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# Rapid Prototyping Tools for Process Automation

## Industrial and Biomedical Case Studies

PhD program in  
Industrial Engineering



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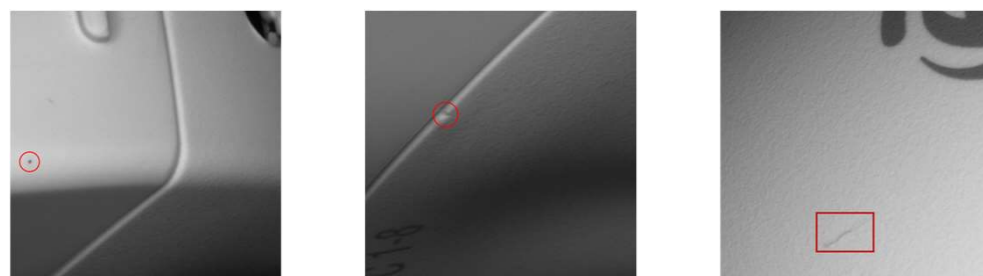
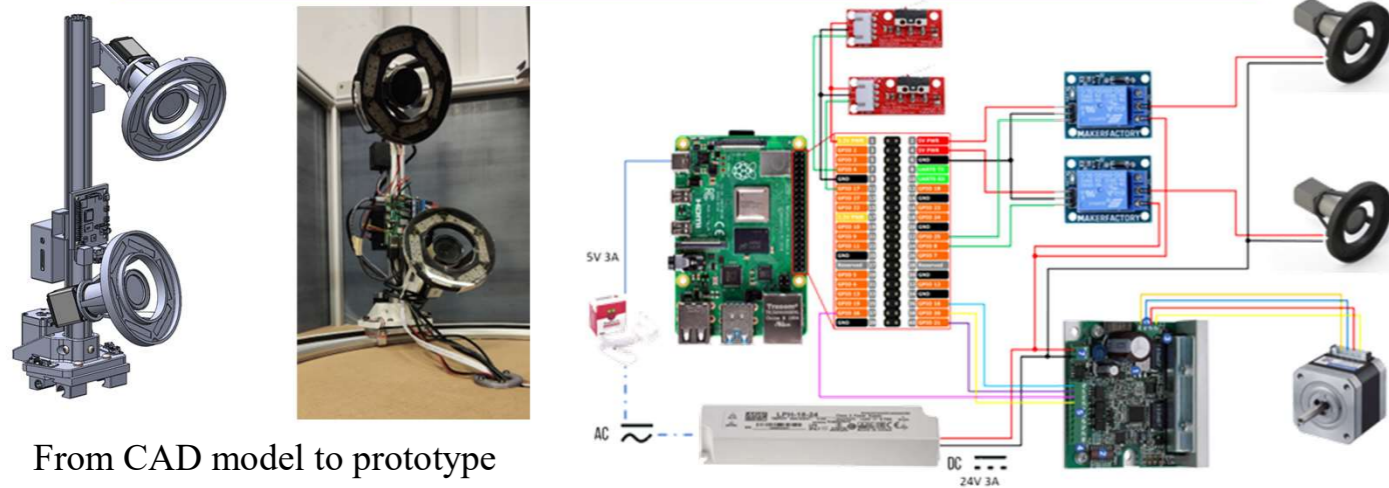


### Abstract

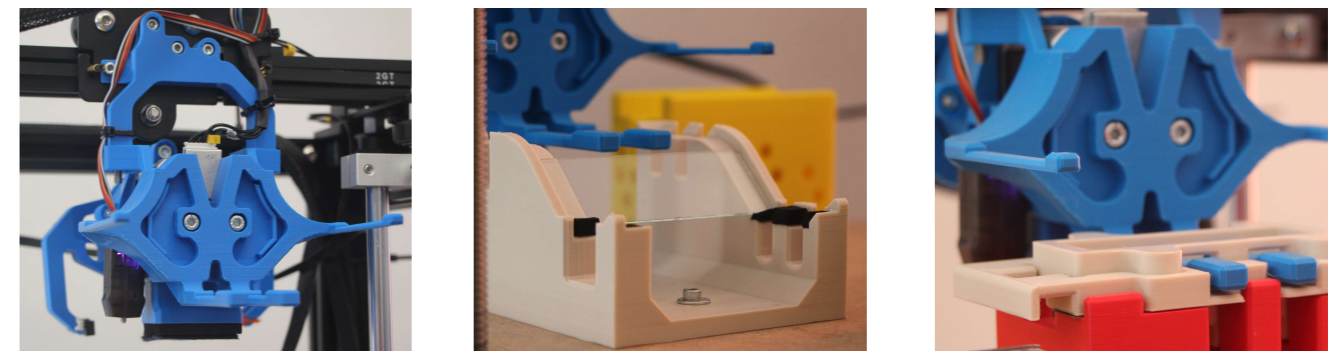
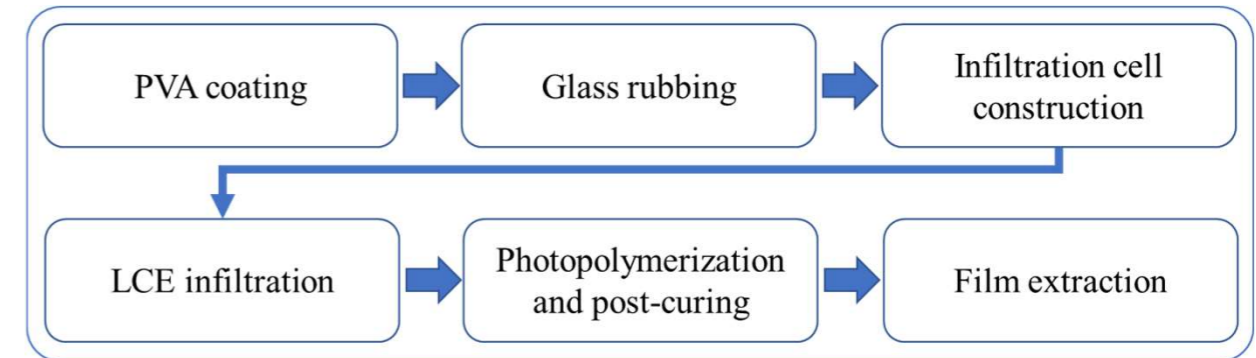
Rapid prototyping tools are essential for developing and testing process automation solutions in a fast and agile way. Here we present two case studies in which these tools have been effectively used. The activities presented are contextualized in two research projects APROMISE and REPAIR. The first solution is an automated machine vision system capable of acquiring the surface of ultrasound probes and detecting defects using artificial intelligence. The second is a prototype capable of assisting the user in the production of liquid crystal elastomers with programmable molecular orientation and uniform thickness, using rubbed glasses as alignment layers.

### APROMISE – Automatic Defect Detection of Ultrasound Probes

Machine Vision System



### REPAIR – Liquid Crystal Elastomers Infiltration Prototype



Nominal layers' thickness of 0.03 and 0.02 mm - Uniform thickness and correct alignment



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