Revolutionizing Veterinary Education: Canine Eye Simulation for Hands-On Learning

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Eye Appearance

The goal of this project is to develop a pair of canine eyes that implements a wide range of eye functions, including blinking, pupil dilation/constriction, and eye movement in response to sensor feedback. This embedded eye simulation system will be integrated with a larger canine system, allowing veterinary students to train with more realistic feedback when diagnosing medical cases of canine patients.

Project Breakdown
1. Eye Appearance: realistic canine eyes
2. Sensor Integration: 2 light sensors and 1 sound sensor
3. Packaging: 3D printed casing for eye displays and sensors
4. Communication Protocols: within subsystem and to the larger system

Eye Configurations for Different Scenarios

Clinical Scenarios
- different combinations of diseases and medication affect bodily responses, including pupil behavior
- the proctor can choose between three abnormal states for each eye
- each eye has its own light sensor

Eye Configurations
- Alert
- Normal (Pupil Response to Light)
- Unconscious
- Abnormal
- Circular (Eye Shape)
- Iris Color
- Closed
- Open
- Fixed-Dilated
- Normal
- Miotic
- Dilation

Electronics Packaging

Successful Simulation of Eyes

We were able to display and animate the canine eyes utilizing our hardware and packaging design. By adding light and sound sensors to the system, we were able to provide sensor feedback to alter eye movement and pupillary response with great success.

Future Considerations
1. Integrate the embedded eye system into the Open-Vet Canine System at Cornell University College of Veterinary Medicine (CUCVM)
   - Enhance existing control/customizations with a completed Application Programming Interface (API)
   - Configure relevant eye features for different medical conditions
2. Expand audio capabilities with sound localization
3. Switch to OLED displays to reduce reflective blue light
4. Improve cable extension and harnessing

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