Modeling Meeting Turns

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- Meeting turns visualization
- Turn-pattern segmentation
- ‘Talkativity’ modeling
Meeting Turn Visualization

- Speaker turns form patterns on multi-minute timescales:

 _mr04: Hand-marked speaker turns

- Points of pattern change are ‘significant’?
  - topics?
  - modes?
Modeling meeting segments

- Model speaker activity patterns like states

Prior vector:

\[ P(spkr^i) \]

‘Transition’ matrix:

\[ P(spkr^i_t, spkr^j_{t-1}) \]
Self-similarity

- Display $\text{Dist}(\text{minute}_i, \text{minute}_j)$ as KL distance of speaker distributions

![Graph showing self-similarity](image)
**BIC Segmentation**

- **BIC (Bayesian Information Criterion):** Compare more and less complex models
  \[
  \log \frac{L(X_1; M_1) L(X_2; M_2)}{L(X; M_0)} \geq \frac{\lambda}{2} \log(N) \Delta \#(M)
  \]

- **For segmentation:**
  - Grow context window from current boundary
  - For each window, test every possible segmentation
  - When BIC is positive, mark new segment
BIC Segmentation

- Example of boundary finding:

![Graph showing BIC segmentation with boundary finding and context limits.](image-url)
BIC Segmentation

- Appears to find shifts in turn patterns:

  mr04: Hand-marked speaker turns vs. time + auto/manual boundaries

- Evaluate against topic boundaries (6 meetings, 36 boundaries)
  - 15 (42%) agree to within ± 2 minutes
  - 16 ‘false alarm’ insertions
“Talkativity”

- Factors affecting how much one person speaks in a given meeting:
  - relevance/interest of topic to speaker
  - competition with other speakers
  - innate tendency to talk - “talkativity” $T_s$

- Model of expected ‘airtime’ consumed by each participant $s$ in meeting $m$:
  $$P_{sm} = \frac{T_s}{\sum_{t\in S_m} T_t}$$
  - given $\{T_s\}$, deviations from expected values factor out competition, baseline talkativity
Estimating “Talkativity”

- Find best-fitting \( \{T_s\} \) to fit meeting set

\[
T_s = \text{avg}_{m \in M_s} \frac{P_{sm} \sum_{t \in S_m, t \neq s} T_t}{1 - P_{sm}}
\]

- Iteratively recalculate \( \{T_s\} \) until (fast) convergence
- 26 meetings (mr* set), 10 common participants, avg 6.9 participants/meeting

- Calculate actual:predicted ratios
“Talkativity” Results

- Meeting proportions & ratio to prediction

Evaluation?