KTX-PC Humanoid Robot



Erik VandeWalle CS 460 Senior Capstone Experience

Project Definition

- Develop a protocol that instructs the KTX under program control from a PC
- Communication should be wireless
- The protocol can direct a specific robot
- Design a library of functions for basic behaviors
- The functions should have parameters (raise left arm(height,speed))
 - Consider using a layered approach
 - A set of low level primitive states (poses)
 - A set of basic activities (functions) that consist of combinations of primitive states
 - Functions with parameters that employ the basic activities to perform a task
- Write a PC program using the library that has the KTX accomplish a task and modifying a behavior from within the program

The KTX-PC

- Has a PC on it's back that runs Windows XP
- 11 Servo motors
- VSRC003 PC board in front for controlling servo motors

Method

- Read
 - Lots of documentation
 - Often vague, need to cross reference

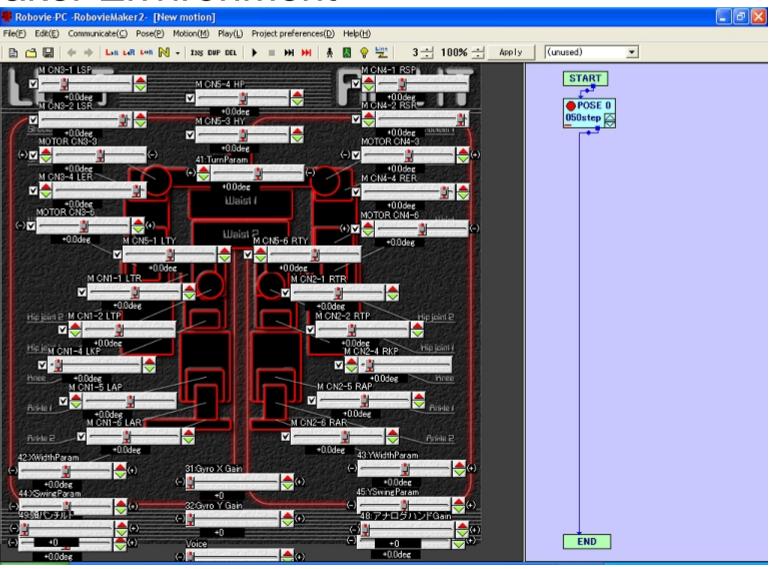
- Investigate
 - Educated guessing and checking

Solutions

Creating documentation for clarification

Solutions

RobovieMaker Environment



Exceptions

- SDK problems
- Wrong version of Visual Studio

```
user\desktop\sdkproj\sdkproj.cpp(41) : error C2664: 'VSRC003_LoadMotion' : cannot convert parameter 1 from 'char [260]' to 'TCHAR *'
unrelated; conversion requires reinterpret_cast, C-style cast or function-style cast
user\desktop\sdkproj\sdkproj.cpp(59) : error C2664: 'VSRC003_LoadMotion' : cannot convert parameter 1 from 'char [260]' to 'TCHAR *'
unrelated; conversion requires reinterpret_cast, C-style cast or function-style cast
user\desktop\sdkproj\sdkproj\cpp(122) : error C2440: '=' : cannot convert from 'char [11]' to 'LPCWSTR'
unrelated; conversion requires reinterpret_cast, C-style cast or function-style cast
user\desktop\sdkproj\sdkproj\cpp(124) : error C2440: '=' : cannot convert from 'char [260]' to 'LPWSTR'
```

RobovieMaker

Motions and Demonstrations

```
liftarm.txt - Notepad
                                                                                                                                                                                                                                                                                                                         _ u ×
File Edit Format View Help
_MOTION_FORMAT: [ POSEDEF_V1R4 ]
 ENABLE AXIS: [62]
 _MOTION_INFO:[[]]-[50]-[10]-[6]-[0]-[1]-[-1]
 STARTMOT:
 MOTION_INFO:[[POSE 0]]-[35]-[42]-[6]-[6]-[3]-[-1]
 _POSE: [48]-[0x0000, 0x0000, 0x0000, 0x0000, 0x308e, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0xccde, 0x0000, 0x0000,
 _MOTION_INFO:[[ END ]]-[50]-[890]-[16]-[46]-[-1]-[-1]
 ENDMOT:
_MOTION_INFO:[[POSE 1]]-[23]-[108]-[6]-[6]-[4]-[-1]
_POSE:[49]-[0x0000,0x0000,0x0000,0x308e,0x0000,0x0000,0x0000,0x0000,0x0000,0xccde,0x0000,0x0000,0
_MOTION_INFO:[[POSE 2]]-[27]-[202]-[6]-[6]-[5]-[-1]
_POSE:[50]-[0x0000,0x0000,0x0000,0x308e,0x0000,0x0000,0x0000,0x0000,0x0000,0xccde,0x0000,0x0000,0
_MOTION_INFO:[[POSE 4]]-[30]-[272]-[6]-[6]-[6]-[-1]
_POSE:[51]-[0x0000,0x0000,0x0000,0x308e,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x0000,0x000,0x000,0x000,0x000,0x000,0x000,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00
_MOTION_INFO:[[POSE 2~]]-[27]-[343]-[6]-[6]-[7]-[-1]
_POSE:[52]-[0x0000,0x0000,0x0000,0x308e,0x0000,0x0000,0x0000,0x0000,0x0000,0xccde,0x0000,0x0000,0
_MOTION_INFO:[[POSE 1~]]-[30]-[411]-[6]-[6]-[8]-[-1]
_POSE:[53]-[0x0000,0x0000,0x0000,0x308e,0x0000,0x0000,0x0000,0x0000,0x0000,0xccde,0x0000,0x0000,0
_MOTION_INFO:[[POSE 0~]]-[24]-[492]-[6]-[6]-[2]-[-1]
_POSE:[48]-[0x0000,0x0000,0x0000,0xb2a8,0x0000,0x0000,0x0000,0x0000,0x0000,0x4d58,0x0000,0x0000,0
```

```
demo01.rsc - Notepad

File Edit Format View Help

SCRIPT: [[AUTODEMO_V1]]

AUTODEMO: [3] - [[]]
STARTUPMOT_FILE: [[initMotion.txt]]

AUTODEMO_FILE: [1] - [[sitting.txt]]
AUTODEMO_FILE: [3] - [[liftarm.txt]]
AUTODEMO_FILE: [1] - [[sitting.txt]]
```

Extensions

- Controlling the robot using the PC on it's back
- Investigate real time motion control and face detection