

# SprBlender : Creation Environment for Touchable Characters

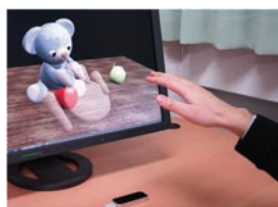
Hironori Mitake \*    Takahiro Harano    Shingo Fujinaga    Shunsuke Matsuyama    Shinichi Shibata  
Masataka Ezoe    Shoichi Hasegawa    Tokyo Institute of Technology



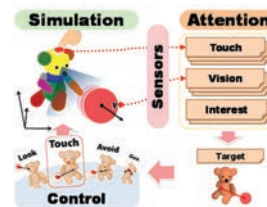
(a) SprBlender Creation Environment



(b) Visualization



(c) Interaction with Leap Motion



(d) Behavior Engine

## Abstract

SprBlender is a novel environment to create characters for direct-touch interaction. You can model and enjoy your character cute reaction, when you interact with him. Creators can design their characters' appearance, physics and behaviors on Blender GUI. SprBlender will stimulate creation of touchable 3D characters from hobby users to professionals.

**Keywords:** interactive character, physic based animation, blender

## 1 Introduction

Playing and touching pets and small animals is fun. We can also imagine interaction with many characters look like cute animals. However, most of them cannot be touched like real pets.

Affordable motion sensors like Leap Motion[Lea ] are now available for dexterous touch of VR objects. With a simple environment to create reactive characters for direct touch interaction without large motion data or complicated programing, many people can have fun touching and programing their own characters.

For this purpose, SprBlender provides real-time rigid body simulator and an attention-driven behavior engine to generate realistic behaviors with touch interaction. With the SprBlender add-on, creators can design and interact with their characters on Blender[Ble ]. They can use Blender GUI to make 3D physical model, to connect with rigged skin and to adjust attention parameters.

## 2 Features

**Motion Generation** The simulator generates body motion based on physics. Full-body motion controller is also available for various active motions, such as hand reaching or head movement. First, the controller solve inverse kinematics for reaching target. Then PD-control realize target joint angle. Springhead2[Spr ] physics engine incorporate PD control in implicit LCP solver, which provides stable control without unexpected divergence.

\*e-mail:{ mitake, fujinaga, harano, matsuyama, shibata, ezoe, hase }@haselab.net

The attention driven behavior engine allows characters to react to the user's touch as if it is conscious of what happening around it. After sensing simulated objects by "looking" and "touching" them, the attention model puts amount of attention for each objects surrounding character. Fast moving objects, or the object touching the character with a high pressure, will have high attention. Then it takes action for the object which has its attention on some level.

**Real-time Adjustment and Visualization** Physics model of a character contains parameters such as collision shapes, spring / damper of joints and control coefficient. Those parameters are important to design impressions on character motions, and require a trial and error process to have fine result. With SprBlender, a creator can change these physical properties while running simulation, and check the result motion in real-time.

A creator might also want to know the character's sensation / attention at each moment to design its behavior. For this purpose, SprBlender provides visualization of attention level for each object. This allows creators to "see through" their character's mind during parameter adjustment.

## 3 Exposition

Our booth will provide both interaction and creation. First, attendees experience how they can interact with characters using hands and fingers. So that , various devices will be available such as Leap Motion, touch panel and haptic devices.

Persons who have interest can try to create their own characters. We will teach them how to set-up physical model and behavior engine. They can create a character from scratch, or we can provide some ready-to-use character models. Attendees can take-out and interact with their own character at home, if they install SprBlender on their own PC.

Created characters will be available for next attendees. They can interact and modify it, to start some collaborative work in the SIGGRAPH Studio.

## References

Blender : Free and open 3d creation software.  
<http://www.blender.org/>.

Leap motion : Motion controller for games, design and more.  
<https://www.leapmotion.com/>.

Springhead2 physics engine. <http://springhead.info/>.