ENCS5344 Spoken Language Processing

Abualsoud Hanani

STUDENTS-HUB.com

Spoken Language Processing

Books

- J N Holmes and W J Holmes, "Speech Synthesis and Recognition" Second Edition, 2001
- L Rabiner and B-H Juang, "Fundamentals of Speech Recognition", Prentice Hall, 1993
- L R Rabiner and R W Schafer, "Digital Processing of Speech Signals", Prentice-Hall, 1978
- B Gold and N Morgan, "Speech and Audio Signal Processing", Wiley, 2000
- J.R. Deller, J.H.L. Hansen, J.G. Proakis, "Discrete-Time Processing of Speech Signals", IEEE Press, 1999

More Books

- G T Altmann, "*The Ascent of Babel*", Oxford University Press, 1998
- K Jelinek, "Statistical Methods for Speech Recognition", MIT Press, 1998
- Steve Young, "*The HTK Book*", Cambridge University Engineering Department

Software used during course

 SFS – Speech Filing System, by Mark Huckvale, available free from UCL website http://www.phon.ucl.ac.uk/resource/sfs/



STUDENTS-HUB.com

Spoken Language Processing

Praat Toolkit

 Praat: doing phonetics by computer <u>http://www.fon.hum.uva.nl/praat/</u>





Spoken Language Processing

Uploaded By: anonymous

STUDENTS-HUB.com

Matlab and Python

Matlab toolbox's:

- Signal processing toolbox
- Voicebox toolbox
- Netlab toolbox
- WEKA- an open source modelling toolkit
- Some of Python Audio Libraries for Speech
 - SpeechRecognition, PyAudio, and Librosa
 - Parselmouth
- Google Colab / Cloud computing

STUDENTS-HUB.com

Spoken Language Processing

Speech Science

- What is speech?
 - Unique
 - Human-to-human communication
- Multi-disciplinary
 - Acoustics
 - Phonetics and linguistics
 - Psychology
 - Biology and neuroscience
 - Computer science, cognitive science, AI
 - Mathematics and statistics
 - Electronic engineering

Spoken Language Technology

- Speech technology is concerned with:
 - Automatic analysis of human speech
 - Human interaction with computers and other technology, using spoken language
 - Integration of speech with other modalities
- It has potential applications wherever people interact with machines or use spoken language

Application areas

- Education
- Entertainment
- Forensics & crime prevention
- Information retrieval
- Biometrics
- Help to disabled people





Spoken Language Processing

Advantages of Speech

- Fast
- Natural
- Rich and Complex
- Works over the telephone
- "Hands and Eyes Free"
- Works in hostile environments
- Needs minimal panel space



Component Technologies

- Automatic speech recognition (speech-to-text)
- Speech synthesis (text-to-speech)
- Speech coding (parameters/samples represent speech)
- Spoken language understanding (content meaning)
- Spoken dialogue processing

Component Technologies (contd)

- Paralinguistic speech processing
 - Speaker verification / recognition / identification (who is speaking?)
 - Language recognition (what language?)
 - Gender recognition (male/fmale)
 - Accent/Dialect recognition (which accent/dialect?)
 - Age estimation from speech
 - Topic spotting
- Speech verification

Summary

- Information on the course
- Introduction to spoken language processing
- and speech technologies
 - Advantages
 - Applications areas
 - Multi-disciplinarity