Multimodal Person Identification through the Fusion of Face and Voice Biometrics

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Methodology

- Person identification is used every day in a variety of applications from access control and security cameras to social media and face ID on smartphones.
- The process of person identification involves different biometrics such as face, voice, fingerprint, etc.
- However, there are still various limitations to their efficiency which makes them incompletely reliable.
- In public settings, like that of a museum, using one biometric alone becomes challenging due to factors like background noise, overlap of people’s faces, varying angles and/or distances from the camera, as well as the recently introduced challenge of face masks.

Dataset

Michigan State University Audio-Video Indoor Surveillance (MSU-AVIS) Dataset:
- 50 Subjects (16 females, 34 males)
- Image data variations include:
  - Indoor illumination
  - Facial expressions
  - Pose & distance relative to the camera
- Audio data variations include:
  - Indoor reverberations
  - Background Noise
  - Distance from the microphone

Conclusions & Future Directions

Results prove that biometric fusion improves the accuracy of person identification compared to using a single biometric.

Future work will include:
- Expanding the dataset to include more subjects
- Testing other convolutional neural networks
- Testing other fusion strategies (e.g., feature-level)
- Using greyscale edge detection for a color-blind face recognition system
- Implementing a two-stage system that first passes through a binary classifier in order to minimize the number of possible classes in the second stage

References

   http://cslab.cse.msu.edu/papers/avis-dataset.html
   https://www.computer.org/portal/web/facial-recognition/viola-jones
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