Theme : Next Generation Computing

Subject : High-Speed Graphics Modeling & Simulation

Introduction

The goal of this research subject is to explore novel high-speed physics-based modeling and simulation for mobile devices. Physics-based modeling and simulation covers various combinational dynamics of particle, rigid, non-rigid body, and fluid. Intensive research activities on generating natural phenomena have been conducted so far in computer graphics field. However, most of current algorithms require intensive computation and massive memory space. Applying those methods to mobile devices raise great challenges on reducing complexity of modeling and simulation, while retaining its high quality.

Therefore, to model and simulate natural phenomena in mobile devices, developing novel physics-based modeling and simulation methods with reduced complexity is highly desirable. Nevertheless, important physical properties need to be reproduced with limited computational resources.

Scope

- Concepts and methods to reduce the computational cost of modeling natural phenomena (fluid dynamics, soft body-fluid interactions, and so on.)
- Concepts and methods for large-scale phenomena modeling and simulation with low-memory usage
- Algorithms to enhance the computational efficiency using multicore computing

Research questions

We are interested in the following research questions. These questions are not exhaustive but different research questions are open to discuss with research partners.

- What would be the critical factor for designing high-speed physics-based modeling and simulation platform for mobile devices?
- What would be the most effective scenarios that can leverage physics-based modeling and simulation technology except mobile games?

Expected Deliverables

The following is open to discussion:

- Design documents of new concepts and/or design of high-speed physics modeling and simulation platform with technical details
- Patents with Samsung (if agreed)
- Prototype samples (executables and source codes)
- Detailed quarterly progress reports summarizing accomplishments