - is RBM is really necessary? How much is the boost in performance provided by use of Bayesian networks? The authors have provided none. 3. The writing needs to be substantially improved.
Confidence. Write "Very Confident" to stress that you are absolutely sure about your conclusions (e.g., you are an expert who works in the paper's area), "Confident" to stress that you are mostly sure	

about your conclusions (e.g., you are not an expert but can distinguish good work from bad work in that area), and "Not Confident" to stress that that you feel some doubt about your conclusions. In the latter case, please provide details as confidential comments to PC/AC chairs (point 7.).	Very Confident

Masked Reviewer ID: Assigned_Reviewer_15

Review:

Question	
Paper Summary. Please summarize in your own words what the paper is about.	The authors proposed a novel architecture for ADHD classification and achieved state-of-the-art results in ADHD-200 competition. The architecture uses a deep belief network to extract distribution representation from normalized fMRI voxels. This representation then yields a Bayesian network which is treated as features into an SVM for ADHD classification. The proposed system brings a 5- 20% accuracy improvement across datasets from different data centers.
Paper Strengths. Please discuss the positive aspects of the paper. Be sure to comment on the paper's novelty, technical correctness, clarity and experimental evaluation. Notice that different papers may need different levels of evaluation: a theoretical paper may need no experiments, while a paper presenting a new approach to a known problem	The approach seems to be well evaluated. Internal comparisons showing sensitivity to different model parameters, and external comparisons to other approaches in the AHDH-200 competitions have been conducted.

may require thorough comparisons to existing methods. Also, please make sure to justify your comments in great detail. For example, if you think the paper is novel, not only say so, but also explain in detail why you think this is the case.

Paper Weaknesses. Please discuss the negative aspects of the paper: lack of novelty or clarity, technical errors, insufficient experimental evaluation, etc. Please justify your comments in great detail. If you think the paper is not novel, explain why and give a reference to prior work. Do not ask the authors to cite your own work. If you think this is essential, write it in the confidential comments to the AC. If you think there is an error in the paper, explain in detail why it is an error. If you think the experimental evaluation is insufficient, remember that theoretical results/ideas are essential to ICCV

1) Lack of clarity. The paper is very difficult to understand. The main reason is that almost every other sentence is grammatically incorrect. Just to give an example, line 093: "Due to the cause in ADHD cases is unknown, the relationships between different areas should be token into consideration rather than analysis the brain area separately" should be "Since the cause of AHDH is unknown, one should take into consideration the relationship between different brain areas, rather than analyzing the brain areas separately". The grammatical errors affect the reading experience and render section 2.3.3 incomprehensible to me. e.g. What does (line 362) "speed up the structure of Bayesian network" refer to? For this reason I do not know what role Bayesian network plays in the system.
The second flaw is that most symbols are not explained. e.g. what does "com" mean in line 406? what is the specification of "Indep" in Eq (7) line 566? What is the "limitation" of a node (line 399)?

2) Potential technical errors: In Algorithm 2, why does the class label "L" enter into the SVM? Shouldn't L be the target variable that the SVM is

and that a theoretical paper need not have experiments. It is not ok to reject a paper because it did not outperform other existing algorithms, especially if the theory is novel and interesting. It is also not ok to ask for comparisons with unpublished papers and papers published after the ICCV deadline. Last but not least, remember to be polite and constructive.	trying to match?
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one weakness that makes you unsure as to whether they should be oral or poster. Poster: these are strong papers, which have more than one weakness. For example, a well-written paper with solid experiments, but incremental; a paper on a well studied problem with solid theory, but weak experiments; or a novel paper with good experiments, but poorly written. Weak Reject: these are papers that have some promise, but they would be better off by being revised and resubmitted. Strong Reject: these are papers that have major flaws, or have been done before.	Weak Reject
Preliminary Evaluation. Please indicate to the AC, your fellow reviewers, and the authors your current opinion on the paper. Please summarize the key things you would like the authors to include in their rebuttals to facilitate your decision making. There is no need to summarize the	This paper needs serious rewriting. I can only assess the paper from very high-level as the readability issues prevent me from understanding the details. Other than going to a language service and defining symbols before/right after usage, the authors may improve this paper by: 1) Explaining what role structural learning of Bayesian network play in the system. What each network looks like and represents. 2) Justifying why use the magnitude of the max frequency as the characteristic of each voxel, which is sensitive to sampling frequency. Other alternatives include the voxel's mean, std, etc. 3) Drawing the structure of the final network. The structure of the DBN is not clear from the text. It took some investigative work to see that it has three layers (line 342), but we donot know how many units are at each layer.

paper.	
Confidence. Write "Very Confident" to stress that you are absolutely sure about your conclusions (e.g., you are an expert who works in the paper's area), "Confident" to stress that you are mostly sure about your conclusions (e.g., you are not an expert but can distinguish good work from bad work in that area), and "Not Confident" to stress that that you feel some doubt about your conclusions. In the latter case, please provide details as confidential comments to PC/AC chairs (point 7.).	Very Confident

Masked Reviewer ID: Assigned_Reviewer_19

Review:

Question	
Paper Summary. Please summarize in your own words what the paper is about.	In this paper, the authors try to build a binary classifier to distinguish children with ADHD from other children. For this purpose, they propose a framework with three step: First, It converts 4D-fMRI data into a vector indexed by a voxel indentifier. An element of the vector is filled with the largest amplitude of any frequencies by adopting FFT to the timeseries with the corresoponding voxel indentifier. By clustering voxels with 52 brodmann area that have different numbers of voxels for each area, they reduce the vectors into the same number of dimension with Deep Belief Networks(DBNs) Second, They infers Bayesian network structure by adopting MMHC and treat the resulting graph and probability table as a feature for the subject. Last, they build a SVM classifier upon the dataset derived in the previous step with the given labels.
Paper Strengths. Please discuss the positive	

aspects of the paper. Be sure to comment on the paper's novelty, technical correctness, clarity and experimental evaluation. Notice that different papers may need different levels of evaluation: a theoretical paper may need no experiments, while a paper presenting a new approach to a known problem may require thorough comparisons to existing methods. Also, please make sure to justify your comments in great detail. For example, if you think the paper is novel, not only say so, but also explain in detail why you think this is the case.

The method, which combines DBN, Bayesian net, and SVM, seems to be a sound and interesting idea to tackle ADHD classification using fMRI data.

Paper Weaknesses. Please discuss the negative aspects of the paper: lack of novelty or clarity, technical errors, insufficient experimental evaluation, etc. Please justify your comments in great detail. If you think the paper is not novel, explain why and give a reference to prior work. Do not ask

the authors to cite your own work. If you think this is essential, write it in the confidential comments to the AC. If you think there is an error in the paper, explain in detail why it is an error. If you think the experimental evaluation is insufficient, remember that theoretical results/ideas are essential to ICCV and that a theoretical paper need not have experiments. It is not ok to reject a paper because it did not outperform other existing algorithms, especially if the theory is novel and interesting. It is also not ok to ask for comparisons with unpublished papers and papers published after the ICCV deadline. Last but not least, remember to be polite and constructive.

This paper IS NOT EASY to read sometimes since there are many typos and undefined notations through the paper. In the algorithm 1, there is no description for prepro(X_f) and there is unused index k, which presumably means the index of layer in a DBN for each brodmann area. Moreover, we do not know the number dimensions of Y, which seems very important factor for dimension reduction.

Some descriptions or illustrations are misleading. For instance, Eq. (2) is a updating rule for RBM. However, authors use this equation in explaining error backpropagation. I have no idea what's going on this paper. In the structure learning of Deep Bayesian Network, they do not even mention MMHC paper even though this is an important part of this paper.

Regarding the accuracy, specificity and sensitivity of NYU dataset, I wonder how much we can get by adopting random binary classifier.
With enough luck, random classifiers may show competitive result.
Is there any effect of the number of reduced dimensions in the first step in the framework?

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a theoretical breakthrough with no experiments; an interesting solution to a new problem; a novel solution to an existing problem with solid experiments; or an incremental paper that leads to dramatic improvements in performance. Oral/Poster: these are very strong papers, which may have one weakness that makes you unsure as to whether they should be oral or poster. Poster: these are strong papers, which have more than one weakness. For example, a well-written paper with solid experiments, but incremental; a paper on a well studied problem with solid theory, but weak experiments; or a novel paper with good experiments, but poorly written. Weak Reject: these are papers that have some promise, but they would be better off by being revised and resubmitted. Strong Reject: these are papers that have major flaws, or have been done

Strong Reject

before.	
Preliminary Evaluation. Please indicate to the AC, your fellow reviewers, and the authors your current opinion on the paper. Please summarize the key things you would like the authors to include in their rebuttals to facilitate your decision making. There is no need to summarize the paper.	The problem of classifying ADHD using fMRI data is considered and a method, which combines DBN, BN, and SVM, is presented. While the method itself seems to be sound, presentation and writing should be dramatically improved, since in many places, descriptions are misleading and do not even match equations. Typos: line 330,345) RBN -> RBM , line 358 Duo -> Due, line 591 resutls -> results.
Confidence. Write "Very Confident" to stress that you are absolutely sure about your conclusions (e.g., you are an expert who works in the paper's area), "Confident" to stress that you are mostly sure about your conclusions (e.g., you are not an expert but can distinguish good work from bad work in that area), and "Not Confident" to stress that that you feel some doubt about your conclusions. In the latter case, please provide details as confidential comments to PC/AC chairs (point 7.).	Confident