Comment on Paper 1

In paper one, Order the faces by Diffusion Map, ISOMAP and LLE, author used Diffusion map, MDS, ISOMAP and LLE to find the low-dimensional embedding of the high-dimensional face images. After comparing these four methods respectively, author finds that Diffusion map, ISOMAP and LLE can get correct low-dimensional embedding results while MDS performs poorly in this problem.

Author use the four methods to order the faces and the result is the face is correctly ordered by Diffusion map, ISOMAP and LLE. The results of MDS shows that it performs poor in manifold learning, but its extension-ISOMAP can get correct face order. Compared with ISOMAP, LLE can get smoother scatter plots but with more computation time. The two-dimensional scatter plots of Diffusion map and LLE looks to be similar.

Strength: The strength of this paper is that the author uses different four methods to order face data and compare them to come to a conclusion. The result is reasonable.

Weakness: The weakness of this paper is that the 33 faces dataset is small and may not show each method clearly.

Evaluation on quality of writing: 4. The writing is clear and there is no obvious mistake. Pictures and examples are used in this paper.

Evaluation on presentation: 4. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on Paper 2

In paper two, Finding Trend in Stock Market with Robust PCA, the author used Robust PCA and PCA method to analyze SNP500 and try to find trend in stock market. In this report, they explore how to capture the main trends within different classes of stocks with Robust PCA. To better evaluate the performance, they convert their problem into a classification task using SNP500 dataset. Specifically, given a stock, they try to recognize its underlying class (10 classes in total, e.g. Industries, Information Technology, etc.), based on the assumption that stocks in the same class will have similar trend. That is, higher accuracy can be achieved if one could better characterize the trends of stocks.

Through the experiment, they find that Robust PCA can successfully separate the main trend from the noise and achieve the highest accuracy regarding classification, while PCA struggles with the noise and underperforms.

Strength: The strength of this paper is that the author uses Robust PCA and PCA method to analyze the SNP500 widely. Their dataset is big and the analysis is reasonable.

Weakness: The weakness of this paper is the PCA gets a worse result and author thinks it’s caused by the noise of stock market. And the solution to improve it is not given.

Evaluation on quality of writing: 4. The writing is clear and author uses many pictures.

Evaluation on presentation: 4. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on paper 3

In paper three, Order the Faces via Manifold Learning, the author used several manifold learning techniques to order 33 images of the same person but with different face directions. After comparing the results, they found that locally linear embedding performed better than others in which number of components and neighbors are 2 and 5, respectively. They also conducted experiments to compare the performance depending on hyper-parameter (number of components), by changing the number of neighbors from 5 to 10. It was discovered that 5 neighbors provided the best model performance.

Strength: The strength of this paper is that the author uses many mathematics in the paper to describe the method and uses many pictures and charts to describe the result very clearly.

Weakness: The weakness of this paper is the mathematics is too much and it can be reduced.

Evaluation on quality of writing: 4. The writing is clear and there is no obvious mistake. Pictures and charts are well used in this paper.

Evaluation on presentation: 5. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on paper 4

In paper 4, Human age ranking from pairwise comparison data via Hodge Rank, the author tried to evaluate the capability of Hodge Rank on the human age ranking by evaluating pairwise comparison data. They make the comparison between real age distribution and generated ranking, and evaluate the accuracy of people’s judgement by investigating the RMSE.

The result is that four GLMs are tested and their inconsistencies are evaluated. HHRG is a suitable framework for managing the incomplete pairwise comparison data on the human age ranking. Based on the Error analysis and Inconsistency analysis, it is convinced that Thurstone-Mosteller model is the most appropriate GLM on human age ranking.

Strength: The strength of this paper is that the author uses reliable dataset includes 30 images from human age dataset.

Weakness: The weakness of this paper is the content is not too rich.

Evaluation on quality of writing: 4. The writing is clear and there is no obvious mistake. Pictures and charts are used in this paper.

Evaluation on presentation: 4. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on paper 5

In paper 5, Representation learning on gene expression data, the author explored three levels of representation learning methods: (i) linear dimension reduction methods: PCA and robust PCA, (ii) non-linear dimensionality techniques: manifold learning, and (iii) deep representation methods: VAE, on a single-cell gene expression dataset. They implement various methods and stress on a common problem in single-cell expression analysis, cell clustering, to demonstrate their representation power and give detailed analysis and comparison of different approaches as well as different settings of hyperparameters. In conclusion, manifold learning and VAE outperform linear dimensionality reduction approaches on this dataset.

The author describes the methods and the reasons for considering them. They demonstrate the utility of various methods on real data and analyzes the results comprehensively in the end.

Strength: The strength of this paper is the author compared three different types of clustering and each of them contains some methods. The result is clear and convinced.

Weakness: The weakness of this paper is the pictures and charts are not so rich.

Evaluation on quality of writing: 4. The writing is clear. Pictures and charts are used in this paper.

Evaluation on presentation: 4. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on paper 6

In paper six, Dimensionality Reduction of Face Order Problem Using Non-linear Embedding Methods, the author used four methods including Diffusion map, MDS-embedding , ISOMAP-embedding and LLE-embedding to order faces and compared them.

The result is as an extension of the MDS method, the ISOMAP captures the geometric distances and can well describe the high dimensional problem, which is superior to the MDS methods which only capture two intrinsic features. The LLE method uses the neighbouring data to reconstruct low dimensional embedding and such methods can offer information of global geometry. Diffusion map as another nonlinear method, maps the data to a diffusion space to preserve their diffusion distance. It can well distinguish different images with a relatively large time scale parameter. In this specific face order problem, it seems that the non-linear embedding algorithms can better describe intrinsic structures of the data.

Strength: The strength of this paper is the author compared four methods and the analysis is convinced.

Weakness: The weakness of this paper is there are some typos.

Evaluation on quality of writing: 4. The writing is clear. Pictures and charts are used in this paper.

Evaluation on presentation: 4. The paper is well organized and clear.

Evaluation on creativity: 3.

Confidence on your assessment: 3.

Comment on paper 8

In paper eight, Human Age Ranking Using Hodge Rank, author intended to rank 30 human face images based on their ages. They employed Hodge Rank method to solve the rank aggregation problem due to the incompleteness of the comparison. The predicted global rank was then compared with the ground-truth to access the model accuracy. In addition, they also compared the performance by four most commonly used models, which are Uniform, Bradley-Terry, Thurstone-Mosteller and Angular transform model. Author made three experiments to rank the dataset and compared the methods.

Strength: The strength of this paper is the author compared four methods and used Hodge Rank method to solve the rank aggregation problem.

Weakness: The weakness of this paper is the structure of this paper is not so well. There is no conclusion or analysis to describe the difference between the methods.

Evaluation on quality of writing: 4. The writing is clear and there is no obvious mistake. Pictures and charts are used in this paper.

Evaluation on presentation: 3.

Evaluation on creativity: 4.

Confidence on your assessment: 3.