Lab 2 Finite State Machine Calculations

Sunday, September 12, 2021 5:19 PM

Cozmo framerate : ~15 fps

CS360 TA's ImageClassifier accuracy: ~98%

⇒ Assume that the ImageClassifier will classify/misclassify all images (including "no image detected") equally at 98% accuracy.

⇒ Assume that if the classifier does incorrectly identify an image, it will classify as any "wrong" image equally

P(idle state works perfectly) = P(correctly classified "no image")
+ P(misclassified "no image") P("truck", "hand", "box", "plane")

These will not result in a state transition

$= 0.98 + 0.02(4/7)$

$= 0.9914$

Let's say we're in the Idle state for 5 seconds.

P(mistriggered state transition at least once in 5 s) $= 1 - [P(\text{idle state works perfectly})]^{15(5)}$

$= 1 - (0.9914)^{75}$

$= 1 - 0.524$

$= 0.476$

Based on the previous assumptions, there is almost a 50% chance that your Idle state will result in a mistrigger in 5 seconds. This will occur if you determine your state transition on only a single frame. How could you mitigate this?