Contents

• TTS : What for?
• Challenges
• Currently Used Technologies
  – NLP
  – DSP
• Currently Available Systems
  – Non-commercial
  – Commercial
• Conclusion :
  A Bright (Corpus-based) Future?

The MBROLA project
http://tcts.fpms.ac.be/synthesis/mbrola/

Festival
http://www.cstr.ed.ac.uk/projects/festival/

• Aimed at being the MATLAB of TTS
• Some pre-processing (e.g. numbers, new compounds, mail addresses etc.).
• Stochastic parser (n-grams)
• Fully trainable letter to sound rules system
• Durations as Klatt rules or by a CART tree.
• Intonation with a corpus-based ToBI system. The ToBI system predicts tones using CARTs based on a natural speech database. These tones are used to render an F0 contour using linear regression
• Supports MBROLA diphone synthesizer, plus a simple implementation of NUU-based synthesis.

C++ implementation (monolithic)
• GNU Public License
• Utterance architecture = Multi-level + relations
• Scripting language based on Scheme, mixed in the kernel
  ex : MLDS accessed in C via calls to scheme interpreter
• English, Welsh and Spanish
• Lots of people working on their own language

J’ai été conçu... Ma voix...
This is a short introduction to the Festival Speech Synthesis System. Festival was developed by Alan Black and Paul Taylor, at the Centre for Speech Technology Research, University of Edinburgh.

**SCHEME**

```
(lex.add.entry
  '( "awb" n ((( ei ) 1) ((d uh) 1) ((b @ l) 0) ((y uu) 0) ((b ii) 1)))))
```

```
(lex.add.entry
  '( "cstr" n ((( s ii ) 1) (( e s ) 1) (( t ii ) 1) (( aa ) 1) )))
```

**EULER**

- **Aim**: Multilingual TTS which integrates code from many other TTS systems, mostly GNU C++, in a modular way
- **No mix** between scripting language and kernel, nor between kernel and modules
- Data organized in Multiple synchronized layers (MLC : Multi-Layer Container; STL-based)
**EULER**

http://tcts.fpms.ac.be/synthesis/euler/

- Use of Engines for generic technologies
  (ex: rule-based transducer: MLRR; CART-based transducer: ID3)

**EULER Light : eLite**

http://www.multitel.be/TTS/

- **Aim**: Provide EULER results in a compact (light) format, while still enabling application development
- **Sources by default, except for universities (NDA)**

- **On the Web-based demo**: access to multi-level data structure

---

API : for application developers
API : for module developers
API : for engine developers

- French, Arabic (+ simple Spanish, Dutch, English, Turkish)
- MSWindows and (Linux !)
- Ex : French:

**API : for application developers**
**API : for module developers**
**API : for engine developers**
Excellent example of an expert-based approach
French only
Formal grammars, chart parsing
Rule-based phonetization, tone assignment
Rule-based pitch and duration generation
MBROLA synthesis

Other Systems

- Freespeech, Univ. Edinburgh, http://www.anthemion.co.uk/code/wxtts/wxtts2.zip
- LAIPTTS : SpeechMill, (Win, Mac, Unix; Fr, De), Lausanne University, http://www.unil.ch/imm/docs/LAIP/LAIPTTS.html