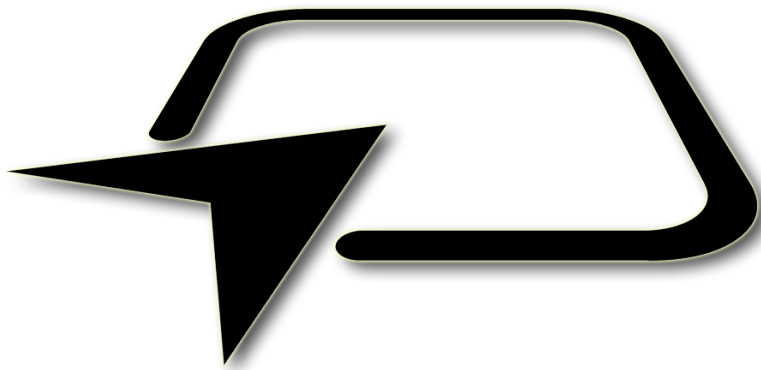


# Kinetic Space

User Manual



## Abstract

The *Kinetic Space* provides a tool which allows everybody to record and recognize customized gestures using depth images as provided by PrimeSense's PS1080, the Kinect or the Xtion sensors. Three highlights of the software are that the gestures

- *can be easily trained*  
the user can simply train the system by recording the movement
- *are person independent*  
the system can be trained by one person and used by others
- *are speed independent*  
the system is able to recognize the gesture also if it is performed faster or slower compared to the training

The software has already been used by media artists, dancers and alike to control third party software such as Max/MSP, Pure Data, VVVV, Resolume, etc. via the OSC protocol. The software is written in Processing and based on SimpleOpenNI, OpenNI and NITE.

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# 1 Introduction

The *Kinetic Space* provides a tool which allows everybody to record and recognize customized gestures using depth images as provided by PrimeSense's PS1080, the Kinect or the Xtion sensors. The software observes and comprehends the user interaction by processing the skeleton of the user<sup>1</sup>. The unique analysis routines allow to not only detect simple gestures such as pushing, clicking, forming a circle or waving, but also to recognize more complicated gestures as, for instance, used in dance performances or sign language.

Three highlights of the software are that the gestures:

- *can be easily trained*  
the user can simply train the system by recording the movement/gesture to be detected without having to write a single line of code
- *are person independent*  
the system can be trained by one person and used by others
- *are speed independent*  
the system is able to recognize the gesture also if it is performed faster or slower compared to the training and is able to provide this information

The software has already been used by media artists, dancers and alike to connect and to control a wide range of third party applications/software such as Max/MSP, Pure Data, VVVV, Resolume, etc. via the OSC protocol. The software is written in Processing and based on SimpleOpenNI, OpenNI and NITE.

More information about the project and the source code can be found at (reading this manual you probably have already done so)

<http://kineticspace.googlecode.com>.

To get a quick overview about the project check out the short video introduction about the functionality of *Kinetic Space* at

<http://www.youtube.com/watch?v=e0c2B3PBvRw>.

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<sup>1</sup>two users are supported, but more users can be simply added by small changes in the source code

## 2 Installation

The *Kinetic Space* is intended as an open system so that everybody has access to the full source code and that everybody can make adjustments to their own needs. Therefore, it does not come in binary form. Instead the program has been written in *processing*<sup>2</sup> which can run on several platforms such as Linux, Mac OS X, and Windows.

To make the software run on your system, you have to install OpenNI<sup>3</sup> and PrimeSense's Natural Interaction Middleware (NITE)<sup>4</sup>. In addition you have to install Processing<sup>5</sup> with the following packages installed in the `libraries` folder:

- SimpleOpenNI<sup>6</sup> — a simple OpenNI and NITE wrapper for processing
- oscP5<sup>7</sup> — an implementation of the OSC protocol for processing
- fullscreen<sup>8</sup> — better full screen support for processing

A detailed step by step instruction on how to install most of the used software, except oscP5 and fullscreen, for Windows, OS X and Linux can be found at the following link:

<http://code.google.com/p/simple-openni/wiki/Installation>.

Now, finally, you are able to load the source code in processing and run the program.

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<sup>2</sup>an open source programming language and environment

<sup>3</sup><http://www.openni.org/downloadfiles>

<sup>4</sup><http://www.primesense.com/?p=515>

<sup>5</sup><http://processing.org>

<sup>6</sup><http://code.google.com/p/simple-openni>

<sup>7</sup><http://www.sojamo.de/libraries/oscP5/index.html>

<sup>8</sup><http://www.superduper.org/processing>

## 3 How To Use

This section gives you a brief overview on how to use the software, how to train new gestures and how to set customized OSC messages.

### 3.1 Recognizing Gestures

After running the source code you first have to register yourself by holding up your hands as shown in the figure. Note that even though only a single person is shown on the registering screen a second person can always be registered by the system. If one or two persons are registered, the system is already ready to use and is constantly analysing the gestures. In case the user is getting out of range, an icon (in the users color) is prompted which points into the direction the user has to move.

By pushing the *d* key you can flip the images.

By pushing the *+* or *-* key you can switch between the different gestures to be visualized (only for the first person).

### 3.2 Training New Gestures

The system can easily learn new gestures by pushing a key between *0* and *9*. If one of these keys has been pressed the last 25 frames (one second) of the first person are stored and the novel gesture is immediately ready to be used by both persons.

Please note that in the current setup, stored gestures are replaced by the newly trained gestures without warning.

### 3.3 Customize OSC Messages

In order to customize your OSC messages to your own needs (the needs of your favored music or visualization tool) you can adjust the sample code as provided in the function: `void sendOSCEvent(int event, int person)`.

Note that you can already separate between the detected gestures/events and the person who performed the action. If you want to include other information such as speed of action or confidence you have to extend the code respectively.

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