**Goal**

The objective of our capstone project is to develop an interactive game in Unity 3D with the Microsoft Kinect that tracks people in a given three dimensional area and records the interactions between observed people and the environment. Our hope is that this effort can be further applied for visualization purposes for Professor Marsic’s research area in workflow optimization in trauma rooms.

**Old Methodology:**
- Place the camera 2.2 meters off the ground to avoid view occlusion.
- Acquire coordinates of the head joint from Kinect V2 and its SDK.
- Project a player into three dimensional space.
- Develop interactive game that works in real time. **“Coordinate output had to be saved first and did not end up being real time.”**

** Revised Methodology:**
- Place the camera 2.2 meters off the ground to avoid view occlusion.
- Use Unity’s implementation of Kinect to track joints and project figures into 3D space.
- Develop interactive game that works in real time.

**Results and Accomplishments**

- Developed code that outputs three dimensional coordinates of all people and displayed people in two dimensions and three dimensions.
- Created all game mechanics and usage is in real-time.
- The game can handle and track up to 6 people at 30 fps although tracking performance deteriorates due to small view occlusion.

**Research Challenges**

- Accurately track a person in three dimensions with the depth camera in the Microsoft Kinect.
- Learn how to develop in Unity3D.
- Implement the system in real-time.
- Learn how to code in C# and utilize the development kit library.

**Current limitations:**
- The Kinect recognizes joints but tracking objects and interactions between people and objects is a challenge.

**Future Work:**
- Redevelop the game in C# without the Unity3D interface (more intensive) to be combined with Prof. Marsic’s object recognition research.

**Motivations and Objectives**

**Motivation(s):**
- Activity recognition is a growing field that has multiple applications in industry especially for workflow analysis which seeks to find and eliminate inefficiencies in the workplace.
- Partial focus was on the application area of trauma rooms where normal RGB cameras are not allowed for privacy concerns and where workflow inefficiencies have life threatening consequences.

**Objective(s):**
- To develop a real-time platform for tracking people through the usage of Unity 3D and Visual Studio.

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**References**