CATSpace: Sharing, Discovering, and Improving Laboratory Materials through a Social Network

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CATSpace is a social networking web site that enables the dissemination, evolution, and discovery of laboratory materials for computer science education. Our objective is to investigate the impact that a social network for instructors and students has on the improvement of these types of documents. CATSpace promotes the refinement of materials through open, document-specific discussions and versioning. It also empowers students to affect the evolution of materials by allowing them to provide constructive feedback based on their experiences. Its tied integration with Web-CAT, a widely-used automated grading tool, promises to provide a strong user base for community growth and future research.

Discovering

When users login to CATSpace through **Facebook's** application menu on the left side, the first thing they will see is a home page that provides several options for exploration and discovery.

In center stage, there is a **feed** with the latest user activity in CATSpace. It **aggregates** different types of events (e.g. comments, uploads, etc.) as well as CS education news from outside of CATSpace.

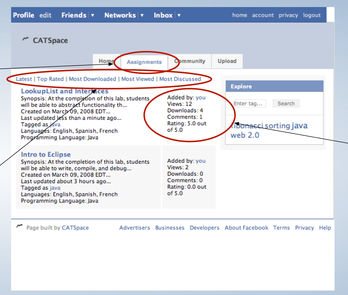
Example: the current CATSpace user responded to another user's comment about the *Circular Array for Queues* assignment.

CATSpace supports exploration through a **cloud of metadata** which is comprised of user-defined tags as well as automatically generated terms. **Searching** is also supported.

A list of top rated assignments **affords the discovery** of new assignments. Users can easily browse the assignment contents by following the hyperlinks. It also promotes the notion of **experienced-based quality measures**.

A list of assignments is displayed. Note that since the "Java" tag was selected, the list shows only assignments with that tag.

The list can be sorted using different criteria. Most of the options represent **"social" statistics** that are part of the assignment.



A single view of an assignment shows statistics, tags, and other metadata.

Example: the *LookupList and Interfaces* assignment has been viewed 12 times, downloaded 4 times, has 1 comment, and it is rated 5 out of 5.

Users can also explore **related** assignments **suggested** by CATSpace

The following are some of CATSpace features that are still work in progress:

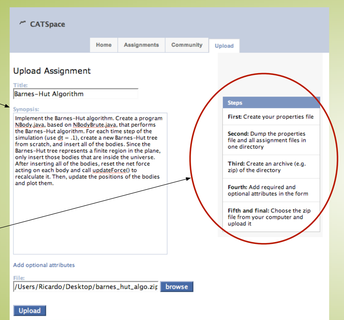
1. support for student contributions
2. provide an external user interface (outside of Facebook)
3. expand it to use Google's OpenSocial Platform
4. provide a community view that allows for more direct user interaction
5. refine upload/sharing process
6. support versioning through the user interface

CATSpace uses the Facebook Developer Platform to gain access to an-already-existing network of thousands of computer science instructors, educators, and students that are part of Facebook. The objective is to leverage the exposure and interconnection that Facebook provides to go beyond traditional digital libraries into socially evolving document collections.

Sharing

In CATSpace, CS instructors can **share** assignments by uploading them through a simple web interface.

Five easy steps to upload an assignment:
1. Create your properties file
2. Copy the properties file and all assignment files in one directory
3. Create a zip file of the directory
4. Go to the web interface, add information in the upload form
5,. Select the zip file, and press "Upload"



Properties files are used in Java to store setup parameters for an application. Each line (property) holds the form of a `key = value` pair.

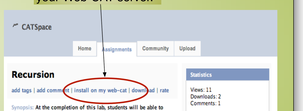
A properties file or metadata file is broken down into three categories of data: (1) **required**, (2) **recommended**, and (3) **optional**.

```
/* start of required properties */
title = A Tetris-playing Robot
synopsis = Build a class that represents an automated tetris player, and \
    that can be run inside a pre-provided tetris game with a full GUI \
    (no GUI programming involved).
programming language=C++
author1.name.first = Stephen H.
author1.name.last = Edwards
author1.email = edwards@cs.vt.edu
author1.url = http://people.cs.vt.edu/~edwards/
author1.affiliation = Virginia Tech, Dept. of Computer Science
author1.phone = +1 540 231 5723
languages = en
copyright = (c) 2008 Virginia Tech Department of Computer Science
license = Creative Commons Attribution-Noncommercial 3.0 United States License
license.url = http\://creativecommons.org/licenses/by-nc/3.0/us/

/* start of recommended properties */
keywords = GUI, TDD, test-first coding, \
    test-driven development
type = program
topics = recursion, parameter passing, method decomposition

/* start of optional properties */
abstract = This is a cool game assignment that motivates students ...
goals = This assignment is designed to allow students to practice \
    writing recursive ...
potential = This assignment lends itself well to contests, where \
    student solutions are played against each other.  This is an \
    excellent way to increase engagement.  Consider offering extra \
    credit for achieving different levels of performance, or for winning \
    a contest.
```

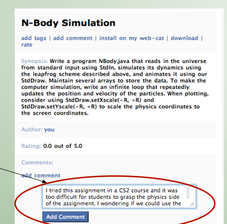
Web-CAT is a widely-used automated-grading system. CATSpace supports installment of assignments directly to your Web-CAT server.



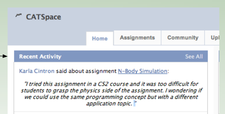
Improving

Scenario: (1) Ricardo added an assignment called *N-Body Simulation*

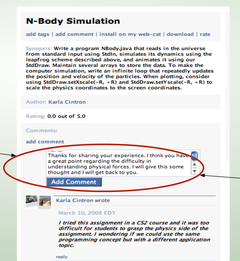
Scenario: (2) Karla downloads *N-Body Simulation*, uses it in class and adds the following comment:
"*I tried this assignment in a CS2 course and it was too difficult for students to grasp the physics side of the assignment. I wondering if we could use the same programming concept but with a different application topic.*"



Scenario: (3) Ricardo sees Karla's comment on CATSpace's home page.



Scenario: (4) Ricardo replies to Karla's comment with the following message:
"*Karla:*
Thanks for sharing your experience. I think you have a great point regarding the difficulty in understanding physical forces. I will give this some thought and I will get back to you."



Tagging: CATSpace allows users to tag assignments. This creates a **folksonomy** that enables the creation of user-defined connections and relationships between assignments as well as people.

The relationships created between assignments that are **tagged similarly** could allow instructors to improve them through the exchange of ideas.

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