

Research program

ROBOTIZATION AND AUTOMATION IN INDUSTRY AND SERVICE ROBOTICS

Development of industrial and service robots for special applications. Development and system integration of handling equipment and industrial robots into robotized technological workplaces. Research and development of new types of effectors (gripping and technological heads) of robots. Research and development of special gripping heads for heavy duty and special operating conditions (with increased temperature, increased dust, vacuum etc.) supported by numerical simulations. Design of gentle handling of fragile, hot and unstable objects, handling of complexly shaped objects. Research of methodology and development of algorithms, software and hardware for evaluation of production quality, acquisition and interpretation of 2D and 3D images of difficult to detect objects. Development and application of mechatronic systems for specific applications.



Research activities

ROBOTIC MANIPULATION AND EFFECTORS

- ▶ Research and development in the field of robotic handling of less common objects due to their weight, temperature, brittleness, shape instability or shape complexity or to special environments such as elevated temperature, dust or vacuum.
- ▶ Development and system integration of handling equipment and industrial robots into robotized technological workplaces.
- ▶ Research and development of new types of robot effectors (gripping and technological heads).
- ▶ Support of research and development using numerical simulations.

OBTAINING 2D AND 3D IMAGES OF DIFFERENT DETECTABLE OBJECTS

- ▶ Research and development of methodologies for obtaining and interpreting 3D images of difficult to detect objects (glossy surfaces, surfaces with parasitic reflections, objects made of transparent materials or materials with subsurface light scattering and others).
- ▶ Research of methodologies for obtaining image data using electromagnetic radiation outside the visible spectrum (infrared and ultraviolet electromagnetic radiation), mechanical waves (ultrasound) and other physical fields for the subsequent interpretation of 2D and 3D images and quality evaluation. Development of applications for industrial use.

SERVICE ROBOTICS AND MECHATRONIC SYSTEMS FOR SPECIFIC APPLICATIONS

- ▶ Application of service robots for difficult and specific surfaces, in difficult conditions, in dangerous areas.
- ▶ Research and development of mechatronic systems for medical and rehabilitation purposes.
- ▶ Development of single-purposed machines and mechatronic devices for specific professional applications (de-icing, robotic lighting etc.).
- ▶ Support of research and development using numerical simulations.