

Combined real-time velocimetry for natural and built environments

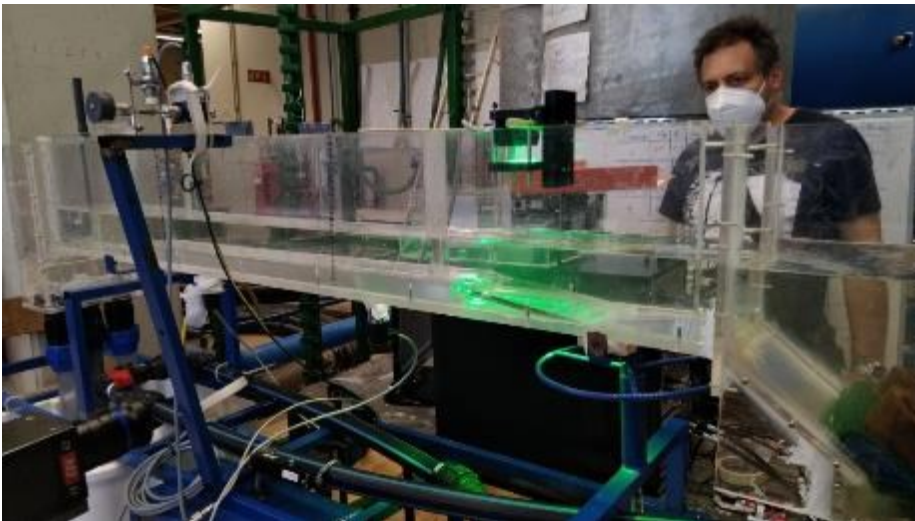
Summary

Velocimetry techniques are highly necessary in the context of flood risk mitigation. The present work is aimed at the design, building and testing of a Computer Vision-based flood monitoring velocimetry instrumentation. This entails I) evaluating and improving Optical Flow estimation methods, possibly complementing LSPIV techniques, and II) developing portable embedded measurement hardware equipment, possibly based on FPGAs, to implement the novel optical-flow estimation method, while enforcing cost-effectiveness, yet allowing real-time computation times.

Cost-effectiveness assures simultaneous installation at multiple places and installation in drones, increasing flexibility and the area of operation. This PhD is in line with the research project RiverCure, funded by FCT, benefiting from the lab techniques for validation of the latter project and contributing with instrumentation that enables data assimilation for computational models, thus improving operational risk mitigation tools. The work will benefit from the expertise, experience and resources of two research groups at IST, the ISR and CERIS.

Keywords

Velocimetry, optical flow estimation, real-time, computer vision, fluid flow.



Portable Particle Image Velocimetry device in a demonstration of a hydraulic flume.



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