

CONCLUSION

Where are we?

- Speech **coding** is \approx **dead** (*in terms of research* :)) ; consumer products available
- Speech **recognition** is now reaching the market of **consumer products** (personal dictation); still a long way to go, though (robustness, language models, speech understanding)
- Speech **synthesis** is now living **exciting** times, \approx ASR in the mid 80's (automatic unit selection)

On the importance of large text and speech corpora

- Tagged **text corpora** required for training language models for ASR, phonetizers and taggers for TTS
- Phonetically labeled **speech corpora** needed for ASR (multi-speaker, 100s hours) and TTS (single speaker, 1-5 hours)
- **ELRA** (European Language Resource Agency) and **LDC** (Language Data Consortium) collect and distribute databases
- **From expert-based systems to corpus-based systems**

Speech Science?

This time is over

- planes do not flap their wings
- replace experts by corpora

cf. Jelinek 's «Each time I fire a linguist my recognition rate goes 1% higher»

1. Future milestones in speech processing will come from labs with strong commitment to solid, portable, and extensible code;
2. Speech scientists and software engineers will soon be the same people.

Speech Engineering!

I don't believe in Computer "Science"

**from R. Feynman's talk
on Quantum Computers
Bell Labs, 1985**

Where to go now?

- Books

- » *Traitement de la Parole*, R. Boite, H. Bourlard, T. Dutoit, J.Hancq, H. Leich, Presses Polytechniques Romandes, 1999 (in press)
- » *Speech Communication: Human and Machine*, Douglas O'Shaughnessy, Addison Wesley series in Electrical Engineering: Digital Signal Processing, 1987.
- » *Natural Language Processing in Prolog*, G. Gazdar and C. Mellish, Addison Wesley, 1989
- » *An Introduction to Text-to-Speech Synthesis*, Thierry Dutoit, Kluwer Academic Publishers (Dordrecht), 1997
- » *Fundamentals of Speech Recognition*; Lawrence Rabiner & Biing-Hwang Juang Englewood Cliffs NJ: PTR Prentice Hall

- On the web

- » **speech.comp** newsgroup
- » the unescapable speech FAQ :
<http://svr-www.eng.cam.ac.uk/comp.speech/>