Odyssey workshop 2001
Open discussion on algorithmic issues

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Contributors : ALL Odyssey workshop participants

Menu

1. Where can we expect IMPROVEMENTS in current state-of-the-art approaches ?
2. What type of UNEXPLOITED sources of INFORMATION should we use, and how to do so ?
3. Which are the most dramatic ROBUSTNESS issues that we are / will be facing and how can we cope with them ?

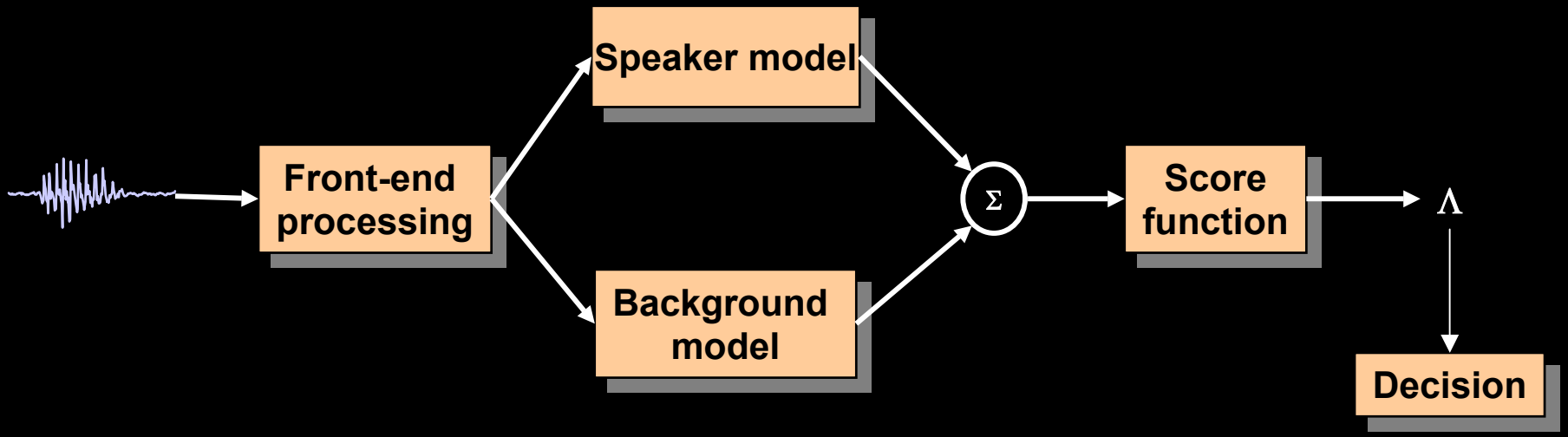
Objective of the discussion

- Prepare a collective contribution to a Scientific Journal comprising :
  - A summary of today's discussion
  - Several short (2-page) individual contributions defending a specific challenging issue

" Where are we, and where do we go from here ? "

- Targets :
  - Within the scientific community : increase interest and excitement of researchers, students, …
  - Outside the scientific community : underline margins and potential for future progress

Components of Verification System



- Features
- Models
- Score function
- Decision

Acoustic-based Systems

- **Features**
  - Cepstra and delta-cepstra, …
  - *F0*
- **Models**
  - Probabilistic
    - HMM, GMM, Gaussian, *DTW, VQ,…*
  - Neural Net (Discriminative)
    - ANNN, MLP, etc…
  - SVM
- **Score functions**
  - Znorm, Hnorm, Tnorm, Htnorm, Posterior Probabilities, …
- **Decisions**
  - Batch, Sequential, Fusion, …

What info ISN'T being used currently ?

- Low-level (signal) features
  - Speaker-specific signal components / representation
- Suprasegmental features
  - Patterns over time (acoustic, phonetic, …)
- Prosodics
  - F0 contours; pause patterns; rate of speech
- Word usage
  - Idiolectal, lexical, syntax
- Non-linguistic
  - Accents, laughs, idiosyncrasies
- Behavioral
  - Speaker-dependent characteristic response / interaction

How to use this info ?

Robustness issues

- Speaker itself
  - Physiology, health, emotion, …
- Type of device
  - Phone (regular, mobile, internet / VOIP …)
  - Type of coding (variable rate coding,…)
- Context of use / Environment
  - Surrounding noises, background music
  - Other speakers
  - Old recordings
- Lack of a priori knowledge
  - Number of speakers
  - Type of channel

How are our algorithms going to resist these factors ?

Open questions in current State-of-the-Art

- **Acoustic features**
  - How can we decouple speaker and channel effects ?
  - How can we "customize" the features to the speaker ?
- **Score function / normalization**
  - What is a score function ?
  - Do we understand "normalization"
- **Models**
  - Other models / frameworks
  - Where do SVM fit ?
  - Are there ways to combine / embed components
    - Features and models
    - Models and score function
- **Decision**
  - Is the Bayesian framework optimal in all circumstances ?
  - Can we make "smarter" decisions ?

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Tasks

What are the Tasks in speaker recognition

- Close set ID
- Open-set ID
- Verification
- Segmentation / tracking
- Numbering / clustering
- Matching (adaptation speech recognition)