Vector Tools

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Problem statement

- Implement a simple-to-use interface similar to that of cozmo-tools and the FSM language on Vector
- Recreate simple_cli for Vector
- Keep the interface, language, and usage as similar as possible
- Be able to re-use genfsm-generated FSM's with this new interface

Approach

- 1st Approach: Change all instances of 'cozmo' to 'vector' in the existing tools
  - Many issues: SDK changes, updates, different design for Vector modules, different asynchronous framework
  - Many of Cozmo_fsm's features are already implemented internally in Vector
  - Much of Cozmo's API is not available on Vector at all
- 2nd Approach: Recreate the functionality of FSM Nodes and Transitions using Vector's Asynchronous framework
  - Much easier to run FSMs with
  - Easy to run multiple programs simultaneously
  - Can more easily take advantage of Vector's features

Demo

```
1    from NewFSM.NewFSM import *
2
3    class SimpleMotion(StateMachineProgram):
4        $setup{
5            Forward(50) =C=> Turn(30) =C=> {driver, speaker}
6            driver  : Forward(-50) =T(5)=> Say("All Done") =C=> SetHeadAngle(degrees(45)) =C=> photo
7            speaker : Say("Save Anki!")
8            photo   : TakePicture() =D=> DisplayImageOnScreen(5) =T(5)=> mirror
9            mirror  : MirrorMode() =T(5)=>MirrorMode(enable=False)
10       }
```

Results

Nodes:

Forward, Turn, SetHeadAngle, SetLiftHeight, MoveLift, GoToPose, GoToPosition, DriveOffCharger, DriveOnCharger, Say, TakePicture, DisplayImageOnMonitor, DisplayImageOnScreen, MirrorMode

Transitions:

CompleteTrans =C=>, SuccessTrans =S=>, FailureTrans =F=>, DataTrans =D(x)=>, TimerTrans =T(x)=>

Others:

Camera Viewer, 3D World Viewer, Low Battery Warning

Future work

- Add more nodes
- Add our world map and navigation algorithms
- Add Aruco marker support
- Support nested state machines