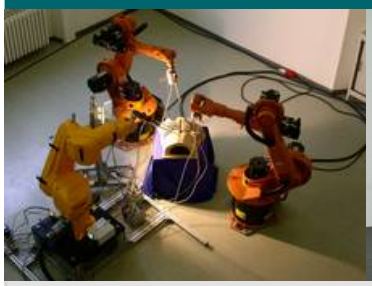
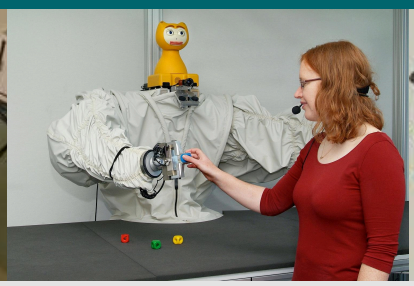
Robotics, Cognition, Intelligence

Technische Universität München
Master of Science


Programme

Complex technical systems, that combine mobility with perception, reasoning, and action generation

We are currently observing a strong trend towards a convergence of three areas of science and engineering that have different origins and have traditionally been taught as more or less different subjects:

- robotics was considered to be the art of designing computer programmable fixed actuators of different shapes, sizes and physical power, primarily used for material and parts handling;
- computer vision and sensor fusion have emerged as applicable engineering methodologies;
- cognitive sciences have only very recently been discovered as potentially being helpful as a basic tool for designing complex sensor-actuator systems involving interaction with the environment and/or human partners.

As we move towards more and more complex technical systems that combine mobility with perception, reasoning, and action generation, engineers will need a thorough interdisciplinary understanding of the basics of all these fields, along with a good understanding of their interrelation and their application. In other words: future engineering will be largely dominated by designing very complex perception-action systems featuring a variety of different sensors, interacting reasoning modules and actuators, resulting in complex cognitive skills and multimodal interaction capabilities. The challenge will be to design these systems in such a way that they can handle tasks in a flexible way, adapt to user's needs, are affordable and reasonably easy to instruct.

Duration of study: 4 semesters
Degree: Master of Science
Start: winter and summer semester
Application deadline: winter semester 31. May, summer semester: 30. November
Application / Admission: Aptitude test, further information here >
Costs per Semester: student union fee + basic semester ticket fee = 129,40€ per semester.
Teaching language: German/English

Flyer Master Program >

Technische Universität München

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To the Website >

Course of studies

Purpose

It is the purpose of this Master's course on "Robotics, Cognition, Intelligence" not only to provide students with the necessary basic knowledge in all underlying scientific areas, but also to train them in the practical design of such systems using a variety of real technical platforms (including all kinds of different robots) available at TUM.

Moreover, there is a large "cultural" gap between engineering disciplines and cognitive sciences, which makes it difficult, if not impossible, for scientists in these areas to efficiently communicate with each other. It is even more difficult to enable them to work together in an effective way. It is therefore an additional goal of this Master's course to encourage students to acquire a basic understanding of the working principles of each of the disciplines. Although most of the courses are oriented towards engineering principles, this course also includes modules dealing with

topics from neurosciences and cognitive sciences.

Taken together, the profile of this course will not only give students a competitive advantage in the labor market in a fast-growing field; it will also provide an excellent education as a sound foundation for further studies, e.g. PhD programs at TUM or elsewhere.

Students must have completed their basic university education (they must have obtained a Bachelor's degree or equivalent, for example, in electrical engineering, physics or computer science), but highly-motivated students of different backgrounds who want to broaden their perspective by studying this challenging field are also eligible and welcome.

Informatik

Maschinenbau