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Open source software development for neuroinformatics

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A commentary on Concierge: Personal database software for managing digital research resources

by Hiroyuki Sakai, Toshihiro Aoyama, Kazutsuna Yamaji and Shiro Usui

According to the Mission Statement of this journal, neuroinformatics is a field devoted to the development of neuroscience data and knowledge bases together with numerical models and analytical tools for the sharing, integration and analysis of experimental data and the advancement of theories of nervous system function. An important distinguishing feature of neuroscience is the heterogeneity and complexity of the data collected, and the need of information collected at multiple levels of investigation, from genes to cognition and disease states. The goal [] is to catalyze a rapid development of this immense area of research.

The Concierge desktop application presented by Sakai et al. (this volume) purports to do exactly this by offering freely configurable software on the basis of the Eclipse Java open source framework and the concept of plug-ins. It targets in particular the Japanese neuroinformatics community with its interface to the XooNIps database, which is apparently widely used as a content management system for sharing digital resources among their neuroscience labs.

Many aspects of the Concierge application are applaudable: Open source development under the GPL license, extensibility using the plug-in concept, flexibility in configuration for different neuroscience-related purposes. Currently, however, only a few modules are available (document organization, literature administration, calendar, database link), and these are not even custom-tailored to identified needs in (neuro)science. Also these tasks overlap considerably with general purpose productivity tools, which are normally much more polished, and have a strong focus on usability. Thus it is one possibility that generic tools could solve the current bottleneck in the end, not necessarily because they are better for neuroinformatics applications, but because they will just about do enough, and will be very widespread and easy to use - the kind of convenience and momentum that only comes with a massive user base.

From a different point of view, Sakai et al. are employing well-established, independently supported, technologies including Xindice for indexing and Eclipse components for the user interface. Leveraging such technologies is a good way to build high quality projects at moderate cost. Indeed, with the Eclipse platform extending its capabilities to more general organizational tasks beyond its original core focus of software development, it is possible that the best solution would be to invert the structure completely: Instead of building a new application out of certain Eclipse components, neuroscience-specific plugins could be contributed to the existing Eclipse framework thereby keeping the benefits of the many other tools already there such as text and XML editing, file version control and database access.

It seems a pity that the neuroinformatics community to date has not yet been able to come up with a software suite that uses technology such as this to implement a large range of modules that specifically address recurring neuroinformatics issues, such as the complexity of terminology/ontology in neuroscience, the 3D visualization of synapses, neurons or brains, the diversity of time series data, or the vagueness of behavioral and cognitive concepts. Projects such as NeuroSys (http://neurosys.cns.montana.edu/) point the way ahead. It can be hoped that the newly established International Neuroinformatics Coordinating Facility (Bjaalie and Grillner, 2007) will be able exert the catalyzing function to oversee the development of projects that are neither too limited in scope nor too tightly controlled to obtain broad community involvement.

Conflict of interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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