Starting Up
As a Computational Linguist

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Computational Linguistics Fall School
Bochum, 29.10.2005

Agenda
1. Job Market & Key Qualifications
2. Trends in CL & Language Technology
3. Start-Up or Large Company?
4. Conclusions

What doing next...
... after graduation?
Bad news

- Current job market is highly competitive.
- In Germany, most available jobs seem to be academic ones.

Good news

- There is a niche for a non-academic career: speech and language technology
- International opportunities
- Interdisciplinary qualifications

Key Qualifications

- Depth in linguistics
- Programming and scripting skills
  - Java/ C++, Perl, Prolog, XML, JavaScript
- Knowledge of hot applications
- Soft skills
  - good communication skills, capacity for teamwork, ability to work independently, abstract thinking, ability to work in a structured way, critical faculty, etc.
- On-the-job training and practical experiences

Jobs by qualification type

- Programming skills alone are not enough.
- There are non-academic jobs at the universities.
What fits best?

What do I like most in CL?
What do I hate most in CL?
What are my strengths?
What are my weaknesses?
Which professional objectives do I have?

Possible career entries

- **Lingware developer**
  - modeling linguistic data
  - creating language resources

- **Software developer**
  - software engineering
  - developing NLP-based systems

- **Salesperson**
  - presenting and selling LT
  - explaining basic technology
  - tool training

- **Consultant**
  - agent for language technology
  - providing applicative solutions

Possible career entries

There is a lot in between:

- (Technical) Support
- Presales
- Product Management
- Training
- Document Processing/Technical Writing/Translation
- ... Watch out for job descriptions mentioning these areas as well!

A typical task

- **Software developer**
  Design and implement a fast and robust transducer that can be easily integrated into an existing software architecture.

- **Lingware developer**
  Write a regular grammar to extract financial information (sales figures, profitability, growth), sales information (market shares, number of customers) or stock market information (capitalization, trends) out of a set of documents.

- **Consultant**
  Conceptualize a knowledge management system for a large company and manage a respective customer project.

- **Salesperson**
  Get and keep clients for the company. Distribute products.
Where to search active job ads?

- Job area of the linguist list: http://www.linguistlist.org/jobs/index.html
- Several job markets and job search engines
- Web pages of potential employers

How to contact a company?

- To come in touch:
  - Internships
  - Graduate recruiting fairs
  - Bonding contact fairs
  - Post your profile to a job market
- To apply for a job:
  - React to an active job announcement
  - Use online application forms
  - Apply blindly
  - Talk to people

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Emergence of the language engineering paradigm

- Demand for language industry products
  - to assist the traditional linguistic professions (translation, language teaching, etc.)
  - to develop new language processing applications (natural language interfaces, speech input and output, document retrieval and indexing, etc.)

Requires development of robust language processing components, capable of dealing with real texts in concrete information and communication systems = language technology
Language technology (LT) is...

... the cover term for all information technologies specialized for dealing with text and speech in human language. It is also the field of engineering in which LT methods and applications are developed.

- Getting an Insight: [http://www.lt-cc.org/index-e.html](http://www.lt-cc.org/index-e.html)

German Competence Center for Speech and LT:
- Virtual Information Center LT-World
- German Demonstration Center for LT Systems
- Evaluation Center for LT applications

Stakeholders of LT

- Computer programmers, NLP experts and computational linguists
  - conduct basic research
  - create language engineering solutions

- Users of language engineering solutions
  - professional application experts: translators, localizers, terminologists, and interpreters
  - non-specialist users: bankers, layers, health professionals, etc.

Recent Trends in CL & LT


Principal Application Areas

- Information Extraction / Information Retrieval
- Authoring Tools
- Language Analysis / Language Understanding
- Knowledge Representation and Discovery
- Spoken Language Input / Written Language Input
- Natural Language Generation
- Spoken Language Output Technologies
- Discourse and Dialogue
- Multilinguality
- Multimodality
- Coding and Compression
- Language Resources
- Evaluation
Topics at ACL 2005

- Main Conference Sessions:
  - Corpus Annotation
  - Generation
  - Information Extraction
  - Lexical Acquisition from Corpora
  - Machine Learning and Statistical Methods
  - Machine Translation
  - Segmentation, Tagging, and Semantic Role Labeling
  - Semantics
  - Speech and Language Modeling
  - Summarization
  - Word Sense Disambiguation

Internet Survey of GLDV

**What is the big thing in NLP?**

- Speech Understanding: 32.26%
- Text/Data Mining: 19.35%
- Ontologies: 19.35%
- Neurolinguistics: 16.13%

Industries applying LT

- Life Sciences
- Automotive
- Energy/Utilities
- Publishing/Media
- Telecommunication
- Banking/Insurance
- Government
- Life Sciences
Challenges to the CL community

- Combination of new empirical corpus-based methods with traditional symbolic methods
- From purely rule-based or purely statistical methods to hybrid methods
- Creation of technically mature LT for hot application areas: multilingual processing, learning environments, multimodal communication, bioNLP, spam filtering, security, etc.

Challenges for LT companies

- Development of commercial products that
  - cover frequent linguistic phenomena
  - are robust, fast and user-friendly
  - reduce global costs and time-to market
  - increase the return on investment (ROI)

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Potential Employers

... and many others
My experiences

- IBM Development Laboratory, Böblingen
  - IBM is the world's largest information technology company
  - Number of employees worldwide: 319,273
  - Lab in BB engaged in research and development of hardware and software technologies
  - Lab in BB employs more than 1700

- TEMIS GmbH, Heidelberg
  - A software company designing, developing and distributing corporate Text Mining solutions
  - Founded in September 2000 by a team of managers, researchers and consultants from IBM
  - Employs 50 people and operated subsidiaries in France, Germany, Italy, UK and USA.

Chances and Risks

- Start-Up Company
  - One innovative technology
  - Flat structure
  - Dependent on Investors
  - Staff
    - Variety of tasks
    - Training on-the-job
    - Less opportunities for advancement within the company
    - Sometimes better salaries
    - Compensation mostly includes stock options

- Large Company
  - Several business units
  - Hierarchically structured
  - Relevance of LT depends on general strategy
  - Staff
    - Specific task
    - Trainee programs/Professional trainings
    - Job rotation within the company possible
    - More social security, e.g. pension plan

You need a Start-Up mentality

- Willingness to be extremely hands-on
- Being proactive and optimistic
- Being flexible (in time and location)
- Willingness to work on a variety of tasks
- Ability to develop projects to extremely tight timescales
- Ability to work under pressure
- Being independent of securities
- Willingness to take on responsibility
- Being entrepreneurial

Ask yourself ...

... whether you prefer to work

on an ocean liner

or on a sailboat!
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Conclusions

- Many careers are open to graduates of Computational Linguistics.
- Start-ups, large-scale enterprises and research institutes offer manifold non-academic job opportunities.
- Identify your personal preferences: What suits best to you?
- Take the decision into your own hands!

Focus Areas of Language Engineering

- Interface and support tools
- Shared language resources
  - include text databases and corpora, translation memory corpora, speech corpora, reference and encyclopedic products, lexicographical and terminological databases, and field-specific thesauri and classification systems
- Standards
  - character sets like UNICODE
  - various text markup, formatting standards, and file conversion standards

- Speech Communication
- Adaptive technology
- Education
- Document Generation and Management
- Translation
- Ontological systems
Three areas of recent progress:

- part-of-speech tagging
- stochastic parsing
- lexical semantics

Industry sectors using NLP

- aims to provide an overview of current trends and challenges in putting Text Mining approaches to work in a variety of scenarios. More and more these methods are used large scale analysis of patent documents

- pharmacy, chemistry and biotechnology

Automatic processing of multilingual medical terminology:
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