

ISAID: A WEB-BASED SCIENTIFIC DATABASE FOR NUCLEAR AND PARTICLE PHYSICS

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We outline goals for and progress towards a web-based scientific database for nuclear and particle physics data. The system under construction (iSAID) is based on SAID, a program developed at Virginia Tech to display data and models for reactions of interest to the medium-energy physics community.

1. Motivation

The existing Scattering Analysis Interactive Dial-in (SAID) site has a number of components extensively used by the Nuclear/Particle physics community¹. Decades of research and development have been devoted to the present software, which connects models and data associated with 10 different reactions (30 reaction sub-types). The model and experiment database continues to grow, with increasing large additions from experiments at facilities such as Jefferson Lab.

The SAID experimental database uses flat files, which limits the ability to query or search for specific entries. Data are added, deleted, and updated through routines which directly edit these flat files. This approach can be tedious, and does not include rigorous checks for data consistency/validation. Difficulties in managing such a database increase with increasing data volume.

2. iSAID Features

The system now under development (iSAID) is web-based, and uses a Relational Database Management System (RDMS). The implementation is

enhanced with the addition of tools to analyze, search for, and integrate new data. The usefulness of iSAID will also be enhanced through the dif-

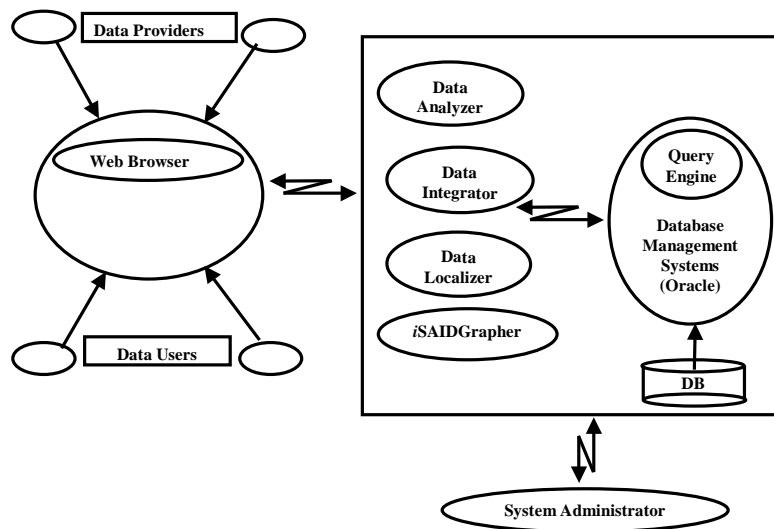


Figure 1. iSAID architecture.

ferentiation of users into two types: (a) the general user and (b) the data provider.

The general user will be able to compare existing data with models encoded into the iSAID system. Built-in tools will allow a comprehensive view of the current status of theory and experiment. This will be useful in planning new experiments, or comparing different fits against user-defined sets of data.

The data provider, typically an experimentalist with preliminary data, will be able to add data to the iSAID database, in order to more-easily compare with existing data and models. Data from this source will be labeled as private and not accessible to outside (general) users. This will also allow

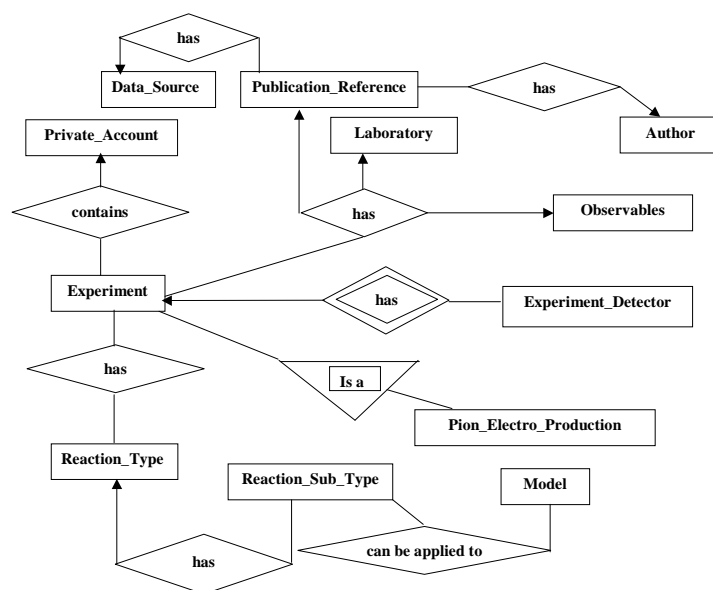


Figure 2. iSAID architecture.

exploratory fits, again inaccessible to general users, prior to publication. Once labeled “final” (as opposed to preliminary) data in private accounts can then be easily “added” into the full data base.

3. iSML Data Representation in iSAID

Data representation will use XML: eXtensible Markup Language. Rational: it is a W3C standard, platform independent, flexible, and separates content and presentation. Validation is via DTD or XML schema. Free tools are also available for processing and web support.

An example XML document has the format:

```
<?xml version="1.0">
  <experiments>
    <experiment>
      <author>Bell</author>
      <laboratory>
        <name>JLab</name>
        <address> 123 Street </address>
      </laboratory>
      <date>01-Jan-2002</date>
    </experiment>
  </experiments>
```

4. Project Status

Data have been transferred from flat files for the 10 reaction types to a single unified RDMS. Tools have been developed for the addition or modification of data/data types/reaction types, and an administrator's interface is nearing completion. Graphical output for data distributions is also incorporated. A prototype is now available for testing ².

Acknowledgments

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References

1. The full SAID database and numerous PWAs can be accessed *via* the GW DAC website <http://gwdac.phys.gwu.edu>.
2. The prototype of iSAID is available *via* the GW website <http://128.164.158.188/isaid/index.jsp>.