To: Dr. Svarovsky
From: Section 9; Group 3; Sae Rome Choi, Griffin Collins, Jack Gergets, Joshua Redoute, Meg Ryan
Date: November 24, 2015
Re: State Machine Diagram Update

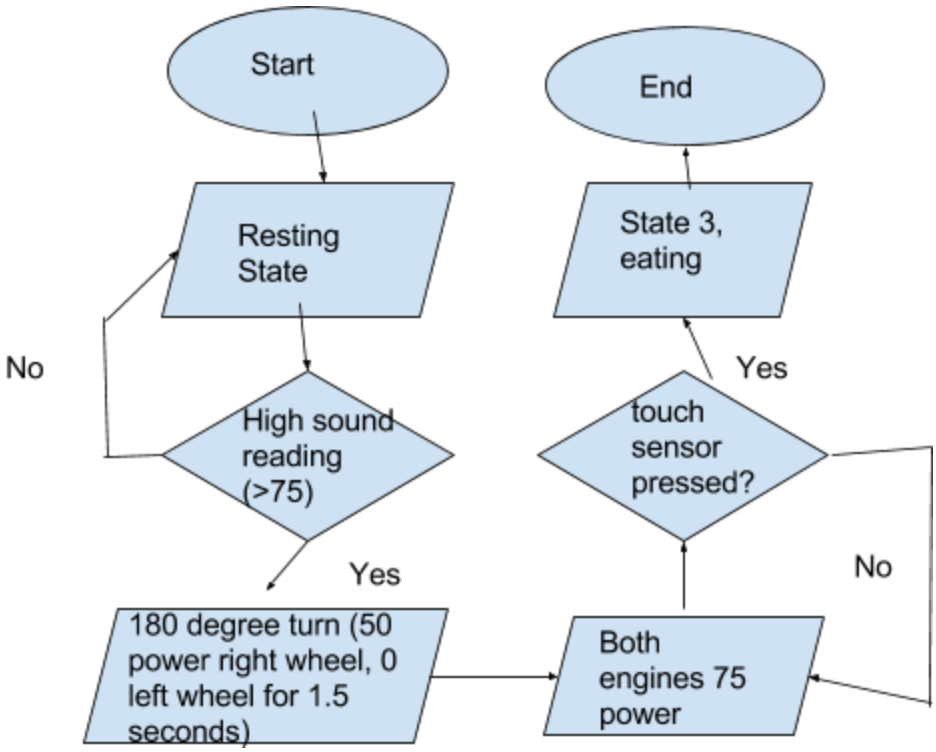
General Introduction

Our pet prototype will resemble a lion that will consist of the block as the body, four legs with wheels attached to each, a tail and a head. The pet will be programmed using LEGO Mindstorms and LabVIEW NXT. One motor will be attached to each front leg allowing for movement forward and backwards in addition to turning, and a third motor will be used to open and close the jaw of the lion. Three sensors will be used in our prototype: an ultrasonic sensor attached to the front, a touch sensor attached to the upper body, and a light sensor also attached to the front.

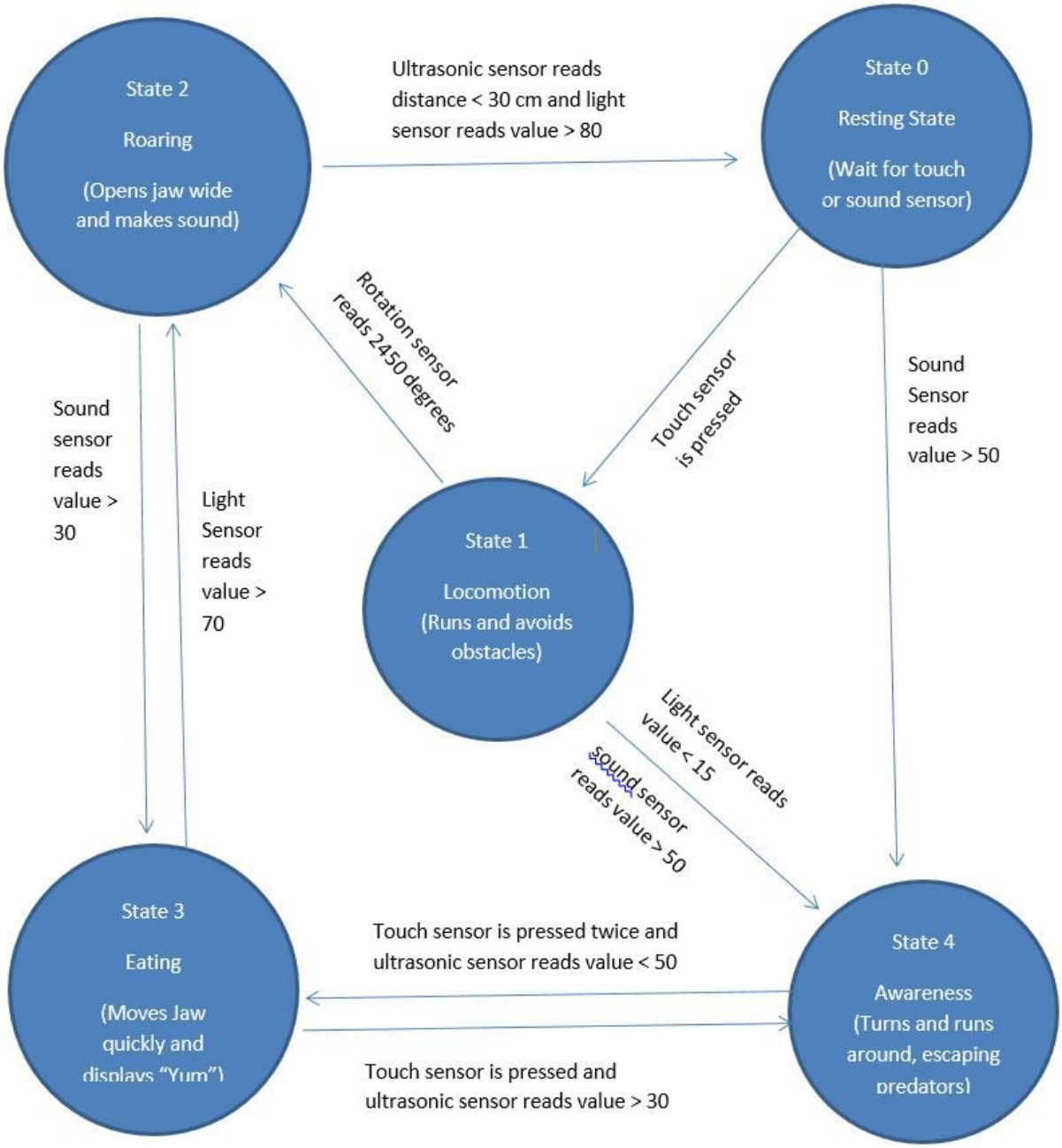
Feature Name	State Number	State Name	Description of Action
-----	0	Resting State	No action. Waits to begin
Locomotion	1	Walks around	Lion will walk around, avoiding obstacles until prompted to do another action.
Roaring	2	Roaring	Lion opens its jaw all the way and makes a loud roaring sound.
Eating	3	Eating	Lion moves its jaw up and down repeatedly while displaying "Yum".
Awareness	4	Awareness	When surprised by a loud noise, or touched by another animal, lion will turn around and run away at high speed.

In-Depth look at awareness feature

The fourth state of our robot will be the awareness state. In this state, if our pet is resting and is disturbed by a loud noise it will turn and run. As our pet is a lion, we want its reactions to be similar to that of an actual animal. If a lion was sleeping and heard a loud noise it would flee the area as the noise could be poachers or some other danger, or prey for the lion to catch. To do this we equip the sound sensor. If the sound sensor picks up a high reading in the resting state, the program continues. Otherwise, it loops back into the resting state. With the high value read, the robot turns the opposite direction it was facing. Then, the robot quickly evades the attacker or pursues the prey by moving with 75 power in the new direction. To signify that the lion is chasing prey the touch sensor must be touched, symbolizing the lion catching its prey. This brings on the third state, the eating state. Otherwise, the lion continues to run. After moving to the third state, the program ends.



State Machine Diagram


State 2
Roaring
(Opens jaw wide and makes sound)
Ultrasonic sensor reads distance < 30 cm and light sensor reads value > 80
State 0
Resting State
(Wait for touch or sound sensor)
Rotation sensor reads 2450 degrees
Touch sensor is pressed
Sound Sensor reads value > 50
Sound sensor reads value > 30
Light Sensor reads value > 70
State 1
Locomotion
(Runs and avoids obstacles)
Light sensor reads value < 15
sound sensor reads value > 50
State 3
Eating
(Moves Jaw quickly and displays "Yum")
Touch sensor is pressed twice and ultrasonic sensor reads value < 50
Touch sensor is pressed and ultrasonic sensor reads value > 30
State 4
Awareness
(Turns and runs around, escaping predators)