TECHNOLOGY OFFER

BIONIC ANTI-COLLISION TECHNOLOGY FOR DRONES

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Over the last years, there has been a strong increase in drone operations of the private and industrial sector. Current safety regulations restrict the use of drones due to harmful accidents that occurred in the past. The safe use of drones mainly depends on efficient collision avoidance to be executed autonomously in scenarios with high collision risk. Efficient collision detectors enabling safe drone operations are not yet established, and current systems are technically complex and expensive. In a bionic approach, researchers of the University of Graz are developing an anti-collision sensor inspired by the reliable collision sensing of locusts flying in large swarms, where individuals have to respond swiftly to neighbors. Because of the simplicity of this bionic sensor, computational effort is low and efficient evasive maneuvers are possible.

BACKGROUND

Increasing safety in drone operations is attracting growing attention by the industry, because cheap and reliable anti-collision sensors are not available. Currently, successful distance sensors rely on the stereoscopic vision of two cameras and reconstruct the environment in 3D, which is computationally demanding. Even more complicated, LIDAR systems enable exact distance estimation and perform object identification, which increases weight and reduces flight time.

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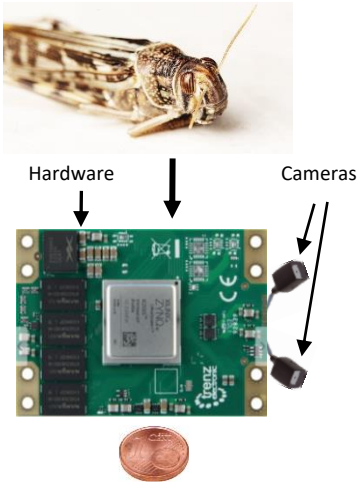
This innovative, vision-based anti-collision algorithm was inspired by locusts and extracts the collision risk from certain features of the visual scene. It works independently of object identification and distance estimation. This method was developed by studying the collision detection system of locusts at the neuronal level. Compared to the real locust, this algorithm responds more selectively to impending collisions and even calculates evasive vectors. In an FFG funded project, this bionic algorithm will be implemented into a hardware receiving input from two miniature cameras which comprise a total visual field of 180°. When objects are on a collision course, this hardware takes over the flight controller of the drone.

ADVANTAGES

- Increased visual field of 180°
- Low weight and energy consumption
- Low computational power
- High detection range of at least 20m
- Extended flight time
- High flight speed



From nature to an anti-collision sensor.
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KEYWORDS:
COLLISION DETECTION
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LICENSING AGREEMENT
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DEVELOPMENT STATUS:
DEVELOPMENT OF A DEMONSTRATOR

INTELLECTUAL PROPERTY:
SECRET KNOW-HOW

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