Workshop

"Similarity from Distinct Point of Views"

PhD program "Empirical Speech and Language Processing"

San Servolo, Venice, 11th - 16th October 2010

Notions of "similarity", or its neighbour "near-identity", appear in many disciplines. In this workshop we want to look at the problem of defining, understanding, formalizing, recognizing, and exploiting similarity from an interdisciplinary point of view.

Schedule

11th Oct. 2010	Travel and informal Meeting in the Evening
12th Oct. 2010	Workshop "Similarity from Distinct Points of View"
13th Oct. 2010	Workshop "Similarity from Distinct Points of View"
14th Oct. 2010	Morning: Parallel Meetings of the ESP-Lecturers and PhD-Students
	Afternoon: Free Time
15th Oct. 2010	Workshop "Speaker Characteristics"
16th Oct. 2010	Departure

First informal meeting

Monday, 11th October, 18:30 p.m. at the Vaporetto Station San Servolo for a trip to Venice.

Further information

For further information about local transport and accomodation please look at our website
http://www.esp.phonetik.uni-muenchen.de/lehre/viu/index.html

Urgent help in Venice

Mobile phone from Christoph Draxler: 0152 2258 4157

Coordination

Sibylle von Tiedemann, sibylle.tiedemann@lmu.de

www.lmu.de/esp

Speakers

Invited

Prof. Dr. Janet Fletcher, Linguistics and Applied Linguistics, University of Melbourne
Prof. Dr. John Nerbonne, Computational Linguistics, University of Groningen
Prof. Dr. Hans Tillmann, LMU Munich, Phonetics and Speech Processing, Munich University

Lecturers of the PhD-Program

Dr. Michael Cysouw, LMU Munich, Quantitative Language Comparison
PD Dr. Christoph Draxler, LMU Munich, Phonetics and Speech Processing
Prof. Dr. Jonathan Harrington, LMU Munich, Phonetics and Speech Processing
Prof. Dr. Heinrich Hußmann, LMU Munich, Media Informatics
Prof. Dr. Friedrich Leisch, LMU Munich, Computational Statistics
PD Dr. Florian Schiel, LMU Munich, Phonetics and Speech Processing
Prof. Dr. Klaus Schulz, LMU Munich, Computer Linguistics

ESP PhD-Students (Munich University)

Barbara Baumeister
Christian Heinrich
Veronika Neumeyer
Mareike Plüschke
Clara Tillmanns

Guest PhD-Students

Nina Kottenhagen, Max Planck Institute for Evolutionary Anthropology, Leipzig
Nicole Weidinger, Clinical Neuropsychology Research Group, Munich

Research Scientists

Tina John, Phonetics and Digital Speech Processing, University of Kiel
Dr. Claudia Kuzla, Phonetics and Speech Processing, Munich University
Dr. Stefania Marin, Phonetics and Speech Processing, Munich University

Workshop „Similarity from Distinct Point of Views"

Tuesday, 12th October, Room 7A

09:30 – 09:45	Welcome
09:45 – 10:45	Key Note Speech **John Nerbonne, University of Groningen** *Inducing segmental similarity from dialectal distributions*
10:45 – 11:00	Coffee break (in the seminar room)
11:00 – 11:45	**Jonathan Harrington** *Similarities between synchronic and diachronic change*
11:45 – 12:30	**Michael Cysouw** *Using language-internal similarities to compare languages*
12:30 – 13:45	Lunch
13:45 – 14:30	**Klaus Schulz** *Fast search for similar words*
14:30 – 15:30	*PhD-Presentations* **Nina Kottenhagen**: *Applying distance to genetic and linguistic data* **Clara Tillmanns**: *Perception skills and imitation*

Wednesday, 13th October, Room 7A

10:00 – 10:45	**Friedrich Leisch** *Similarities and differences: How they are used in statistics*
10:45 – 11:00	Coffee break (in the seminar room)
11:00 – 12:30	*PhD-Presentations* **Nicole Weidinger**: *Gestures with and without speech in childrens` narratives: How are they related to verbal and nonverbal skills?* **Mareike Plüschke**: *Peak Alignment in Estonian* **Veronika Neumeyer**: *Acoustic Characteristics of the Speech of Cochlear Implantees*
12:30 – 13:45	Lunch
13:45 – 14:45	*PhD-Presentations* **Barbara Baumeister**: *On the Effect of Alcoholisation on Fundamental Frequency* **Christian Heinrich**: *Rhythmical features of alcoholized and non-alcoholized speech*
14:45 – 15:30	**Christoph Draxler** *Web-based perception experiments for the study of dialectal distributions*
15:30 – 15:45	Coffee break (in the seminar room)
15:45 – 16:30	**Heinrich Hußmann** *Similarity as a concept in constructing user interfaces*
16:30 – 16:45	*Closing*

09:00 – 13:30	**ESP-Lecturers** research training group	**PhD-Students** meeting
afternoon	free time	

Friday, 15th October, Room 7A
Workshop „Speaker Characteristics"

Speakers: Prof. Dr. Janet Fletcher, Prof. Dr. Hans Tillmann, Dr. Claudia Kuzla, Dr. Stefania Marin, Tina John.

Abstracts: Workshop „Similarity from Distinct Point of Views"

Dr. Michael Cysouw, cysouw@eva.mpg.de

Using language-internal similarities to compare languages

In the field of comparative linguistics, the central observation is that different languages are at times quite similar to each other with regard to specific linguistic characteristics. The main challenge of comparative linguistics is to explain the existence of any such similarities, be it by invoking human cognitive or communicative universals, historical events (either descent or contact), or simple coincidence. However, the practical challenge lies in the precise establishment of the observed similarities. How can we specify to which extent two different languages are similar? This might seem evident for some characteristics (e.g. for phonetic measurements), but it is far from obvious for morphosyntactic phenomena (e.g. how similar are passives from different languages to each other).

PD Dr. Christoph Draxler, draxler@phonetik.uni-muenchen.de

Web-based Perception Experiments for the Study of Dialectal Distributions

In online experiments, participants hear audio recordings of single digits and are asked to enter their judgment from a set of given options. The instructions and the options are given in non-technical terms, e.g. "Hört sich das 's' am Anfang von 'sieben' eher wie das 's' in 'reisen' oder das 'ß' in 'reißen'? At the end of the experiment, a map with the geographic locations of the audio items displays.

By solving a challenging task in an entertaining way, participants not only learn something about dialectal distribution, but they also extend the underlying speech database by additional annotation tiers.

Prof. Dr. Heinrich Hußmann, hussmann@ifi.lmu.de

Similarity as a Concept in Constructing User Interfaces

In the construction of modern software systems, the way how the system presents itself to a user and how a user interacts with the system is becoming more and more a central aspect. In particular, increasingly complex functionality has to be presented in such a way that the usage is self-explaining, so that extensive training phases in using a system can be avoided. The basis for making users feel familiar with an unknown system is similarity. Similarity appears in the form of consistency in interface concepts (within one system, within a certain platform, or even across different platforms), but also in the form of metaphors transferring experience and knowledge

from the real world into the operation of technical systems. Innovative user interface technologies like multimedia interfaces, virtual worlds or tangible interfaces put even more emphasis on similarity (or even overlap) between real and virtual world. There is an interesting tradeoff between increasing similarity (which eases first-time usage) and creation of specialized interfaces (which optimizes expert usage).

From the viewpoint of systems engineering, similarity plays a slightly different role. The construction of systems can be greatly simplified by re-using architecture, concepts or even software parts from similar systems which have been constructed in the past. There is also an engineering discipline dedicated to the construction of a family of similar systems (product-line development). Again, a tradeoff appears, in this case between flexibility and individualization of the produced system and economic production of the system.

Prof. Dr. Friedrich Leisch, Friedrich.Leisch@lmu.de

Similarities and Differences: How they are used in Statistics

Measures for similarity or dissimilarity of objects are two sides of the same coin. Using transformations like taking the inverse or "one minus" a similarity measure can be turned into a distance measure and vice versa. Finding two objects that are similar to each other is the same as finding a pair with a small distance in between.

This duality is used in many places in statistical models: Most cluster algorithms find groups of similar objects by minimizing the distance between them. Maximizing the likelihood of a model means finding parameter estimates such that the observations have a high probability, in other words are similar to the model. For Gaussian data (and several other distributions) this is the same as minimizing Euclidean distance, resulting in least squares estimates. The p-value of a statistical test is a standardized distance measure between the data sample and a null hypothesis. If the p-value is not significant, the observed sample is similar to what we would expect under the null. Finally multidimensional scaling tries to find low-dimensional representations of high-dimensional objects which preserve their similarity structures.

Prof. Dr. Klaus Schulz, schulz@cis.uni-muenchen.de

Fast Search for Similar Words

The need to correct garbled strings arises in many areas of natural language processing. If a dictionary is available that covers all possible input tokens, a natural set of candidates for correcting an erroneous input v is the set of all words w in the dictionary for which the Levenshtein distance to v does not exceed a given (small) bound n. In this talk we describe methods for efficiently selecting such candidate sets. After introducing a basic correction method based on the concept of a ``universal Levenshtein automaton'', we show how a filtering method known from the field of approximate text search can be used to improve the basic procedure in a significant way. The method, which uses standard dictionaries plus dictionaries with reversed words, leads to very short correction times for most classes of input strings. Our evaluation results demonstrate that correction times for fixed distance bounds depend on the expected number of correction candidates, which decreases for longer input words.

Barbara Baumeister, bba@phonetik.uni-muenchen.de
On the Effect of Alcoholisation on Fundamental Frequency

One part of my PhD-Thesis will be a study about the effect of alcoholisation on fundamental frequency. This study is based on the Alcohol Language Corpus (ALC) which contains the speech of 162 speakers of both gender, recorded in intoxicated and sober condition. The aim was to analyse the effect of alcoholisation on speaker's F0 with regard to gender, speech style and vowel class.

In a long-term analysis, a significant increase of $F0_m$ (median) can be found for both genders and for all speech styles. $F0_{qq}$ (quarter quantile distance) values also differ significantly for male and female, but the effect is stronger for female speakers. So some significant F0 changes can be seen in intoxicated speech, F0 therefore may be a relevant cue to reveal intoxication but it is not a sufficient cue. Other acoustic parameters should be taken into account. One further aim is to find an adequate way to test if the rise of the fundamental frequency may only be a side effect of an increase of intensity.

I am also going to conduct a perception test with F0 shifts of sober recordings to reveal whether F0 is a perceptual cue to reveal intoxication.

Christian Heinrich, heinrich@phonetik.uni-muenchen.de
Rhythmical features of alcoholized and non-alcoholized speech

Conventional rhythm features were developed on the basis of the durations of vocalic and consonantal clusters, but mainly to differentiate between stress-timed, syllable-timed and mora-timed languages. These rhythm features were used working on the Alcohol Language Corpus (ALC) to search for durational differences between alcoholized and non-alcoholized speech.

With the help of the RMS values of a speech signal a simple maximum-minimum-value function can be estimated where several derived features also reveal differences in the rhythmicity between alcoholized and non-alcoholized speech.

All data processing except a manual transcription is done automatically to find classifiers for alcoholized and non-alcoholized speech only by means of algorithmic processing.

Nina Kotthagen, nina_kottenhagen@eva.mpg.de
Applying distance to genetic and linguistic data

For the past decades, the notion of genetic distance has been well established between two strands of DNA or amino acids with the help of distances like Hamming or Levenshtein. In linguistics, however, research into similarity measures is less well established. Especially typological/morphological distances and distances between languages at different depths of the language tree are difficult to establish rationally. Some authors assign subjectively distances, others use tree depths, and again others use lexical distances all of which yield either contradictory or similar results. In my project, I am looking at putative correlations between linguistic and genetic relationships using matrices of genetic, geographic, lexical, and typological dissimilarities. I will present different approaches and an evaluation of what kind of measurements are reasonable to take into account.

Veronika Neumeyer, vroni@phonetik.uni-muenchen.de
Acoustic Characteristics of the Speech of Cochlear Implantees

The aim of my PhD-Thesis is the clarification of the question how the articulation of deaf people with Cochlear Implants (CI) differs from the articulation of normal hearing people. Another matter

is the extent of the perceptual and audiovisual impairment of these Cochlear Implantees and which conclusions can be drawn from these findings in terms of the interaction of speech production and speech perception.

For a future practical application I want to investigate if it is possible to achieve an articulatory improvement by specific modifications of the CI

Mareike Plüschke, mareikeplueschke@googlemail.com
Peak Alignment in Estonian

Estonian has a three way quantity distinction both for vowels and for consonants. My talk will focus on the question wether the pitch differences between the long and overlong quantity could be a by-product of the aligment of the pitch contour with the segmental string.

Clara Tillmanns, clara@phonetik.uni-muenchen.de
Perception skills and imitation

Strength of spontaneous phonetic imitation can change over various influences, such as word frequency or social matters. I try to create perception tests, with which speaker specific differences in imitation depending on perceptive performance can be analysed. Additionally the use of formant frequencies in studies on phonetic imitation is discusses.

Nicole Weidinger, Nicole.Weidinger@extern.lrz-muenchen.de
Gestures with and without speech in childrens` narratives: How are they related to verbal and nonverbal skills?

We are interested in how preschool and grade school childen use gestures and how these gestures are related to verbal and nonverbal skills. Typically, gesture research focuses on age-related changes in co-verbal gesture and language. However, there is scant knowledge on how children can use gestures to replace speech. To date, research into gestures without speech has concentrated on *pantomime of tool use.* In this task, children are asked to mime verbally designated actions (e.g. "Show me how you clean your teeth"). A developmental transition was found from age five to nine: While five-year-olds show "body parts as objects", nine-year-olds pretend holding the tool. Pantomime of tool use is, however, a very simple variant of gestures without speech: It only refers to a single action with a single object. Futhermore, it is produced on command and therefore not communicatively embedded.

By contrast, the development of gestural use to convey complex ideas has attracted little interest. To explore such competences in children, we ask five- and nine-year old German children to retell short video clips under two conditions: With speech, expecting children to produce gesture spontaneously (verbal condition) and without speech, using only their hands (nonverbal condition). To assess language development, memory span, handedness, and nonverbal intelligence we use standardized German tests. In addition, we collect data of a pantomime-to-command task. The narratives produced by the children are annotated for language and gesture. For gesture analysis we use a system which is suitable for determining the *formal diversity* of hand gestures with and without speech by capturing physiological properties (e.g. handshape, movement type). Furthermore, we determine whether gestures constitute *gesture strings* or form single gestures in both conditions.

Our preliminary data show that children are able to express meaning just by using their hands and that gestures change their characteristics when they are produced without speech. Gestures become more diverse when the transmission of content completely relies on them. With regard to gesture strings we observed that both age groups combine more gestures to strings when deprived of the possibility for verbal expression. However, the length of gesture strings increases with age.