

SYSC 4907 M3

Design and Development of an Intelligent Camera-Guided Sprinkler for Targeted Irrigation and Wildlife Deterrence



AI-generated image illustrating the concept

Group size: 4 or 5 students.

Suitable for: Students with interest in mechatronic systems, integrated systems, Electrical, Computer Systems, and Software Engineering students. A multidisciplinary team with students from different programs is preferred.

Desired background: Mechatronics, CAD, image processing, signal processing, microcontrollers, robotics, embedded systems, software engineering.

Supervisor: Prof. C. Rossa: carlosrossa@cunet.carleton.ca

Lab information: <https://www.biomechatronics.ca>

Before joining the project, please form a group of 4 or 5 students and contact Prof. Rossa by email. Approval is required before joining the project.

Project Description: This capstone project focuses on the design and development of a motorized, camera-based smart sprinkler system that enables targeted and scheduled irrigation as well as wildlife deterrence. Students will develop a complete functional system in which a camera monitors the irrigation area and allows the user to specify zones or objects to water, such as trees, lawns, or specific plants, using different irrigation profiles. The sprinkler will be fully programmable and controllable via a mobile or web application, providing scheduling, zone selection, and real-time monitoring. In addition, the system will include an optional feature to detect and track wildlife (such as hypothetical nocturnal cats) and adjust the sprinkler's aim to deter them without harming plants or animals. The project integrates a mechanical actuation system with adjustable aim and nozzle profile, computer vision, embedded control, and mobile interface development to create a smart and environmentally conscious irrigation solution.

Anticipated deliverables: A functional prototype including the camera-based sprinkler system, and an interface that controls it. The project scope can be adjusted based on the group's interests and background.