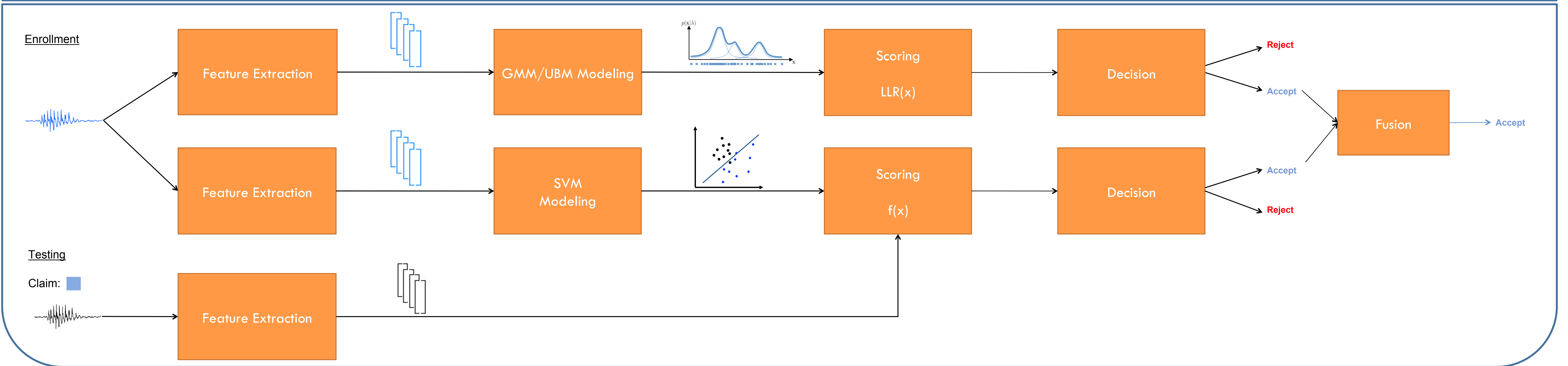




BOUN SRE'10 SUBMISSION

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System Overview



Introduction

- First SRE participation of Bogazici University
- Two baseline systems: GMM/UBM and SVM
- A third decision-level fusion strategy

GMM/UBM Baseline System

- Classic Gaussian mixture modeling approach

Feature Extraction

- 34-dimensional vectors: 16 MFCC + 16 Δ MFCC + Energy + Δ Energy
- Extracted over 20 ms with 10 ms overlaps
- VAD by bi-Gaussian modeling of energy
- Cepstral means subtracted

Modeling

- GMMs with 1024 components with diagonal covariance
- UBM constructed using 27h of speech from SRE06 data
- MAP adaptation of means
- Relevance factor value: 14

Scoring

- Log-likelihood ratio scores
- Optimal threshold determined from tests over SRE08

Software

- BioSecure Reference System BECARs/HTK

System Resources

- 28 cores @ 3.00GHz, max 2 GB of RAM
- Run time: 40h (feature extraction), 960h (MAP adaptation), 4888h (test)

SVM Baseline System

- GMM supervector approach

Feature Extraction

- 34-dimensional vectors: 16 MFCC + 16 Δ MFCC + Energy + Δ Energy
- Extracted over 20 ms with 10 ms overlaps
- Frequency range: 300-3140 Hz
- VAD by utilizing the ASR transcripts
- Cepstral means subtracted and normalized within 3 sec windows

Modeling

- GMMs with 2048 components with diagonal covariance
- Gender-dependent UBMs constructed using 12-14h of speech from SRE08 data
- Half of the short2/short3 data for UBM training, the other half for background samples in SVM
- MAP adaptation of means, relevance factor value: 16
- Supervector linear kernel
- 1604 male, 2217 female negative examples for SVM model training

Scoring

- SVM decision output scores
- Optimal threshold determined from tests over SRE04

Software

- SPro for feature extraction
- FIR Echo Canceller for echo cancellation
- SVMtorch for SVM training and testing

System Resources

- 24 cores @ 2.13 GHz
- Run time: 350h (UBM training), 1120h (SVM training), 1620h (test)
- Memory: 1.9 GB (UBM training), 3.0 GB (SVM training), 1.0 GB (test)

Fusion System

- Basic combination of the outputs of GMM/UBM and SVM systems
- Threshold set to 0 for both systems, fusion scores set by averaging
- Hard decision returns true if both systems agree to accept

Conclusion

- Satisfactory performance for a first-time submission, valuable experience gained
- Baseline GMM/UBM and GMM/SVM systems are achieved
- Weakness : No channel compensation
- NAP, FA, score normalization (ZT norm), score level fusion should be examined

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Experimental Results

