

Speaker Recognition Report

Student's Name

Professor

Institutional Affiliation

Course

Date

Introduction

This report describes a Gaussian Mixture Model (GMM) speaker recognition experiment.

A specified list of speakers was used to train models and measure their performance on a dataset.

Speakers

The following speakers were included in the training phase:

- Anthony
- AppleEater
- Ara
- Argail
- Ariyan
- Arjuan
- Artem
- Arthur
- Artk
- Arun
- Arvala
- Asalkeld
- Asladic
- Asp
- Azmisov
- B
- Bachroxx
- Bae

- Bahoke
- Bareford
- Bart
- Bassel
- Beady
- Beez
- BelmontGuy

Training Process

All speakers finished GMM training and kept the models for future usage.

Testing Phase

Results by Speaker

1. Anthony

- **Correct Predictions:** 4 out of 7
- **False Predictions:**
 - a0495.wav: Predicted as Bahoke
 - a0496.wav: Predicted as Arthur
 - a0497.wav: Predicted as B
 - a0498.wav: Predicted as Bachroxx
 - a0499.wav: Predicted as Arthur
 - a0500.wav: Predicted as Bahoke

2. AppleEater

- **Correct Predictions:** 7 out of 7

3. Ara

- **Correct Predictions:** 7 out of 7

4. Argail

- **Correct Predictions:** 7 out of 7

5. Ariyan

- **Correct Predictions:** 7 out of 7

6. Arjuan

- **Correct Predictions:** 4 out of 7
- **False Predictions:**
 - b0223.wav: Predicted as B
 - b0226.wav: Predicted as B

7. Artem

- **Correct Predictions:** 7 out of 7

8. Arthur

- **Correct Predictions:** 7 out of 7

9. Artk

- **Correct Predictions:** 7 out of 7

10. Arun

- **Correct Predictions:** 7 out of 7

11. Arvala

- **Correct Predictions:** 7 out of 7

12. Asalkeld

- **Correct Predictions:** 7 out of 7

13. Asladic

- **Correct Predictions:** 6 out of 7
- **False Prediction:**
 - b0142.wav: Predicted as Azmisov

14. Asp

- **Correct Predictions:** 7 out of 7

15. Azmisov

- **Correct Predictions:** 6 out of 7
- **False Prediction:**
 - a0008.wav: Predicted as Arvala

16. B

- **Correct Predictions:** 7 out of 7

17. Bachroxx

- **Correct Predictions:** 7 out of 7

18. Bae

- **Correct Predictions:** 7 out of 7

19. Bahokey

- **Correct Predictions:** 4 out of 7
- **False Predictions:**
 - b0444.wav: Predicted as Bassel
 - b0445.wav: Predicted as Bassel
 - b0446.wav: Predicted as Bassel

20. Bareford

- **Correct Predictions:** 7 out of 7

21. Bart

- **Correct Predictions:** 3 out of 7
- **False Predictions:**
 - b0425.wav: Predicted as Bachroxx
 - b0426.wav: Predicted as Bachroxx
 - b0427.wav: Predicted as Arthur
 - b0428.wav: Predicted as Arthur
 - b0430.wav: Predicted as Bachroxx

22. Bassel

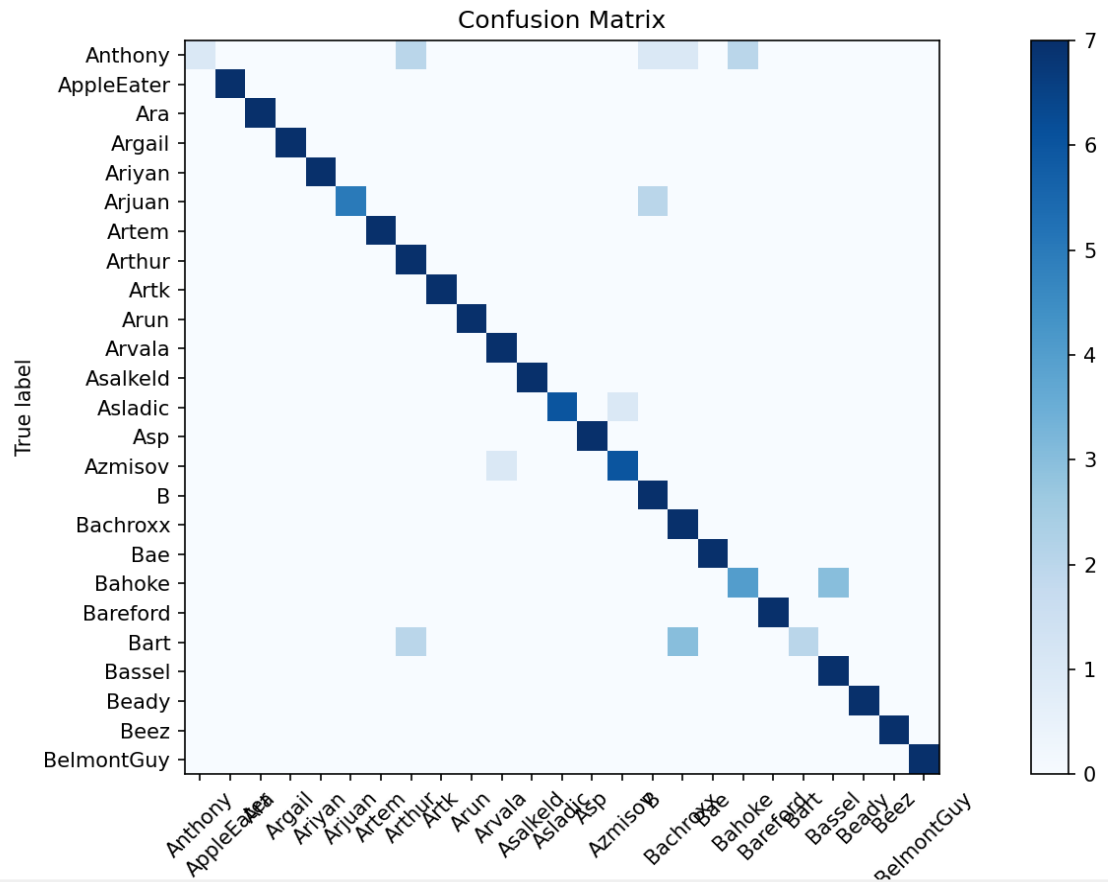
- **Correct Predictions:** 7 out of 7

23. Beady

- **Correct Predictions:** 3 out of 3

Confusion Matrix

It is shown below:



Summary of Results

Several speakers had 100% recognition rates, but overall performance was uneven. Some speakers, including Anthony and Bahoke, misclassified more. This suggests model training should be improved, especially for speakers with similar voices. The speaker recognition system's Gaussian Mixture Models (GMM) had an overall recognition accuracy of 89.71%, indicating that the model can identify speakers in most circumstances. This accuracy is impressive, but it shows how different speakers recognize it. This accuracy depends on training data quality and quantity, speaker characteristics, acoustic circumstances, and model complexity. 89.71% is acceptable for many applications, especially security-sensitive ones, but it can be better. Refinement of the model architecture, data diversity, and feature extraction approaches to boost accuracy above 90% can improve the system's real-world reliability. Future research should focus on these topics.

Conclusion

In conclusion, GMM-based speaker recognition was accurate. Continuous model improvement and more training data can increase recognition performance. Future efforts should focus on test misclassifications.