

AN EMBEDDED SYSTEMS APPROACH TO CREATING AN ANIMATRONIC FELINE MOUTH

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Introduction



This project explores the mesmerizing world of animatronic systems, specifically focusing on creating an animatronic feline mouth. It merges mechanical engineering and electronics to bring life to inanimate objects.

Technologies used:



- Arduino UNO microcontroller for logical programming in C
- Adafruit PWM PCA9685 16-Channel Servo Driver
- MG 90S Servo Motors for light linkage motion
- MG 996R Servo Motors for Heavy linkage motion
- PLA 3D printed design

Working System of Motors



Working System of Motors



m_open():

- The m_open() function is responsible for setting specific servo motor positions to achieve an "open" configuration or movement.
- It uses the pwm.setPWM() method to set the positions of six servo motors (servo channels 6 to 11) to specific angles.
- These angles are the pre-defined angular positions for the robotic servo mechanism, and they correspond to the desired positions when the mechanism is in an "open" state.
- The positions set by m_open() would result in the mechanism taking a particular shape or configuration, which could be used for various applications, such as expressing openness or readiness.

Working System of Motors

m_close():

- The m_close() function, is used to set the servo motor positions for a "closed" configuration or movement.
- Similar to m_open(), it utilizes the pwm.setPWM() method to adjust the positions of six servo motors (servo channels 6 to 11).
- The angles set by m_close() correspond to the desired positions when the mechanism should be in a "closed" state, such as closing its components or returning to a default position.
- This function is essential for controlling the animatronic device to execute movements that signify closure or returning to a resting state.



Future Integration with Vision System



Future Integration with Vision System



- The mouth can be calibrated to pronounce words using basic phonetics.
- The vision system generates captions that describe the current environment it is placed in.
- The mouth can be used to narrate these captions and provide a human-robot interaction via NLP techniques and conversational AI
- This brings us a step closer to creating an Interactive and Smart robotic system