UNIVERSITY OF WALES SWANSEA (UWS) NIST 2010 EVALUATION
OVERVIEW

Speaker Verification System Description
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UWS submitted scores for the **core-core condition** only. The system is built using the open-source ALIZE toolkit. There are three sets of scores, the engine for the three being essentially the same, namely UBM/GMMs followed by an SVM operating on GMM means, plus NAP. Details of the systems submitted to NIST are as follows:

1. UWS1:
    1.1 Front end processing
        - 20-ms frame length with 10-ms overlap
        - Male – MFCC-based features with vector size of 50, i.e. 19 static + 19 delta + 11 1st double delta + delta Energy
        - Female – same as feature for male but uses LFCC features, not MFCC
        - all generated with SPRO4/LIASpkd tools
        - Energy based End point detecting
    1.2 UBM training
        - GMM with 512 components, gender-dependent
        - Training data comes from NIST SRE'04 set
    1.3 Speaker adaptation
        - Mean only adaptation from GMM-UBM
        - SVM using mean supervector
    1.4 Session variability modelling
        - Nuisance Attribute Projection with 40 eigenvectors
        - Two NAP set are used:
            o NAP0405: data from NIST '04 and 05
                ▪ Male speakers: 124 from NIST'04 and 45 from NIST'05
                ▪ Female speakers: 186 from NIST'04 and 52 from NIST'05
            o NAP05: data from NIST'05
                ▪ 45 male speakers
                ▪ 52 female speakers from NIST'05
            o An average of 24 recordings per speaker
    1.5 Score normalization
        - T-norm with imposter selected from NIST SRE'04 (phone speech) and NIST SRE'05 (microphone speech).
    1.6 Score Fusion
        - Male: no fusion, direct score from MFCC-NAP0405 system
        - Female: linear fusion of score from LFCC-NAP05 system and LFCC-NAP0405 system

2. UWS2
    2.1 Front end processing
        - Same as UWS1 but uses LFCC features for both male and female.
    2.2 UBM training
        - Same as UWS1
    2.3 Speaker adaptation

- Same as UWS1

2.4 Session variability modelling
- Same as UWS1

2.5 Score normalization
- Same as UWS1

2.6 Score fusion
- Male:-
  o NAP0405 system for phone-phone, phone-mic and mic-phone trials
  o NAP05 system for mic-mic trials
- Female:-
  o Same as Male

3. UWS3
   A combination of UWS1 and UWS2
   3.1 Score fusion
   - Male: linear fusion of male score from UWS1 and UWS2
   - Female: same as UWS1

Execution time:
   Refer to LIA system description for details about [ALZ] system [1]
   The UWS systems has similar execution times.

[1]: J.-F. Bonastre, N. Scheffer, C. Fredouille, D. Matrouf, NIST'04 speaker recognition evaluation campaign: new LIA speaker detection plateform based on ALIZE toolkit, 2004
NIST SRE'04 Workshop: speaker detection evaluation campaign, June 2004. Toledo, Spain.