An Information System for the Management of Ecological Simulations

Frank Köster[1], Jens Finke[2], Karin Frank[3], Michael Sonnenschein[1]

[1]Carl von Ossietzky University Oldenburg · Department of Computer Science · Escherweg 2
26121 Oldenburg · Germany · eMail: {Frank.Koester, Michael.Sonnenschein}@Informatik.Uni-Oldenburg.de

[2]Oldenburg Research and Development Institute for Tools and Systems in Computing Science
Escherweg 2 · 26121 Oldenburg · Germany · eMail: Jens.Finke@OFFIS.de

[3]UFZ-Centre for Environmental Research Leipzig-Halle · Department of Ecological Modelling
P.O. Box 500136 · 04301 Leipzig · Germany · eMail: karf@oesa.ufz.de

Abstract

For recent years we are working in close cooperation of the Oldenburg Research and Development Institute for Tools and Systems in Computing Science (OFFIS)[1] and the Centre for Environmental Research Leipzig-Halle (UFZ)[2]. So far, we developed three simulation tools to enable even those users from different branches of countryside planning and conservation biology, which are mainly familiar with the operation of usual word processing tools, to use simulation as a powerful instrument for their (practical) work (Meta-X (Lorek et al., 2000), Pop-X (the prototype of this tool was named ExiDLG (Köster et al., 2000)), and AniTraX (Köster et al., 2002)).

Among these simulation tools, many other computer simulations are developed and applied at the UFZ, as well as at other research institutes. These (often) tailored simulations are developed for a multitude of applications in the field of ecology. We can regard this research and the resultant collection of computer programs, their practical applications, and gained insights into the dynamics of ecological systems as a precious resource in the field of ecology. This wealth of experience, which in particular manifests in the resultant simulation programs, can support future (research) activities, e.g. required for decision-taking or simulation-based assessment of alternative management scenarios.

The objective of the project this paper deals with, is to develop an information system for the management of ecological simulations, practical applications of these simulations, and gained results. The prototype of this information system already exists and is named Info-X. Info-X provides a state-of-the-art user-interface to browse the information systems' content, select interesting results (text documents, simulation programs, parameters etc.), start simulation runs with selected simulators, and check published results for plausibility/correctness. Furthermore, the user can assess/rate the quality of existing content and is invited to publish new content, easily.

First, in this paper we will discuss the concept of the information system Info-X in more detail. Furthermore, we introduce the existing prototype of this software system and sketch the already implemented and further intended functionality of Info-X.

At first sight, the most noticeable component of Info-X' user-interface is a GIS-viewer (see Fig. 1). If a user issues a query to the information systems' database the results are displayed together with data form a GIS. Thus, e.g. it is possible to recognize where the data used for parameterization or validation of a model are collected. Alternatively, the results are

[1] in german: Oldenburger Forschungs- und Entwicklungs-Institut für Informatikwerkzeuge und -Systeme.
[2] in german: Umweltforschungszentrum Leipzig-Halle.

displayed using a tree-view. The user can interact with the map or tree-view, to easily browse/select the results of a query by mouse click.

If a user selects one of the presented items, access to different kind of data/information is supported by the information system Info-X: different simulation programs, raw data from observations, parameter settings for simulation runs, evaluations of simulation runs (simulation data), text documents (full text) etc. For instance, a user can access a parameter setting and run a simulation based on this previously published content. Moreover, the evaluation of a simulation run can be compared to the outcome of other (related) simulations or raw data from observations which may also be available via Info-X.

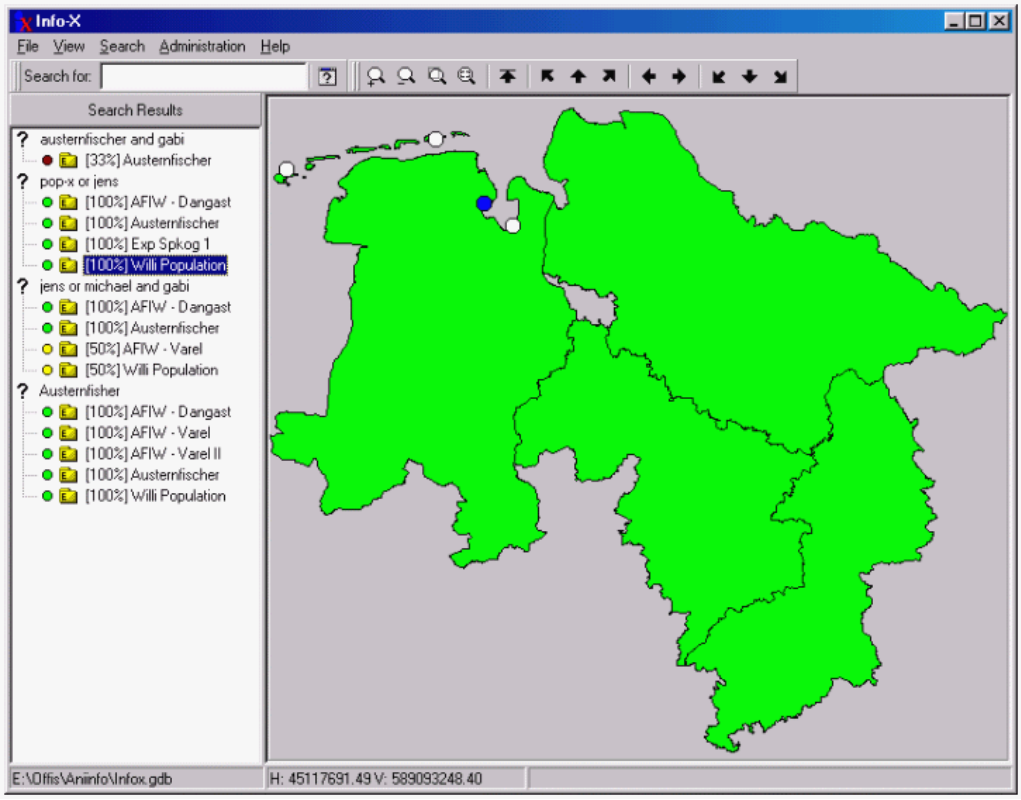

Figure 1: The information system Info-X

It is obvious, that Info-X must be designed to handle different qualities of data/information. For instance, on one hand we have (complex) simulation programs, which should be "accessed" via Info-X' user-interface. On the other hand we have parameters (with special and different data formats) which should be processed by simulation programs. To upload these heterogeneous data/information into Info-X' database and to handle this content, we developed a special XML-based (XML = eXtensible Markup Language (Box et al., 2000)) protocol/procedure. This generic approach enables a user to easily import new content into the information system, and allows user-friendly access to different qualities of data/information.

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