Physically-Based Simulation Project Plan: Fountain Show

Group 7

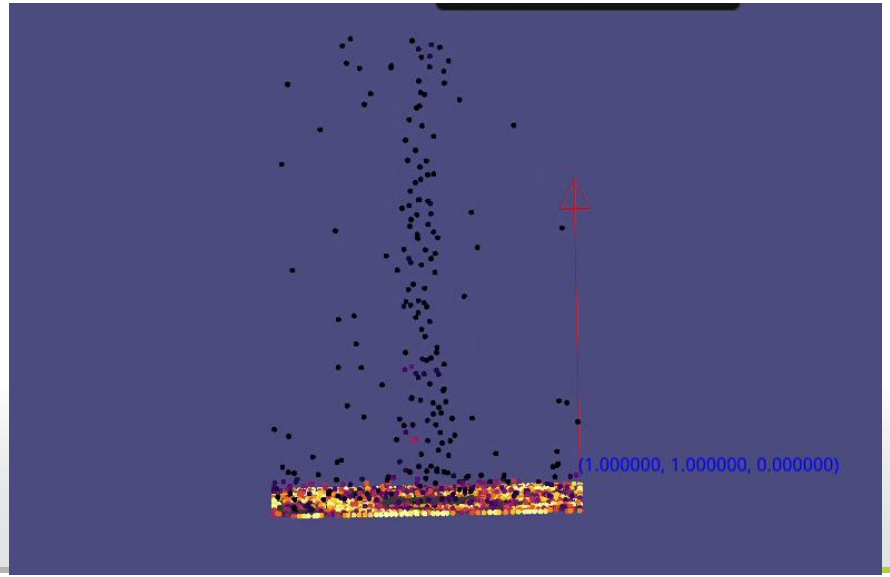
Kaifeng Zhao, Dexin Yang

Simulation Scenario

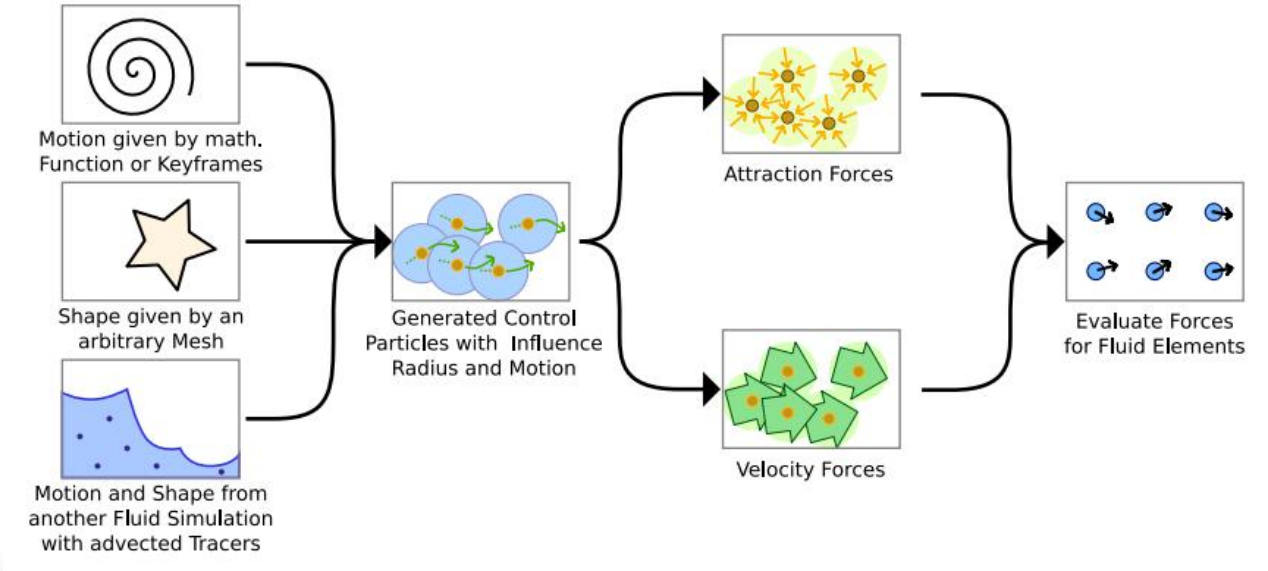
- Fountain Show Scenario
- Motivation: Recreate specific scene from a movie
- Implementation of a SPH solver for fluid simulation

Fluid Simulation

- A naïve SPH solver
- Simple fountain with water spouts up and falls



Fluid Shape Control



Thürey N, Keiser R, Pauly M, et al. Detail-preserving fluid control[J]. Graphical Models, 2009, 71(6): 221-228.

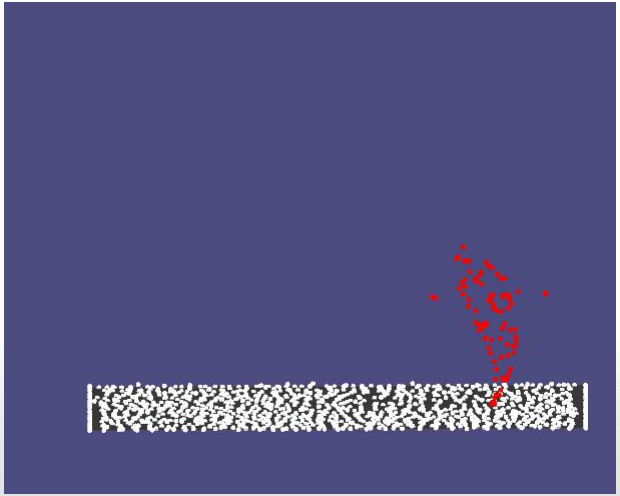
Fluid Shape Control

- Control Particles
  - Sampling imported mesh
- Attraction Force

$$\mathbf{f}_a(e) = w_a \sum_i \alpha_i \frac{\mathbf{p}_i - \mathbf{x}_e}{\|\mathbf{p}_i - \mathbf{x}_e\|} W(d_{i,e}, h)$$

- Velocity Force

$$\mathbf{f}_v(e) = w_v \sum_i (\mathbf{v}_i - \mathbf{v}(e)) W(d_{i,e}, h)$$



Thürey N, Keiser R, Pauly M, et al. Detail-preserving fluid control[J]. Graphical Models, 2009, 71(6): 221-228.

Bonus Targets

- Rendering
  - Particle to mesh
  - blender
- Acceleration
  - OpenMP
  - CUDA

Rendering

Thank you for watching!