



## CAMERA BASED SENSING

SENSOR-SOFTWARE FOR SMART ROBOTS

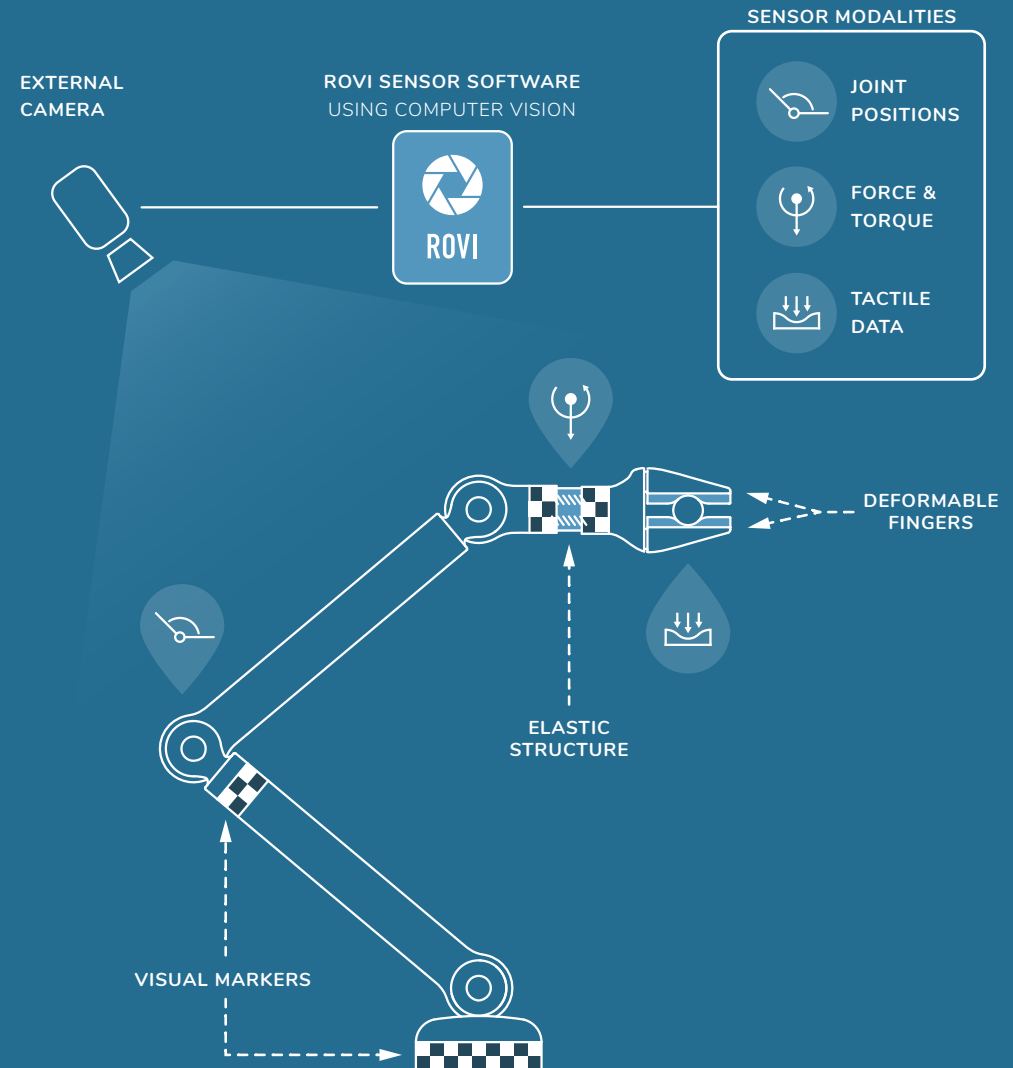


# SOFTWARE TO REPLACE HARDWARE

Our vision is to make intelligent robots available to everyone – to help us with manual work in manufacturing, in the office and at home. Sensors are a key technology to bring robots “out of the cage”, but current sensor systems are too complex and expensive for many such applications.

RoVi has developed the world's first completely camera-based sensor system for robot arms and grippers. Our patented solution relies on an image processing software and features rich sensory feedback. It substitutes electronic sensors built into the robot with remote sensing.

## SENSOR PRINCIPLE



# CAMERA BASED SENSING

On the robot itself, only low-cost passive elements are required. Positions are determined using visual markers. Force sensing relies on deformable elements, such as rubber foam. These elements are observed by a camera, and our computer vision software calculates joint positions, force, torque and tactile signals from the camera image.

RoVi's sensor software greatly simplifies the mechanics, hardware design and wiring of robot arms – and thus enables their use in low-cost automation, service robotics and consumer applications. The robot is continuously auto-calibrated, enabling the use of low-cost structural parts even for precise manipulation tasks.

## EXEMPLARY USE CASES



LOW-COST DESKTOP  
ROBOT ARMS



ARM-EQUIPPED  
MOBILE PLATFORMS



COMMISSIONING AND  
PACKAGING



PROCESS  
MONITORING

## ADVANTAGES



REPLACES  
ELECTRONIC  
SENSOR MODULES



COST-EFFECTIVE  
SENSOR SOLUTION



AUTOMATIC  
SELF-CALIBRATION



RICH SENSOR  
FEEDBACK



## DEMONSTRATION VIDEO

[rovi-robotics.de/video-arm](https://rovi-robotics.de/video-arm)



USE  
QR-CODE  
TO PLAY

Watch camera-based control in action:  
This sensorless robot arm commissions objects detected by a camera. The arm is based on COTS components and features our camera-based sensors.

# FOUNDING TEAM



Dr.-Ing.

**Nicolas Alt**

Computer Vision  
Business Development



Dr.-Ing.

**Clemens Schuwerk**

Control Engineering  
Marketing and Sales



M. Sc.

**Stefan Lochbrunner**

Electronics Engineering  
System Integration

## ABOUT US

RoVi was founded by three engineers as a spin-off from Technical University of Munich (TUM). Our common vision is to create robots that improve our daily lives. Robots that are simple and low-cost yet smart enough to take over dull, dirty and dangerous tasks. We know each other for several years. Nicolas and

Clemens have been working together during their PhD. Our camera-based sensing technology mainly comes from Nicolas' research in computer vision and visuo-haptic perception. Clemens' past research focus was in haptics and telerobotics. Stefan is an experienced electronics and hardware engineer.



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SPIN-OFF AT  
**TECHNICAL UNIVERSITY OF MUNICH**

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Geändert durch:



aufgrund eines Beschlusses des Deutschen Bundestages

