

# On the Equivalence of Two Mathematicians

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## 1 Introduction

It has long been suspected that there is a secret hidden in the research community around Topological Data Analysis, namely, that there is one researcher who is actually posing as two. She is currently affiliated with two universities on opposite sides of the globe: Michigan State University and Australian National University. She appears to be maintaining families in each location, as well as the usual teaching, research, and service obligations of the professorships. She has written papers under both pseudonyms (e.g. [3, 4, 1, 5]), and has even gone as far as writing one paper with both names listed as authors [2]. In this report, we prove conclusively that she is, in fact, one person by applying a classifier to the PCA projections of images labeled with the two pseudonyms, which results in classification no better than random chance. In a statement from the subject, she has asked us to add the following sentence: *“I don’t understand why no one can tell us apart. I hope that our colleagues, should they ever find this report, recognize that the entire paper should not be taken seriously under any circumstances. Unless, of course, they would like to pad my paper count with all of her papers, too.”*

## 2 Anecdotal evidence

In our investigations, we have discovered that she uses a different accent for each persona, one American and one Australian. Even when both of her personas are supposedly attending the same conference, many fellow researchers can see through this and just speak to her as if both



Figure 1: A picture, supposedly of the two personas of the subject in one place. Due to the results of this paper, we assume that this picture has been digitally altered.

personas are the same person. She is quite talented at maintaining and emphasizing different research strengths for each persona. She does not, however, maintain separate computers for the two personas as they appear at conferences using the same one. She has created two separate birth certificates, with each persona having been born on a different continent 8 days apart. She has two children in her Australian family, aged 5 and 2 as of the writing of this report, and has one child in her American family, aged 2. Thus, we further suspect that there is actually only one child aged 2 who she takes back and forth when travelling between the two families.

## 3 The classifier

We have collected photos from the two facebook accounts ( $m = 10$ ). Some of these images are labeled as having both personas in one picture

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\*The authors obviously have no relation to the subjects discussed in the paper.

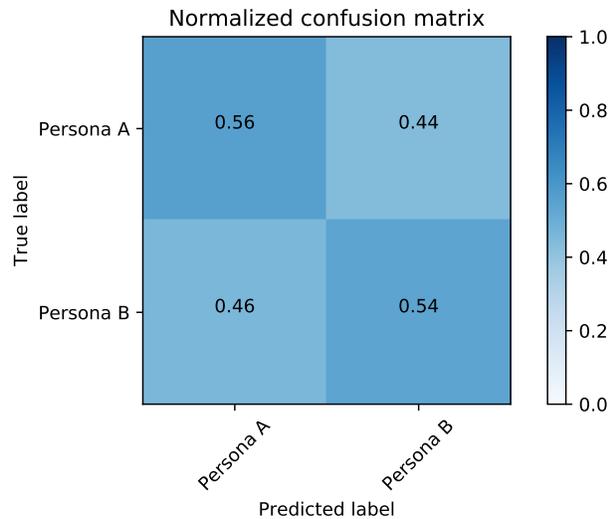


Figure 2: The confusion matrix for the classifier.

(e.g. Fig. 1). PCA was performed using `sklearn` on subsets of the photos and a support vector classifier (`sklearn.svm.SVC`) was constructed on a 80/20 train/test split of the data points. In an average of 10 trials, the correct classification rate was a mere 55%.

## 4 Conclusion

We are sure that, despite using a poorly trained classifier on far too few data points, the only logical conclusion is that this is a case of one woman posing as two. We suspect, further, that she has some access to time travel as she appears to be successfully maintaining two full careers, which can only be achieved by spending more hours on a plane per week than exist. As one potential reason why, she seems to just enjoy confusing people with her accents<sup>1</sup>.

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<sup>1</sup>We suspect that she is, in fact, French, and thus both persona accents are fake.



Figure 3: Examples from the data set. Can you tell the difference? We didn’t think so.

## References

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