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OpenAlea - Visual Programming and Component based software for plant modeling

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Building plant models at different scales requires integrating tools from various scientific domains such as biology, computer science, and mathematics. The open source OpenAlea project's goal is to define a framework to share and reuse heterogeneous models from the plant modeling community. A visual environment is made available to researchers to ease the building of high-level computational tasks in a simple and flexible way.

The core of OpenAlea, implemented in Python, consists of a component framework that allows for the dynamic management and composition of software components. A component is a Python callable object with input and output ports. Components communicate through their ports, and can be interconnected to form complex processing graphs. A package is a deployment unit that provides components, data, and widgets as well as meta-information. The package manager is able to find and load dynamically packages installed on the computer without specific configuration. A series of packaging tools, SconsX and Distx, based on SCons and Distutils, have been developed to ease the distribution of complex C++ extensions, and to share dynamic libraries between different OpenAlea packages.

A special application, Visualea, has been created as a PyQt4 visual programming environment to edit and run dataflow. For each component, graphical widgets can be either provided by user packages or generated automatically, based on their input port interfaces. This makes it possible to reuse widgets in different packages.

More information on OpenAlea is available at http://openalea.gforge.inria.fr.

Summary

This talk will present the main concept of the OpenAlea architecture, and demonstrate how to integrate Python components and widgets in OpenAlea.

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