

Embedded vision for autonomous navigation of mini drones

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In the near future, small robotics systems like mini drones (or MAV for micro-air vehicle) will be able to execute autonomous missions (exploration, surveillance, digitalization, ...) in complex and unknown environments. Embedded vision is a key component of these systems. It builds on methodological achievements provided by 30 years of works in computer vision and exploits new technologies such as embedded processors, sensors and cameras which were boosted by the market of mobile phones. The presentation will first browse major results and actual trends of embedded vision. Then the focus will be put on the work of the MAV Team at ONERA Palaiseau about vision-based navigation of drones in unknown and cluttered environment. A video demonstrating indoor and outdoor autonomous flight of a MAV will conclude the talk.

Intended Audience

This material is intended for engineers, scientists or students who are interested in the principles of vision-based navigation and its practical implementation on a mini drone.

Biography

Guy Le Besnerais graduated from ENSTA in 1989, received the PhD from Univ Paris-Sud Orsay in 1993 and the HDR (post-doctoral degree giving the ability to supervise doctoral studies) from Institut Galilée (Univ. Paris 13 Villetaneuse) in 2008. He joined ONERA/DTIM (Modeling and Information Processing Department) in 1994, where he is now Senior scientist, in charge of the scientific coordination of the research axis IMOV (Image, Motion, Volume). His work concerns data inversion, image processing and computer vision and includes several published contributions in optical flow estimation, 3D and motion measurement from imagery, vision-based navigation, codesign of smart sensors and image super-resolution.