ApalaPramanik Lab2 CSCE 892

Apala Pramanik

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1 Lab 2: Documentation

For each aspect (visual, auditory, motor, and sensor), you've implemented tasks in the code provided for the Ringo robot. Here's a breakdown of each aspect and the corresponding tasks:

1. Visual Task:

   Description: This task toggles the LED colors of the robot's eyes.
   Expected Behavior: The eyes of the robot will change color randomly
   Type: Aperiodic
   Justification: This task is aperiodic because it changes the LED colors randomly, not at regular intervals. The random delay adds variability to the visual behavior, making it more interesting.

2. Auditory Task:

   Description: This task plays a "chirp" sound at different frequencies for different durations
   Expected Behavior: The robot will emit chirp sounds at random frequencies for varying durations
   Type: Periodic
   Justification: This task is periodic because it plays the chirp sound at regular intervals (every 3 seconds, as per the delays in the code). The repetition of the sound creates a rhythmic auditory pattern.

3. Motor Task:

   Description: This task controls the motors to move the robot forward and backward.
   Expected Behavior: The robot will move forward for 2 seconds, then backward for 2 seconds, repeatedly.
   Type: Periodic
   Justification: This task is periodic because it controls the motors to move at regular intervals (every 4 seconds, as per the delays in the code).

The repeated motion of the robot's movement creates a cyclic motor behavior.

4. Sensor Task:

   Description: This task reads light sensor values and plays different sounds based on the sensor readings.
   Expected Behavior: The robot will read light sensor values and play an "excited" sound if any sensor value is above a threshold, otherwise it will play a "boredom" sound.
   Type: Sporadic
   Justification: This task is sporadic because it is triggered by sensor readings, which can occur at irregular intervals depending on the lighting conditions. The task responds to external stimuli rather than executing at fixed intervals.

Deciding on the periodicity of each task involves considering the desired behavior and responsiveness of the robot. Tasks that involve sensory input or external events are often sporadic or aperiodic to react quickly to changes in the environment. Tasks like controlling LEDs or playing sounds can be periodic for rhythmic or predictable behavior.

Here is the link to the video: Watch Ringo being Sassy!