Reinforcement levitation - vision statement

Project goal:

These days a revolution is taking place all around the world – data science revolution. In many fields data science offers new solutions based on learning in all areas of life - from disease detection - in medicine, to autonomous cars – for a safer future on the road.

The vision of this project is to offer a new development tool to moving metallic objects without contact. This tool can be used in many ways, for example non-gravity simulation room or levitate object in science fiction movies without editing.

High level features:

This project will contain a reinforcement learning agent. This agent will be able to see an environment and to change the forces of electromagnets in it, that will affect an object movement.

The agent will be developed with Ml-Agents library in Unity as the developing environment.

Project scope:

* The project scope will contain creating the environments, create the agent and model the forces.
* The project will not contain intentional object movement in space but only levitation.
* The project will focus on levitation in an environment with wind

Milestones:

1. Create a scene on unity that contain an agent, electromagnet and a metal ball.
2. In the scene the agent will learn to levitate the ball – using it coordinates and velocity on clean environment.
3. In a new scene an agent will learn to levitate the ball – using camera video on clean environment.
4. In new scene with more electromagnet the agent will learn to levitate the ball – using two cameras video on windy environment.
5. Set up an experiment environment (real world environment) with electromagnets, metal ball two cameras and reinforcement learning agent.
6. Learn the agent to levitate the ball with or/and without wind on the real world environment.