

Cane Toad control using Machine Vision

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Machine vision is a rapidly evolving field, with current, well-trained neural networks capable of identifying animal species more reliably than most humans. In the context of toad control, machine vision would be capable of differentiating between toads and frogs, and recognising toad tadpoles and egg masses.

Suggested applications and benefits of machine vision-based toad control

- **Traps:** Cane Toad-only traps can be developed allowing only cane toads to enter and excluding all other Anurans. Baits such as calls and pheromones can be intensified when toads are detected nearby. This should improve the performance of the traps by making them responsive and therefore more closely imitating the behaviour of a real toad.
- **Containment:** Machine vision monitoring stations can be established in likely cane toad habitat, and could be assisted with broadcasting male advertisement calls. When toads are detected in an area, rapid eradication can take place, maintaining the toad-free status of a contained area.
- **Tadpole pheromones:** These can be used to trap tadpoles or reduce the viability of eggs. The effectiveness of the pheromone could be greatly enhanced with good timing.
- **Training at-risk species:** When cane toads enter the habitat of an at-risk species, alarm calls of the at-risk species can be broadcast warning them that danger is present.
- **Updating male advertising calls:** If a toad is located in an area and a call is detected, through an inbuilt microphone, the call can be recorded (if it has the characteristics of the advertising call) and replayed as a local version of the call. This should improve the authenticity of the call and make it more effective.
- **Environmental and performance monitoring:** Machine vision can be used not only to monitor toads but all other animals in the area. The species identified can be sorted and filed by the system. Graphs of species abundance vs time can then be plotted. This will deliver a complete environmental snap shot and allow the performance of any control method to be measured against the health of the ecosystem. Monitoring systems can be conveniently accessed using the internet and satellite communications in remote areas.

Visual vs Audio detection

Detection of cane toads through a visual system offers an additional benefit in that toads can be located with a fair degree of precision. Audible systems are unable to localise a toad's vocalisation and can become ineffective in areas in which there is a significant level of environmental noise. Sound travel can also be assisted or hindered by wind.

Examples of animal control systems using machine vision can be found at:

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