Interactive Gravity Exhibit

Overview
Discovery Space requested the complete implementation of an interactive gravity exhibit with the purpose of illustrating the key concepts of gravity in a manner appropriate to the science museum’s broad spectrum of visitors. The exhibit must record a single visitor jumping and superimpose the visitor jumping on different celestial bodies with the jump height affected by the respective gravitational pull. In order to do so, the team was tasked with developing a robust application that could effectively process and display data obtained from a Microsoft Kinect Sensor.

Objectives
The main objective of the exhibit was to create an educational and interactive exhibit for children that:

- Communicates key gravity concepts:
  - Planets have different masses and radii, and therefore have different gravitational pulls
  - Since how high, the duration, and how far you can jump depends on how strongly gravity pulls on you, your jump will be different on different planets
- Withstands constant abuse and is safe for children to use
- Can be easily used and maintained by the non-technical staff
- Entertains while educating a wide spectrum of visitors

Approach
In order to successfully implement the interactive gravity exhibit, the team needed to:

- Review sponsor expectations for the basic functions and educational points of the exhibit
- Generate concepts for application-flow based on how users would effectively learn about gravity
- Learn the developer features for the Kinect SDK by exploring sample projects in the toolkit
- Develop code for background removal, skeletal tracking, and image playback
- Create an intuitive user interface for the portable application
- Interface physical buttons to ASCII input for the planetary selection
- Test and refine all software and hardware features for further robustness

Outcomes
Upon the completion of the project, the team has found:

- Discovery Space saved money by not using the force plate or HD webcam, and could save more money by buying a lower-end Windows PC. This also resulted in a more robust exhibit with less safety hazards.
- The resulting exhibit is a unique creation that appeals to a large range of visitors while remaining highly educational. It also allows for the expansion of its many different features.