Modeling and Simulating the Behavior of a Soccer Player

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Abstract

I would like to create a program that models the behavior of a soccer player performing a specific game action, such as a free kick, penalty kick, throw in, corner kick, etc. and renders a 3D simulation of the player performing the action. I plan to write this program in Python using VPython.

Introduction/Backstory

This project interests me for a number reasons. Primarily, I love soccer and am an avid fan and player. I have played soccer for my entire life and am very interested to see how I can implement this knowledge into my model of the soccer player. In addition, I have very little experience working programming languages at all, including graphical languages such as VPython. I am excited to learn how to use graphical programming and I'm very interested to see how far I can progress this semester

The mathematical/scientific background for the project lies mostly in the physics of the motions that the player is performing when they play the game. Each situation in a game is unique and has its own observable physical properties as the player moves their body to react to the situation. I plan to showcase some of these physical properties in my simulation to the best of my programming abillities.

Goals

The goal for the project's end result is to have an interactive simulation of a soccer player. The program will showcase the motions of the player as they perform a set in-game action, based on a real situation that could occur in a soccer game. I plan to implement key press interaction, giving the user control over when the player performs different motions of the simulation (each initiated by keypress). In addition, the player will have some counterpart, either a defending player or a goalkeeper to add a bit of realism into the simulation.

Finally, there are a few ways I can go further than my initial proposal to enhance my program. The initial plan is to pick one certain action or set of related actions and focus in

on that scenario for the simulation. However this project has the potential for a variety of different scenarios that the user could choose from to give a wider range of options for the modeling of players' behavior. Depending on my progress with the initial scenario, I will add more as I see fit.

Timeline

In regards to the time needed to create this program, I have already begun work on a proof of concept using the blobby figure. Currently the proof of concept (a model of a soccer player juggling a soccer ball) is nearly complete. I believe that creating a full simulation of an in-game scenario will take a while longer than this more simple proof of concept. However, considering the additions I can apply to my program that I have discussed, time allowing, I believe that I will be able to finish the project within the semester and possibly add one or more of its extenstions that I previously mentioned.