EVALITA 2011

Forced Alignment on Spontaneous Speech

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Introduction

- The task consists in the alignment of a manual transcription (at words and phone levels) to a recorded speech utterance

- The automatic alignment is compared with a manual one to evaluate the accuracy in boundaries positioning

- The goal of the task is to evaluate forced alignment systems on Italian

Participants

- The SPPAS participation to Evalita 2011
  - Brigitte Bigi (CNRS - Aix-en-Provence)
- UNINA System for the EVALITA 2011 Forced Alignment Task
  - Bogdan Ludusan (University of Naples)
- SAD-based Italian Forced Alignment Strategies
  - Giulio Paci, Giacomo Sommavilla, Piero Cosi (CNR Padova)

Task Modalities

- Closed: Only provided training data could be used to train the system
  - Participants: Bigi, Ludusan, Paci/Sommavilla/Cosi

- Open: Any data could be used in training
  - Participants: Ludusan, Paci/Sommavilla/Cosi

Training Data

- 16 Italian regional varieties

- Dialogues from the CLIPS corpus (Map task and Differences test)

- 8063 training units (~ 6 hours)
  - Wav File
  - Transcription of the utterance at word level
  - Transcription of the utterance at phone level

Test Data

- Never before published dialogues recorded for the CLIPS corpus

- 89 units (10 minutes)
  - Wav File
  - Transcription of the utterance at word level

- All participants chose to present a forced alignment system integrated with their own automatic phonetic transcription step.

Evaluation

- Time mediated Alignment computed by the NIST SCLITE tool

- Word-to-word distances replaced by the following formulas:

$$D(\text{correct}) = |\, T1(\text{ref}) - T1(\text{hyp}) \,| + |\, T2(\text{ref}) - T2(\text{hyp}) \,|$$

$$D(\text{insertion}) = T2(\text{hyp}) - T1(\text{hyp})$$

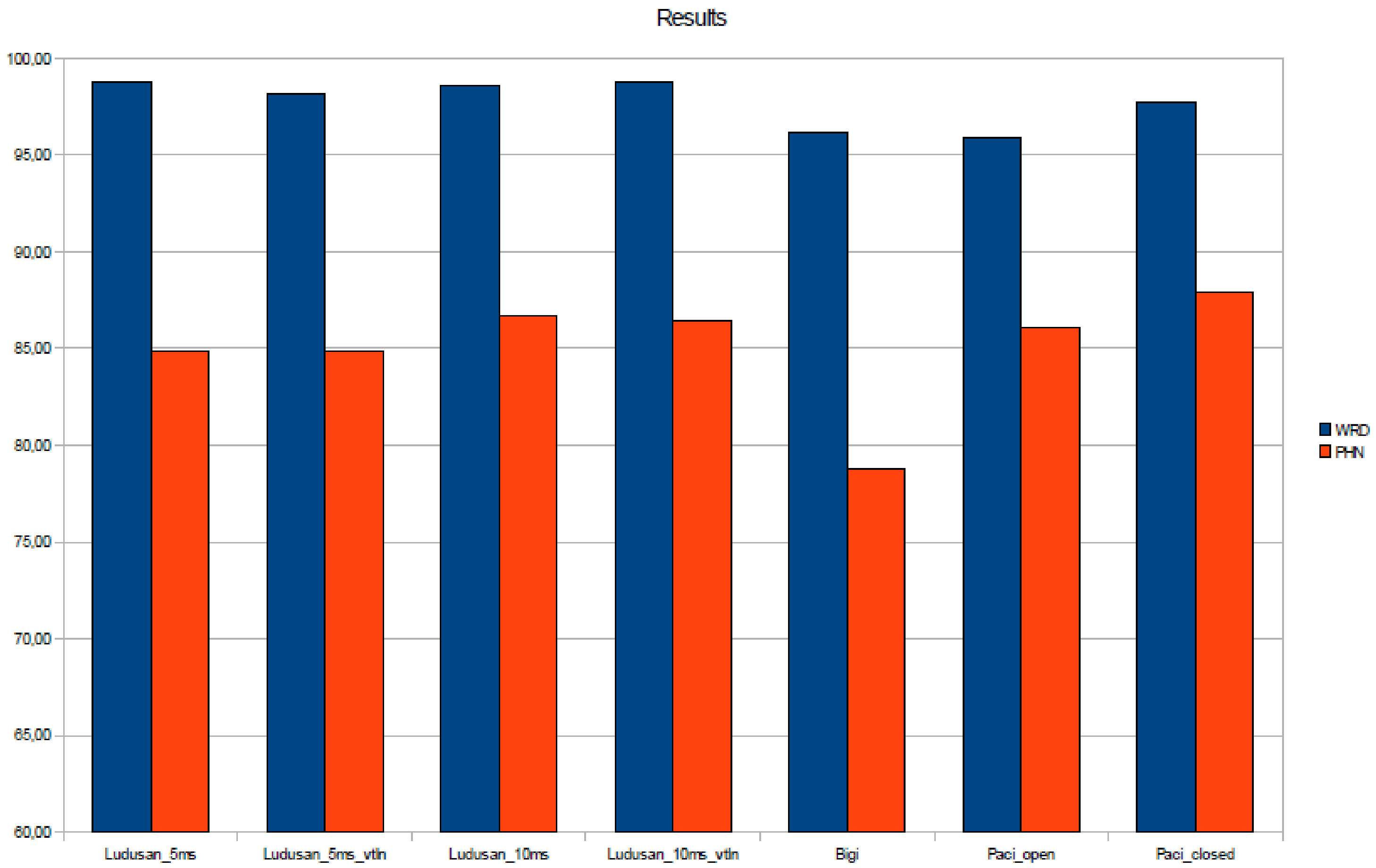
$$D(\text{deletion}) = T2(\text{ref}) - T1(\text{ref})$$

$$D(\text{substitution}) = |\, T1(\text{ref}) - T1(\text{hyp}) \,| + |\, T2(\text{ref}) - T2(\text{hyp}) \,| + 0.001$$

Phonetic transcription

- Only “clean” phones were left in the training set annotation
- Adjacent vowels were merged
- Groups of more than two vowels in the test set had alternative transcriptions (allowed by the CTM format)
- Predicted but non produced phones were not annotated in the test set
- Unpredictable phones were not annotated in the test set

Absolute results

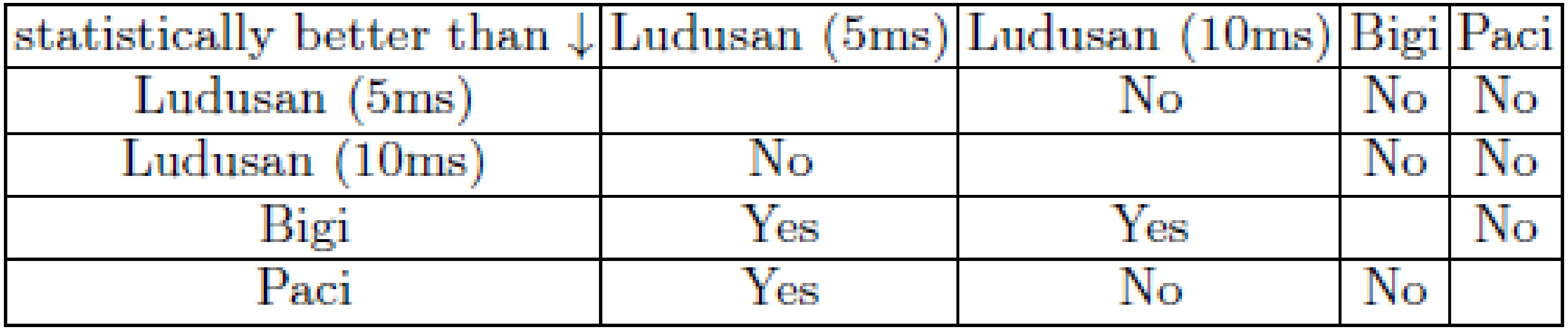


Statistical comparison

- Statistical tests performed with the NIST SC_STATS tool
  - Word alignment: Matched Pairs Sentence Segment Word Error Test
  - Phone alignment: ANOVA test

Statistical comparison

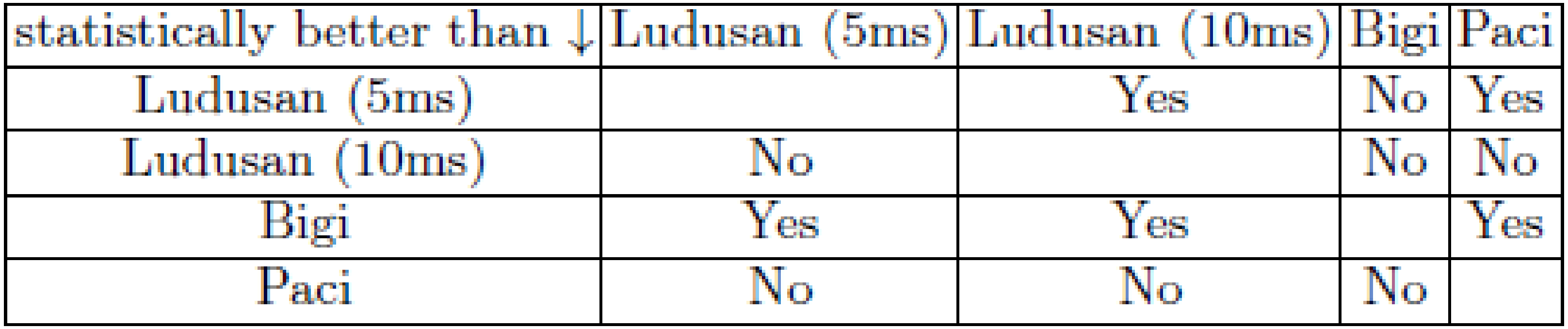
Word alignment task – closed mode
MPSS test: confidence 95%



statistically better than ↓	Ludusan (5ms)	Ludusan (10ms)	Bigi	Paci
Ludusan (5ms)		No	No	No
Ludusan (10ms)	No		No	No
Bigi	Yes	Yes		No
Paci	Yes	No	No	

Statistical comparison

Phone alignment task – closed mode
ANOVA test: confidence 95%



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Bigi	Yes	Yes		Yes
Paci	No	No	No	

No statistically significant difference found among systems in open mode

Conclusions

- All the systems obtained very high performances even in difficult conditions

- Results are comparable to the state of the art in other languages

- Difficulties in the phone alignment task highlight the problems in annotating spontaneous speech because of reduction phenomena