Work Report Summary

Date Assigned: 20th May, 2019.
Date Submitted: 29th May, 2019.
Name: Abhishek Deshpande
Subsystem: Coding

Summer Project – Control and Dynamics of Biped:

- Assigned: Read up on DH Parameters. Derive 2,3 and 4 DoF equations using the DH method and transformation matrices.
  Completed: Read up on Denavit-Hartenburg (DH) parameters – The rules to name the axes, how to find the parameters, how to make the homogeneous matrix from one reference frame to another and how to find the total/final homogeneous matrix.
  Also derived the forward and inverse kinematic equations for 2 DoF. Having some difficulty deriving the 3 and 4 DoF equations.

- Assigned: Write a basic Python script to translate 3 DOF equations derived above into code.
  Completed: Unable to complete as it requires derivation of 3 DoF equations using DH parameters, which I am experiencing some difficulty with.

- Assigned: Perform a literature survey of Biped projects. (Just downloading and reading papers)
  Completed: Read the following research papers on Bipeds, their control and walking algorithms:
  - A framework for learning biped locomotion with dynamical movement primitives. https://www.academia.edu/36202037/A_framework_for_learning_biped_locomotion_with_dynamical_movement_primitives
  - Modelling of a Five-Link Biped Robot Dynamics Using Neural Networks https://www.academia.edu/37361930/Modeling_of_a_Five-Link_Biped_Robot_Dynamics_Using_Neural_Networks
  - A simple reinforcement learning algorithm for biped walking https://www.academia.edu/36201907/A_simple_reinforcement_learning_algorithm_for_biped_walking
  - Design of a 12-Dof Biped Robot https://www.researchgate.net/publication/262943956_Design_of_a_12-Dof_Biped_Robot
  - Walking Control Algorithm of Biped Humanoid Robot on Uneven and Inclined Floor https://www.cs.cmu.edu/~cga/legs/Paper_3.pdf

- Assigned: Get started with CS231n. You do not need to work on image classification.
  Completed: Learning about CS231n – Convolutional Neural Network from a Stanford University Playlist on YouTube – Watched 5 out of 16 videos.
  https://www.youtube.com/playlist?reload=9&list=PL3FW7Lu3i5JvHM8ljYj-zLfQRF3EO8sYv

- Assigned: Understand Pybullet / ROS environment
  Completed: Watched some basic tutorials of Pybullet.