



Computerlinguistik in Arbeitswelt & Gesellschaft

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Über mich...

Wer bin ich?

<http://www.linkedin.com/in/hendrikzender>

Ausbildung

- 2000–2006 Uni Saarland, Studium der Computerlinguistik und Anglistik
 - Diplom-Linguist (Coli)
- 2006–2010 Uni Saarland, Promotion in Computerlinguistik
 - “Sprechende Roboter”
 - Situierte Sprachverarbeitung (NLG, NLU, Dialog)
 - Räumliche Wissensrepräsentation

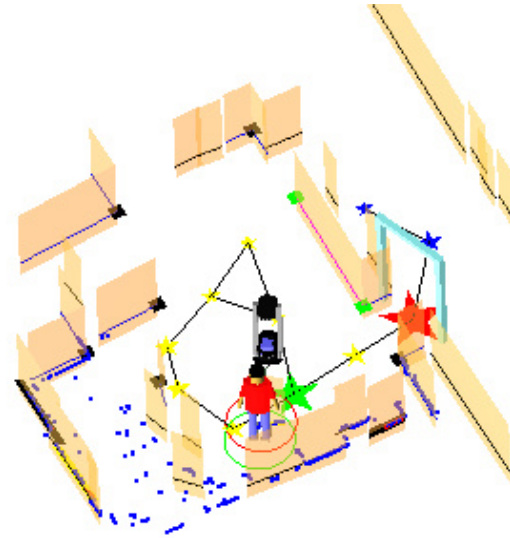
Beruflicher Werdegang

- 2005 – 2006 DFKI Saarbrücken
 - Diplomand / Hiwi
- 2006 – 2010 DFKI Saarbrücken
 - Doktorand / Researcher
- 2010 – 2012 DFKI Saarbrücken
 - Post-Doc / Senior Researcher
- Seit 2012 Nuance Communications Deutschland GmbH, Aachen
 - Senior NLP Research Engineer

EU-Projekte am DFKI

FB Sprachtechnologie (Uszkoreit), Talking Robots Group

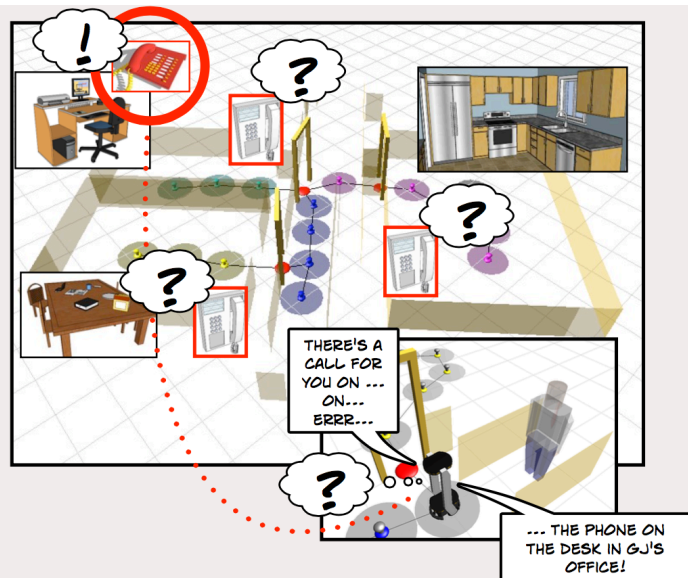
COSY: Cognitive Architectures for Cognitive Assistants



EU-Projekte am DFKI

FB Sprachtechnologie (Uszkoreit), Talking Robots Group

CogX: Cognitive Systems that Self-Understand and Self-Extend



EU-Projekte am DFKI

FB Sprachtechnologie (Uszkoreit), Talking Robots Group

NIFTi: Natural Human-Robot Cooperation in Dynamic Environments



Nuance Communications

Senior NLP Research Engineer

- Corporate Research Organization
 - Dragon R&D
 - NLP Applications
 - Advanced Dialog Research Team
- Forschung und Entwicklung im Bereich Sprachdialogsysteme hauptsächlich für Nuance Mobile und Automotive
 - Nuance Cloud Services (NCS)



Über Nuance Communications...

Delivering global solutions



Specialized: Deep knowledge across broad industry domains

Customized: Products and solutions tailored to specific client needs

Integrated: Expertise to integrate with existing customer technology

Scalable: Ability to implement technology in large enterprises with high volume needs

Global: Extensive partner network to design and deploy solutions around globe

Unparalleled local capabilities and resources to service customers around the world

World-class technology portfolio

14 billion

customer engagements
per year

4,300

patents and
applications

40

text-to-speech
languages and voices

80

languages

800 million

mobile keyboards
shipped annually

30,000

mobile app
developers

309 million

patient stories shared
annually

140 million

voice-enabled
vehicles shipped
globally

6,500

companies use
Nuance Enterprise
solutions



Strong customer and brand preference

With leading global relationships, it's rare to go a day without Nuance

Healthcare



Consumer Electronics



Document Imaging



Automotive



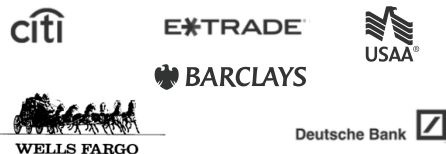
Telecommunications



Government



Financial Services



Travel



Consumer goods



Nuance Mobile

Creating a more human experience with cars, smart devices and IoT through voice, touch and natural language understanding innovations

- Voice, NLU and keyboard technologies that are highly intelligent, specialized and deeply integrated
- AI-driven assistant experiences that give devices, cars and apps the ability to listen, understand and respond
- Flexible technology that OEMs and developers can quickly and easily customize and integrate
- Value-added services through voice messaging innovation
- Support for any platform on any device or car, in more than 70 languages

Upsides

- A more compelling and simple user experience
- Mobile innovation that drives brand differentiation in competitive, global markets
- Personalization of the consumer experience that drives brand loyalty
- New paths to revenue through alternative monetization
- Shared insights and visibility into the data that drives next-generation innovation



Mercedes-Benz



Audi



TOYOTA



Roku

pebble

Nuance Developers Program

APIs für TTS, ASR, NLU



- Kundenportal, das Nuance Technologien für Entwickler anbietet
- Tools und APIs zur “Selbstbedienung”: **Nuance Mix**

- Nuance Mix ist eine Beta-Plattform
- An (App-)Entwickler gerichtet (auch für Studium und Hobbyprojekte geeignet!)
- Reaktion auf Vermehrung von Geräten- und Kundentypen (IoT, Apps, ...)
- Eignet sich sehr gut für Rapid Prototyping (auch Hackathons!)
- SDKs, APIs und Beispiel-Apps

- TTS: Text to Speech / Sprachsynthese
- ASR: Automatic Speech Recognition / Spracherkennung
- NLU: Natural Language Understanding / Sprachverstehen



Nuance Mix Beispiel



Nuance® Mix

1

ASR

“Turn on the heating”

2

NLU

Intent: temperatureControl

turn [state] on [/] the
[homeElement] heating [/]

Nuance Server
Client Application

4

Resultat

TTS: “Okay, heating is on.”

Effekt: <Haus ist warm und
gemütlich, wenn der
Anwender nach Hause
kommt.>

3

Client Business Logic

If temperatureControl
check what control (heating, cooling?)
check to what state to set it (On, OFF?)



Meine Tätigkeit bei Nuance...

Nuance Corporate Research

AI Research, Dragon R&D (ASR, NLU, Dialog)

AI Research

- Data Mining
- Big Data > Big Knowledge
- Ontologien
- Reasoning

ASR Research

- Acoustic Modeling
- Language Modeling
- Distant Speech
- Speech Signal Enhancement

NLU Research

- Grammatikentwicklung (JSGF)
- Maschinelle Lernverfahren
- Model Training
- Internationalization > Localization

Dialog Research

- Conversational Dialog
- Virtuelle Assistenten
- GUI + VUI User Experience (UX)
- Dialog Domain Entwicklung

Senior NLP Research Engineer

Advanced Dialog Research

Senior NLP Research Engineer

- Entwicklung / Programmierung
 - Java für Cloud-Systeme
 - C/C++ für Embedded
 - Python für Tools
 - XML, JSON
- Dialogmodellierung / Implementierung
 - Visio
 - Excel
 - JIRA (op. Projektmanagement)
- Forschung / Planung
 - Produktplanung
 - Prototyping
 - Proof-of-Concept Entwicklung
 - Nuance Research Conference
- Verbesserung und Erweiterung
 - Dialog-Features
 - Natural Language Generation
 - Localization
 - Prompt Management

Nuance Communications für Colis...

Fun Facts

- Sunnyvale AI Team aufgebaut durch Ron Kaplan (LFG...)
- Mind. 15–20 mir persönlich bekannte Ex-Colis/DFKI-ler @ Nuance
- Nuance ist Anteilseigner des DFKI
- “Innovation Challenges” – jährliche Hackathons

Nuance Job-Profile und Coli-Skills

- NLU Language Developer
 - **Grammatikentwicklung**, Annotation
 - Kommandozeilentools, Scripting
 - Datenerhebung, -analyse
- NLU oder ASR Researcher
 - **Machine Learning**
 - Python, Scripting, Kommandozeile
 - Datensammlung und -analyse
- AI oder Dialog Researcher
 - Software Engineering
 - **Ontologien und Reasoning**
 - **Machine Learning**

Nuance Job-Profile und Coli-Skills (2)

- UX Designer
 - Ausarbeitung von Callflows, Dialogkonzepte; Umsetzung von Kundenanforderungen
 - Multi-modale UX (VUI + GUI); Usability Studies
 - ggf. Lokalisierung, Customisierung bestehender Lösungen
- Sales Engineer
 - Ausarbeiten von Kundenprojekten (technisch, planerisch, juristisch)
 - Enger Kundenkontakt; Koordinierung mit Engineering und Research
- Software Engineer
 - Programmierung, Scripting
 - Skalierbare Lösungen (DB, Server, Client-Server, Grid, Cloud Computing, ...)
- Speech Scientist
 - Prompt Recording / Tuning; Callflow Tuning; Hardware Tuning; Usability Tests

Jobs bei Nuance

Stellenangebote in den NLU Languages Teams (AC, MTL, CAM)

- NLU Developer Japanese
- NLU Developer French
 - PhD/Master, 2J Berufserfahrung
 - Spr. jp bzw. fr
 - ML, Python, Java
 - Development of the NLU pipeline
 - Development of new features in NLU
 - NLU accuracy improvements
 - Accuracy checking of annotations
 - Contribute to improving NLU system
- Senior NLU Developer (LT)
 - PhD/Master, 5J Berufserfahrung
 - Spr. de/cn/fr/it/es/pt/jp/ko



Jobs bei Nuance

Stellenangebote für Studenten/Absolventen

- New Grad Softw. Dev. AI
 - Core Dialog/AI Research Team (MTL)
 - PhD/Master Absolvent
 - Dialogsysteme
 - Ontologien
 - ML, Java
- Language Engineer
 - Auto Prof. Services (Aachen)
 - BSc/MSc
 - ASR, Lokalisierung, User Studies
 - Phonetische Transkription
 - Programmiererfahrung (Python)



Jobs bei Nuance

Stellenangebote für Studenten/Absolventen

- Student Worker – Voice Barge-In
 - Auto PS (Ulm)
 - UI Design, Psychologie, Coli, Info, ...
 - Office, XML
- Student Worker – Hybrid Dialog
 - Auto PS (Ulm)
 - Info, Coli, E-Technik, ...
 - C/C++, Java
- Praktikant/-in – Mix NLU
 - NLU Research Team (MTL)
 - Java, Scripting
 - Ontologie-, Grammatikentwicklung



Jobs bei Nuance

Andere Stellenangebote

- (Sen.) UI Engineer/Dev
 - Auto Professional Services (Ulm)
 - UI Design für Sprachdialoge
 - Dialogflows in XML; Grammatik in BNF
 - C/C++, (Java)
 - Koordination mit NLU Dev; Übersetzern
 - Testen/Integration
- TTS Language Engineer
 - Nuance Vocalizer Team (Merelbeke, BE)
 - de/en-US Muttersprachler
 - Text Normalization
 - Phonetische Transkription
 - POS Analyse; Prosodie Vorhersage
 - Scripting in Python, Perl o.ä.





Danke fürs Zuhören!

Fragen...?

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