

Our portfolio

- Research and development
- Study, Bachelor and Master thesis (also external)
- PhD (also external)
- Advanced training
- Consulting
- Certificates
- Staff transfer

Partners/Cooperations

Research partners:

- Charité Universitätsmedizin Berlin
- Deutsche Forschungsgemeinschaft, Bonn
- Deutsches Forschungszentrum für Künstliche Intelligenz GmbH, Saarbrücken
- Deutsche Krebshilfe e.V., Bonn
- Friedrich-Schiller-Universität Jena
- International Max Planck Research School, Erlangen
- Rheinische Friedrich-Wilhelms-Universität Bonn
- Stanford University, CA, USA
- Universitätsklinikum Erlangen
- Universität Koblenz-Landau
- Universität Mannheim
- University Szeged, Ungarn
- University of Utah, Salt Lake City, UT, USA

Industry partners:

- adidas AG
- Asahi Kasei Corporation
- Astrum IT GmbH
- Audi Electronics Venture GmbH
- BMW AG
- Chimaera GmbH
- DaimlerChrysler AG
- Elektrobit Automotive GmbH
- Fraunhofer IIS
- HipGraphics Inc.
- IBM Deutschland GmbH
- MEDAV GmbH
- Siemens Corporate Research GmbH
- Siemens Medical Solutions
- Softgate GmbH
- Sympalog Voice Solutions GmbH
- Talking Eyes

Staff

- 3 Professors
- 1 Academic Director
- 37 Researchers (thereof 7 external)
- 2 Administration Secretaries
- 2 Laboratory Assistants
- 1 Trainee

How to get to us



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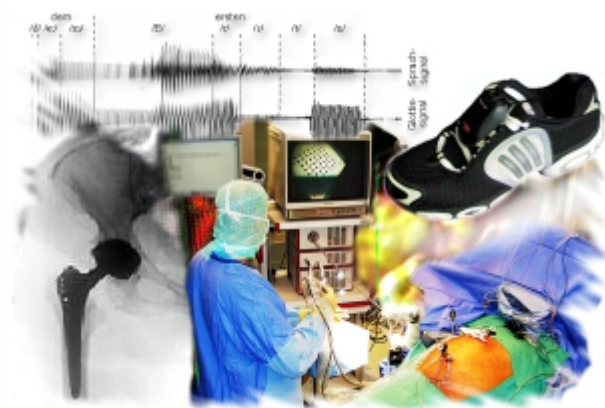


Computer science

Computer science
Computer science
Computer science

LEHRSTUHL FÜR MUSTER- ERKENNUNG

Institute of Pattern Recognition



Friedrich-Alexander-Universität
Erlangen-Nürnberg



www.techfak.uni-erlangen.de

What is Pattern Recognition?

Pattern recognition is one aspect of computer science and describes the automatic acquisition, recognition and analysis of sensor data, e.g. from microphones, cameras, x-ray equipment or thermometers.

The typical pattern recognition pipeline is as follows: acquisition, pre-processing, feature extraction, feature reduction and classification.

The range of applications reaches from speech recognition to conversational dialogue systems, from 2-d character recognition to 3-d object tracking. Supporting physicians for diagnosis and surgery, improvement of human-machine interaction and monitoring of processes are goals of pattern recognition. Our focal point is medical image processing.

Institute of Pattern Recognition

The Institute of Pattern Recognition (LME) is one member of the Department of Computer Sciences of the Friedrich-Alexander-University of Erlangen-Nuremberg and was founded in 1975. Professor Heinrich Niemann headed the LME for 30 years, and Professor Joachim Hornegger is in charge of the LME since 2005.

Researchers and students deal with investigation and realization of algorithms for classification and analysis of patterns, e.g. image and speech data. Current research projects are predominantly easy to apply, interdisciplinary and focus on medicine and health.

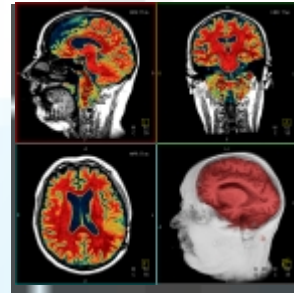
The LME has close national and international collaborations with other universities, research institutes and industrial partners.

Fields of Research

- Medical Image Processing
- Computer Vision
- Speech Processing and Understanding
- Digital Sports

Medical Image Processing

The research activities of the medical image processing group deal with the development of methodologies that provide physicians with additional knowledge of the complete diagnostic and therapeutic workflow. Beginning in the first state, prevention: a major research topic consists of the automatic and early detection of diseases in retina images of different modalities. A further aspect is information needed for the planning of operations: from multiple images of a single body region, e.g. CT data sets, a 3-d/4-d reconstruction is computed. If images of a patient are acquired using more than one imaging modality (CT, MRI, Ultrasound) multi-modal fusion can be applied. Consequently, by combining the information the pre-/inter-operative planning/localization is supported.



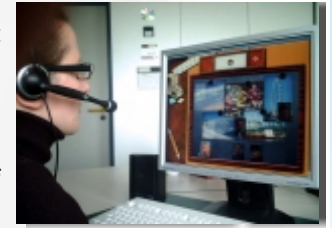
Computer Vision

The concern of the computer vision group is the visual tracking, recognition and reconstruction of arbitrary objects. Therefore, passive as well as active, i.e. computer navigated, cameras are used. The work cover the full range from basic research to concrete applications. Consequently, a special emphasis is given to the robustness and the speed of computation. The developed approaches are evaluated under field conditions. With the available superior equipment, containing several pan-tilt units, cameras with electronic zoom, and mobile as well as fixed robots the evaluation of various procedures is practicable in complex and realistic environments.



Speech Processing & Understanding

The speech group's main fields of activity are robust recognition of spontaneous speech, recognition of childrens' speech, of emotions, and the analysis of speech and voice disorders. Additional projects focus on the speech of elderly people, computer-assisted language learning, and speaker and speaker group recognition, e.g. age or dialect. In 1992 the institute launched the first publicly accessible dialogue system for spontaneous telephone speech. Sympalog - a spinoff company of the institute of pattern recognition - markets successfully the speech technology of the institute (www.sympalog.com).



Digital Sports

As in many other areas of application, an increasing number of embedded systems for data acquisition and evaluation is employed in the sports domain. These systems are used to support, guide and motivate athletes, as well as to increase their performance. In addition to heart rate and respiration, sport specific information such as speed or strain level are also gathered. Conventional sports science methods can only be used to a limited extent to interpret the amount of accumulated data. For this reason, pattern recognition concepts are applied to analyze the acquired data. The algorithms have to be adapted so that they can cope with the restricted hardware environment of mobile systems. Finally, the relevant information can be passed on to the athlete or the trainer. It can be used to adapt the sports equipment to the prevailing situation.

