TJHSST Computer Systems Lab Senior Research Project
tjTalk School Question Forum
2008-2009

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Abstract

All students have had that evening when they don't understand how a carbon lattice works, or they need a succint efficient explanation of Riemann sums. What is worse, is the class's chemistry or calculus whiz may not be available to call upon at that moment. This results in long nights spent trying to ask friends, parents, and whoever else to try to get some satisfactory response... which is sadly sometimes unsuccessful. tjTalk aims to connect the questioners and the whizzes. Using a tree-based structure to focus on specific subject matters, it will provide a way for students to ask questions and get quick answers from other students or teachers. It will create an information sharing community that will push peer education forward in the school it is deployed. For efficiency and ease of use, tjTalk will also bypass the trouble students have to go through to put their question in the right place, and for the whiz to look for the question. The questions asked will be automatically be filed in the tree-based system by intelligently generated keywords, and will be assigned quickly to a person who has a particularly high score in that part of the forum. tjTalk will also be integrated with the SchoolTool school administration infrastructure, and will be able to intelligently provide teachers with information about the students' level of knowledge in their classes, based on peer ratings of answers to questions.

Keywords: artificial intelligence, tree searching, keyword generation

1 Introduction - Elaboration on the problem statement, purpose, and project scope

1.1 Scope of Study

The result of this project will be a web service available on the Zope development platform. It will be written in Python and configured in ZCML (Zope Configuration Markup Language - an extenstion of XML). It will feature an intuitive user interface, and easy asking and sorting of questions. The structure will be a large tree, branching into subjects, classes, and other mini-topics for the efficient delivery of question to responder. The answers will be easy to rate up and down, and the question asker and the teachers will have more weight in grading the answers than the other users. The answers will not appear in order of date submitted, but rather in order of rating, and, as a tiebreaker, the scores of the authors of the answers. The

authors will get the same score boosts that the answers get. Artificial Intelligence methods will stand behind all of this.

There is another requested feature for tjTalk to generate grades for the students involved. As tjTalk will be coded as a module to the SchoolTool school administration system, this will be a simple extra "button" and the action associated with it.

This project is also an experiment in the application of eXtreme Programming, normally a programming technique for programming teams of two or more, in an environment where there is only a single coder.

This project will be machine tested for objective accuracy in object functions (using Zope unit tests) and also machine tested for proper webpage rendering (using Zope functional tests). I will also require one or more alpha and beta user bases to test the user friendliness and usefulness of the features I code. I also will stick by the concept of eXtreme Programming, always open to new user stories and bug reports. These will be tracked via Launchpad.

2 Background and review of current literature and research

There is no previous research directly pertinent to this project, because it is written in a fringe way: artificial intelligence for a web server with an object-oriented database. Methods will be adapted from previous research on artificial intelligence and machine learning on other applications, or on relational databases.

2.1 Type of research

This project will be almost purely user-centric application of development methods to provide a stable product which takes advantage of open source methodologies and artificial intelligence in the form of fast tree navigation.

3 Procedures and Methodology

Goals to accomplish all the features of tjTalk have been set. First quarter was dedicated to getting a bootstrapped SchoolTool instance set up and running, and to the start of development on the basic interface and functionality of a question forum. Second quarter will be dedicated to writing more advanced features, such as notifications of answers to questions, question assignment, intelligent question placement, and scoring. Third and fourth quarter will be dedicated to implementing these, the gradebook extension, and to actual deployment and testing of tjTalk. It will be at this time that I will address third party user stories from individual students or teachers, as well.

tjTalk will be written on on the Zope 3 appplication server. Hence, it will use the Python programming language for the main code, ZCML for the configuration files, and ZPT (Zope Page Templates) to render pages or other on-the-fly resources. It will get to the user in the form of a website with HTML, Javascript, and CSS.

4 Current Progress and Features

The list of current tjTalk features is:

- Tree-based forum structure

  Basic category page templates

- Comprehensive question page templates

- Questions and answers - basic functionality

- Answers can be voted up/down

- Voting security - no double votes, voting for your own answers, etc

- Comprehensive/prettier category page templates

- Ability to follow questions for updates (bookmarks)

An alpha-version view of the root tjTalk page, rendered in the Firefox 3 web browser:
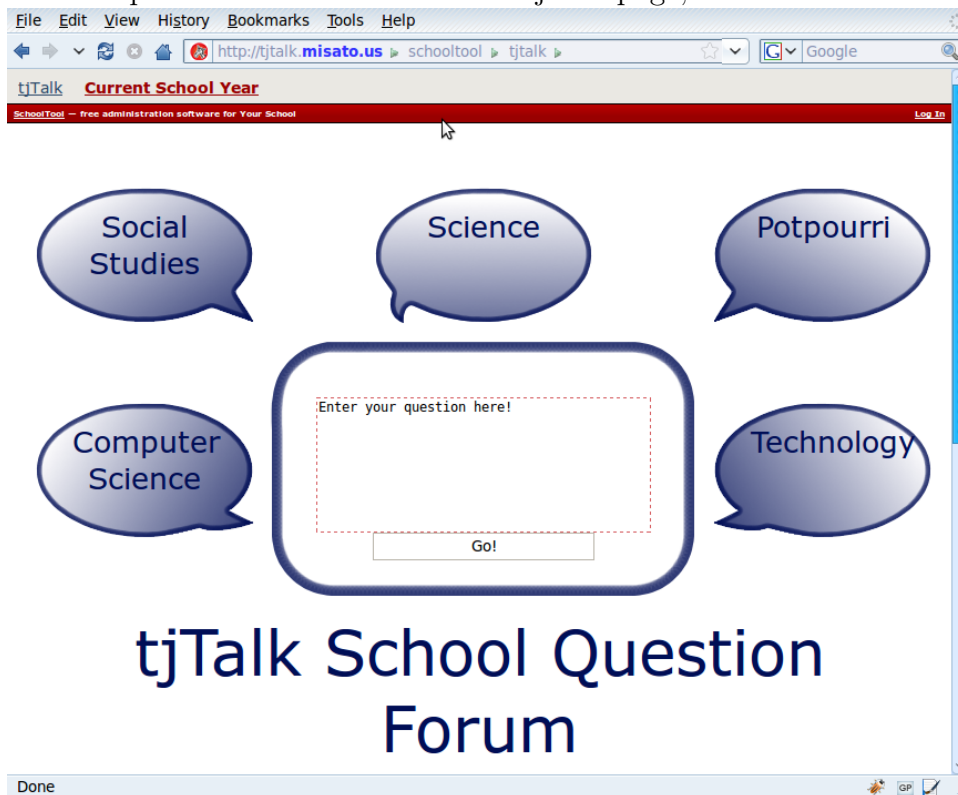
An alpha-version view of a question in tjTalk:

http://tjtalk.**misato.us** ▸ schooltool ▸ tjtalk ▸ computer-scie... ▾   Google

Home   Calendar   tjTalk   **Current School Year**   Gradebook

SchoolTool — free administration software for Your School   Logged in as: **Suftchi, Filip** | **Log Out**

Propose Answer

You are here: tjTalk Root Application > Computer Science > Alan Turing

Alan Turing

Who was Alan Turing and why is he so important?   on 2009-03-16 13:03:45.410031

Proposed Answers:

Alan Mathison Turing, (23 June 1912 - 7 June 1954) was a British mathematician, logician   on 2009-03-16 13:12:06.599986 **Score: 1** Your vote: + Withdraw Vote
and cryptanalyst.

Turing is often considered to be the father of modern computer science. He provided an influential formalisation of the concept of the algorithm and computation with the Turing machine. Of his role in the modern Computer, Time Magazine in naming Turing one of the 100 most influential people of the 20th century, states.."The fact remains that everyone who taps at a keyboard, opening a spreadsheet or a word-processing program, is working on an incarnation of a Turing machine".

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer laoreet nisi sit amet quam. Donec leo erat,   on 2009-03-16 13:12:32.507507 **Score: 0** + | -
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Aliquam bibendum. Phasellus quis arcu. Morbi sit amet metus in est tincidunt eleifend. Donec fermentum ante vitae arcu aliquet porttitor. Proin vestibulum pellentesque tellus. Pellentesque congue nisl sit amet erat. Sed enim odio, rutrum eu, aliquet.

Your School Server Running SchoolTool 2008.04
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5   Upcoming Work

The actual methods of artificial intelligence are keyword generation for the questions and answers. These keywords will then be propagated up the question tree and used for both question and location searches.