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Are Texas Community College Programs Aligned with Employers Preferences for Information Technology Credentials

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This presentation describes a 2008 quantitative research study that used a causal-comparative method and employed an online survey of two groups of Texas employers to determine to what degree, if any, an alignment existed for their preferences with regard to IT credentials. The research conducted in this study yielded empirical data for the preferences for IT credentials between employers serving on Texas community college industry advisory committees and the employers who do not serve on the industry advisory committees.

The study examined the preferences of several hundred Texas employers. The data gathered in this study and the Chi-square analysis of the data present findings that may provide educational leaders with contemporary information that reflects the degree to which a relationship exists between two groups of Texas employers' preferences for various credentials from candidates for IT-related positions for 20 IT areas.

The findings of this study reinforce Bean's (2003a) analysis of the challenges facing community colleges. The study was the first study in Texas to compare the preferences for several different IT areas between the industry advisory committee members that are required by the Texas Higher Education Coordinating Board and a broader group of Texas employers. Because the THECB requires each IT department to seek input from local employers to help direct certificate and degree program development, leaders in Texas community colleges may use the findings to identify opportunities for programmatic changes and the findings may provide IT department leaders with sufficient documentation to establish affirmation of need (Board, 2007).

Keywords: Information Technology, Credentials, Employer Preferences

Automatic Text Summarization Using HAC

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Text Summarization is a methodology to take a textual document, extract content from it and present the most important content to the user in a condensed form and in a manner sensitive to the user's or application's needs. Clustering is useful to discover concepts in the underlying data. Clustering algorithms usually employ a distance metric based (e.g., Euclidean) similarity measure in order to partition the database such that data points in the same partition are more similar than points in different partitions.

In this paper, we study a method of text summarization using clustering algorithms with categorical attributes. Instead of using traditional clustering algorithms that use distances between points for clustering which is not an appropriate concept for Boolean and categorical attributes, we propose a novel concept of HAC (Hierarchy of Attributes and Concepts) to measure the similarity/proximity between a pair of data points. We present a robust clustering algorithm HAC that employs hierarchy of concepts in a given document and not distances when merging clusters. Our methods naturally extend to non-metric similarity measures that are relevant to the user's intention. For data with categorical attributes, our HAC not only generates better quality clusters than traditional algorithms, but it also exhibits good scalability properties.

Keywords: Hierarchy of Concepts and Attributes, Text Summarization, Clustering and User's Intention

Getting Computer Science Majors: What are we missing?

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We hear it's about to get better, but most computer science departments still need to recruit many new students. And we'd like the blend of students to include different personality types, genders, and races. While there are plenty of ideas on how to do this, and some successful programs, we still aren't getting them to come and stay. Small departments face greater challenges in trying to implement many of the good ideas.

In this presentation, we'll present core problems, examples of successful programs, and some of the best ideas on what needs to be done to recruit and retain undergraduate computer science students. One of the best new ideas is integrating computational thinking into education starting in elementary schools, as advocated by George Fletcher James Lu in a recent CACM issue.

Then we'll explore what we as educators may be missing when it comes to understanding why students aren't coming to the discipline. To a large extent, we believe it could be a marketing issue. Where are the heroes, the role models that children can aspire to? For baby boomers with maybe 7 available television channels, shows like Star Trek offered us characters that not only did cool stuff, they were the kind of people we wanted to be. Prestige, respect, societal impact and other desirables of our discipline need to be communicated broadly. Yes, we need the new courses, curriculums, outreach programs. But perhaps we need a bit more.

Keywords: Recruitment, Retention, Curriculum, Outreach

Tools to Improve Collaborative Processes in the Digital Workplace

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In today's business environment that is strongly influenced by the Internet, the network of relationships between workers, corporations, corporations' partners, suppliers, and customers is an important competitive advantage for the business firm. Collaboration within and outside of the company makes the relationships network flourish.

The Computer Supported Collaborative Working (CSCW) systems that support such collaboration need functions that center on the human and social requirements while leveraging the Internet technologies. A range of digital tools is presented and their role in improving the effectiveness of a CWCS system is explained. The tools include a real time collaboration tool, a collaborative decision-making tool, a collaborative learning and training tool, a distributed project management tool, a collaborative portal, virtual workplace and process tools, community oriented tools, and a unified wireless messaging tool. Estimates of the return on investment (ROI) for such a collaborative system have been offered.

Keywords: Computer Supported Collaborative Working, CSCW, Collaboration systems, Group support systems

Open Educational Resources – Getting Started

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An audience interactive PowerPoint presentation that will cover: general concepts and aspects of Open Educational Resources (OER), how easy it is to get started using the resources of the Connexions Project (cnx.org) to produce Internet delivered education materials, and the efforts needed to create a complete open source textbook. The presenter's experiences in creating and helping others to create OER teaching materials as well as his experiences teaching with an open source textbook will be discussed. The audience will be encouraged to try this leading edge innovation. Audience participation in asking questions should make this an informative and interesting session.

Keywords: Open Educational Resources (OER), Connexions

How Will You Teach Your Online Students When Gas Cost $5/Gallon

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If gasoline prices continue to increase, students could be unable to attend traditional classes. This could occur before the $5 threshold is reached!

How will we deal with this problem? Our ability to implement creative solutions will impact both our students and our individual futures.

Here are some ways that we might work to alleviate this impending problem:

- Implement Internet courses – Lecture/Lab taught over the Internet. Students provide the required computing environment.
- Implement Blended courses – Lecture over the Internet. Students attend weekly on-campus lab sessions.
- Implement Internet courses – Lecture/Lab taught over the Internet. Students access the laboratory sessions from the Internet using Web browser access to virtual environments.

We are creative people – Their may be other ways that we can continue to provide a responsive teaching environment for our current and future students. This is an update for this on-going project.

Keywords: Hyper-V, Virtualization, VMM, Web Portal

The Use of Team Work in the First Programming Course to Improve Retention

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Many students experience difficulty when taking their first programming course because they have to not only learn a new language (in this case a programming language), but also develop a more structured way of thinking required to solve the problems. When they work individually on problem solutions, the lack of references (where to start, what to do, how to do it, etc.) can produce stress that, in some cases, ends up in the student quitting the class.

Based on concepts of collaborative learning, students have been assigned to work in pairs to complete lab assignments. The rationale is that by supporting and helping each other, students improve their self confidence, and this leads to their finishing the course or producing a better product. To motivate them to work as a real team, I designed a grading formula in which the grade of their partner can add up to ten points to their own grade. On their first day of class I provide them with a “grade calculator” developed in Excel so they can know their current status at any moment during the semester. To ensure that both teammates work, exams have a component in which I test them individually on what they did for assignments. This presentation presents the tools I developed and discusses the results obtained.

Keywords: Collaborative Learning, Programming Courses, Excel

CCS0: A Computational Introduction to Programming, Mathematical Modeling, and Elementary Mechanics

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Computational Computer Science - Zero introduces students to the basics of programming through multimedia, and then uses these programming techniques to examine basic functions that draw lines and curves. At the end of the course students use these same techniques to explore the principles underlying familiar physical processes.

Computational CS-Zero uses easily taught and adaptable programming concepts as a framework for modeling the behavior of physical objects. The course reinforces the concepts and intuitions of pre-calculus and mathematical modeling by engaging students in hands-on simulations of physical systems. Computational CS-zero teaches the foundations of programming while promoting mathematical competence necessary for academic success in a variety of STEM disciplines.

Keywords: CS0, CCS0, Introductory Computer Science, Pre-Calculus, Mechanics

Characterizing Introductory Courses in Computation

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A remarkably wide variety of engaging introductory computer science courses has been developed. Furthermore, they are typically judged by the enthusiasm they elicit from participants. Is this the only appropriate metric? This roundtable will examine the range of potential educational goals that can be achieved by such courses including technical skills and experiences relevant to career decision-making. In addition, we will discuss whether a single course design meets the needs of all students, or if, instead, a range of introductory courses ought to be available to meet the needs of different student cohorts. Finally, we will discuss appropriate effectiveness metrics for introductory courses.

Keywords: CS0, Introductory Courses, CSE

Eliciting Engagement and Creativity in Students Attending a First Course in Algorithms

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Algorithms courses are generally taught from a mathematical perspective. Many topics are presented in ways that best serve those students who already possess sophisticated mathematics skills. As a result, many students become disengaged from comprehensive analyses of correctness and instead revert to exhaustive note-taking and memorization.

We present an alternative pedagogical approach to presenting a rigorous course on foundational algorithms. Core concepts and techniques underlying complex or abstract algorithms and analyses are initially examined in the context of understandable concrete precursor problems. Rather than impeding initial understandings of an optimized algorithm's structure, students are instead guided to discover and implement optimizations only after they understand the foundational underlying concepts. These techniques are then generalized through their application to increasingly abstract problems. Finally, mathematical techniques are incrementally introduced *as needed* as highly motivated solutions to the practical problems.

This approach has successfully elicited engagement and creative problem solving from a wide range of students both at UTEP and NYU.

Keywords: Basic Algorithms, Fundamental Algorithms, Data Structures, CSE

An Innovation in Engineering & Computer Science Recruitment: the Renaissance Scholar Summer Program

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As computing technology continues to increase its pervasiveness in the global society, the underrepresentation of women and minorities in computer science translates into a loss of opportunity for individuals, a loss of talent to the workforce, and a loss of creativity and innovation in the declining national workforce. This exacerbates the continuing decline in students entering the computer science discipline. Without this high-level, highly-skilled workforce, our country is at risk of losing our ability to design, develop, and apply emerging and established research and technology.

The Renaissance Scholar Program is a week-long summer experience at Baylor University for high-performing high school juniors. During the week, students attend sessions in Computer Science, Engineering, and Great Texts. They are also involved in intellectual discussions over a variety of issues at the intersection of technology and the arts, in addition to having a truly residential experience as they live in the Engineering & Computer Science Living-Learning Center.

This paper will address the development of the program, both in terms of recruiting and admissions, as well as the development of the computer science curriculum. In particular we will discuss the computer science project used in the initial year of the program, and will track students that began their computer science learning adventure at Baylor during the summer of 2007.

Keywords: Recruiting, Retention, Innovative Curriculum Development

Innovation in Computer Science Education: The Computer Science Fellows Program at Baylor University

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The Computer Science Fellows Program at Baylor University was designed for intellectually gifted, highly motivated students entering the School of Engineering & Computer Science with a wide range of interests, who desire a more diverse experience across the disciplines. The program seeks to broaden Computer Science Fellows' backgrounds in their chosen area(s) of diversification while preparing them for a graduate studies or for successful careers. The Computer Science Fellows is a major within the School of Engineering & Computer Science where fellows are free to create an individualized course of study with the advice of a program director who mentors them throughout the entire undergraduate experience. The program has course requirements in computer science as well as other core courses required by the university, but seeks to allow eligible students the flexibility to go deeper in multiple disciplines.

This paper will present a review of the research in various honors programs that integrate honors disciplines with the more technical disciplines of engineering and computer science, the design and development of the computer science fellows program, the partnerships required across disciplines and the university in general, and the implementation of the first year of the program. It will also document the logistical details of attaining regent approval for a new degree (Bachelor of Science in Computing, major in Computer Science Fellows), building consensus within the department and school leadership, recruiting students for the program, and a preliminary assessment of the incoming class of computer science fellows.

Keywords: Honors, Innovation in Curriculum Design

Test Banks: Who Cares? *You* Must

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Often when text books are published, the publishers farm out the development of the ancillary materials to other writers. In most cases the publishers pay a set fee for a fixed number of test items, for example, 10 True/False, 15 Multiple guess, 8 Matching, and 5 short answer per chapter. Since the publishers try to spend the minimum on these ancillaries, they frequently get what they pay for. That means that a faculty member who is using the test bank supplied by the publisher is often at the mercy of the test bank writer when they are evaluating the success of their students.

Many of the test bank writers have little or no experience writing acceptable test items, and many faculty have not had the opportunity to learn what makes up a good test item. In this presentation I will, by example, show the good, the bad, and even the ugly in the world of test items. In addition, I will supply a document, (either electronic, bring your USB drive; or paper) that will help the faculty member either choose good test items, find ways to modify unacceptable items, or even write their own items from scratch.

Keywords: Online, Test Items, Multiple Choice, Evaluation

Using Pivot Tables to Introduce Data Analysis and Business Intelligence Processes in Computer Introductory Courses

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Studies show that many businesses are engaged in mining decade of data stored in their data warehouses and are in need of employees who have the business analytical skills to harvest their data. In order to provide knowledgeable workforce to meet the need of these companies, many schools have added coverage of Data Warehousing, Data Mining, and Business Intelligence topics in their curricula.

This paper presents ways to use Excel and pivot tables to introduce data analysis and Business Intelligence in computer introductory courses. Examples of successful implementation of methodology used to introduce data analysis and Business Intelligence by extending the coverage of Excel and pivot tables in a computer introductory course will be given.

Keywords: Data Warehousing, Data Mining, Business Intelligence

An Additional Examination of Knowledge Creation Model

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We are all overwhelmed by the amount of information we have to deal with everyday. Information anxiety, information phobia, and the hazard of misinformation are few of the negative outcomes of the information overload that we have to deal with in our daily activities. Although information technology has enhanced our processes, it has resulted in unmanageable amounts of information. One of the solutions provided by this presentation is to move to a knowledge-based working environment instead of relying completely on information.

This presentation, as an enhancement to a previous study, discusses a knowledge creation model to distinguish clearly between data, information and knowledge. In addition, it invites educators and administrators to reflect on what makes an effective institution by understanding the difference between tacit and explicit knowledge. It puts intellectual capital as the highest contributing factor to the success of an organization. Knowledge management provides decision makers with the needed tools to create an organic organization where the most valuable assets are those found in peoples' heads, that is, their knowledge.

Keywords: Information, Systems, Overload, Knowledge, Management

Using the Open Science Grid

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We have used the statistical package R, a scripting language Swift, and a protein folding program, OOPS, on the Open Science Grid. We have seen that using these packages together can yield meaningful results for moderate size experiments. We produce regression analysis of our initial results. We will demonstrate how these techniques can be used effectively in an undergraduate statistical computing course

Keywords: Open Science Grid, Statistical Computing

Getting an education in Computer Information Systems

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A degree in Computer Information Systems (CIS) is not well understood by many. Many think about it as a “softer” computer science degree, that is, if students cannot do well in computer science, then they could get a degree in CIS. Many confuse it with information systems, business information systems, and information science. Some others, who have done their undergraduate in fields not related to computing, think that it is a good way of getting into the field of computing.

An education in CIS (either undergraduate or graduate) is a very valuable degree that serves the community and the region. In this paper, the answer to the question “What does a degree in CIS mean?” is presented. The differences between CIS and related fields such as Computer Science (CS), Business information systems (BIS), information systems (IS) or information science are presented. The various educational curricula features of these programs, along with a few samples, are presented and the value of the CIS curriculum to the community and the region is presented. Finally, some recommendations are presented on the contents of a degree in this field, and the steps to market the degree to the industry are presented.

Keywords: Computer Information Systems, Degree in CIS

A Service-Learning Program at Eastfield College: Student's Coaching Faculty in Technology, Faculty Mentoring Students in Life Experiences

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The Millennials are the largest generation in history, and at times they seem so distant from any other generation before them, they understand and love technology. Here we have a valuable resource in education, groups of students that can learn and adapt to new technology in a matter of days, why not explore this resource and have the students become the teachers. A major problem in higher education is bridging the gap between faculty members and students, how can we find a way for these two diverse generations to uncover common ground. This service learning program at Eastfield College provided faculty members with the skills to understanding practical technology applications that allow them new avenues for communicating content to the millennial generation.

Service-learning programs have been in place at colleges and universities for many years. The focus of most service learning programs has been on students and faculty serving their community. Most research conducted for service-learning concentrates on how students benefited from civic engagement. Students are often required to go out into the community to provide a service. This program that was conducted during the spring 2009 semester kept the students on campus to provide a service mentoring faculty members. Students will mentor faculty members, familiarizing them with new technology to enhance and improve the current curriculum.

This service-learning program provided a unique opportunity to observe the relationship of millennial age students and older generation faculty members when their roles are reversed. The students participated in the service-learning project where picked from a technology based program at Eastfield College; these students tend to be very comfortable working with technology. This project demonstrated that students can be a valuable resource to the community by providing a service to the college that serves the community. The faculty mentored the students in life experiences, course content and different teaching styles.

Keywords: Service Learning, Mentoring, Technology, Teaching Software

CTS - More Than a Head Count

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The Customer Tracking System (CTS) was designed to track and expedite customer service in a setting of medium to large walk-in customer flow. By utilizing a relational database model (RDBMS) it effectively captures, in real time, most needed information concerning a customer's visit. CTS captures arrival time, wait time, appointment time, purpose of visit, among many others. It improves customer flow, increases staff's efficiency while providing an effective and positive customer experience. Additionally, it increases staff productivity, enhances time management, and provides accountability metrics as it aids in providing quality assistance. All these benefits with the only time investment of a customer supplied identification number or via the swipe of an ID card.

Keywords: Customer Tracking Software Application

A Technology-based Solution to Reduce Time Spent Identifying and Commenting Writing Errors in Research Papers

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ScanMyDocument.com is a site created to assist writers by scanning uploaded papers to identify and comment grammar and style errors. Several years ago, this professor was spending too many hours editing and commenting writing errors in research papers. There was a need for a more efficient method to provide writers with meaningful and consistent quality feedback concerning their electronically submitted papers. In addition, students needed helpful comments that would provide advice concerning grammar and style writing problems in papers returned for revisions.

Considerable effort has been expended in the development of this tool to create algorithms that accurately detect and comment grammar and style errors. Beta testers scanned thousands of research papers over a three-year period to provide feedback that refined algorithms, comments, and recommendations. Presently, over 600 grammar and style rules are applied to insert comments that are accurate more than 95% of the time. Your results may vary.

Keywords: Grammar, Errors, Comments, Editing, Scan

The Tools and Techniques of Multi-Core Processing – Workshop

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Recent improvements in hardware processing power are deriving additional processing power by adding additional processing cores to the microprocessor package. For software developers, this change raises many challenges. No longer will programmers be able to "ride the wave" of increasing performance without explicitly taking advantage of parallelism. Currently, only a very small proportion of developers have expertise in parallel programming. Software developers need new programming models, tools, and abstraction by the operating system to handle concurrency and complexity of numerous processors.

For computer science educators, this change will also require radical shifts in the way computer science is taught. Parallelism will need to be introduced early in the curriculum, preferably in the CS1/CS2 sequence. This presentation will give an overview of the parallel processing landscape, look at future trends, and present the tools and techniques of multi-core processing, using open source software (OpenMP) to an easily-implemented "incremental approach" to parallelism.

Keywords: Parallel Computing, Multi-Core, Curriculum

AAA: Algorithm Animation in Alice

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Students often have difficulty tracing and understanding the inner workings of algorithms. This paper describes a 3-D algorithm animation system, named AAA, which was developed with Java and Alice running in a Windows environment. AAA provides students with a rich environment for interactively tracing and exploring algorithms. The visualization system displays the entire algorithm in a corner of the animation window and allows the user to control execution of the algorithm by stepping through the algorithm statement by statement.

The interactive system is event-driven, allowing the user to use the mouse to determine when the next statement of the algorithm should be executed. As each statement is executed, the user can visualize the behavior of the algorithm by seeing the intermediate changes in the contents of the data structure used, and intermediate changes in the values of all variables, including index variables of all looping constructs.

On complete execution of the algorithm the user sees the algorithm's output. When appropriate, objects are used to reinforce the dynamic behavior of the data structure. For example, with sorting algorithms, cones of different sizes represent the contents of the data structure and Alice manipulates the cones to reflect changes in the contents of the data structure. AAA combines the video with audio by allowing the animated character, Alice, to provide verbal explanations of all critical events using the sound system in the Alice environment. The system is being beta-tested in teaching the 'Design and Analysis of Algorithms' course.

Keywords: Algorithm Visualization, Algorithm Animation

What Is the Role of Computer Education in Business School Strategy?

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Computer education in Texas universities is commonly viewed as a critical prerequisite for developing skilled practitioners and informed users. Strategic management theory suggests that the critical goals and activities for any organization should be reflected in its formal documents and descriptive materials. This paper uses content analysis techniques to assess the relative importance of computer education in the espoused strategies of Texas business schools.

The research recorded the presence, emphasis, and frequency of references to computer education programs present in the Dean's welcome or overview message on a business school's web site. The research offers insights into the role of computer education in Texas business schools by documenting the variety of strategic approaches followed.

Results indicate that Texas business schools provide relatively moderate strategic support for computer education in their strategic statements. Further, most schools view computer education as a supporting or enabling activity for other programs. Notable differences were observed among schools; nationally accredited, large, enrolment and public institutions attach greater strategic importance to computer education

Keywords: Computer Education, Business Schools, Strategy

Introduction to JavaServer Faces and Their Use as a Distributed Application Project

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JavaServer Faces (JSF) can be used to develop a distributed application in a distributed application class. This presentation begins with a brief review of Java Servlets and JSP pages to provide an essential foundation to understand JSF. Next, the overall structure of a JSF application is discussed and illustrated. A variety of how-to topics will be presented to illustrate key concepts and problems encountered in developing a web application. The use of JavaBeans and in particular their use in accessing a database tier will be illustrated. The experiences encountered in using a JSF as a class project will be discussed. These include the materials used in a course, how the course is organized and the problems encountered.

Keywords: Java, JavaServer Faces, Distributed Applications

Introducing Research to the Introduction to Computers Classroom

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This presentation will focus on describing the experience of students who enrolled in two freshman level classes: an English class where the focus is on research and an Introduction to Computers class. In this pair of classes, students complete the objectives for each course: computer literacy topics, Microsoft Office applications, utilizing HTML to build a small website to highlight their work in the form of a small electronic portfolio, and completing the research work and requirements in the English class – while demonstrating the skills acquired in the linked CIS class. One of the main accomplishments is the completion of a large poster presentation slide which is entered in an on campus university wide Student Research Conference. Future plans are also described.

Keywords: Introduction to Computers, Student Research Conference

Effectiveness of Data Management

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Studies show that the rapid changes in information technology impact the efficiency of information management processes. Factors that may influence the management of data, hence potential information, include effective implementation of business process, usefulness of data, and presentation formats that meet a specific user's applications and needs. Quality, completeness, and effectiveness of information management lie in the accuracy of the data, timeliness of design and implementation of processes, and the reliability of the data. In that respect all users are responsible for reliable, accurate data and, consequently, the information.

Studies also suggest that information quality, correctness, completeness, and adherence to time frames are critical factors in information management.

The presentation discusses and addresses certain issues that are related to data management. This includes data collections and the subsequent requirements for formal data management.

Keywords: Information Management, Data Management, Information Sharing

Mentorship: A Bridge to Retention

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Numerous studies have shown that mentoring programs benefit college students' lives on campus. A survey was conducted at the beginning of the spring of 2009 to investigate the degree of assistance the students expected from their mentors. The population was selected from the computer science foundation course: CS146 - Introduction to Algorithms & Programming. 55 out of 59 students completed the Computer Science Mentoring Program survey.

The results showed that the average student's willingness to join the mentoring program is 3.2 from a scale of 1 to 5, 5 being the highest. The results also showed that the students agree the mentoring program should be able to assist them in the following areas ordered from greatest to least: (a) success in their course work, (b) building a solid foundation in computer science, (c) embracing them as a family member of the department, and (d) guidance in selecting their future career. After reviewing the positive results of the survey, we suggested that the stakeholders of the vulnerable departments might need to consider maintaining a long term mentoring program to lead their students to success.

Keywords: Mentoring, Retention, Computer Science Programs

Green is the New Black and White – What's Happening Out There?

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This presentation focuses on the driving factors and the emerging potential solutions of the "green" movement in this country. The move toward ecological and economical responsibility for business and personal use of energy (also known as ECO^2) is driven in part by the Kyoto Protocol, although the United States has not ratified the protocol. Ecological responsibility focuses on reducing the greenhouse gases and carbon emissions that are being blamed for global warming. Economic responsibility focuses on reducing the country's dependency on imported oil. Both focuses are seeking sustainable energy solutions such as wind, wave, and solar power.

It is predicted that IT will drive the green movement. Organizations and businesses that are currently seeking and implementing sustainable energy solutions will fare much better than those that are not. If and when sustainable solutions become mandated, homes and businesses alike will be scurrying to implement them. The time for research, development, and training is now. The energy industry of the future is one filled with new opportunities. These positions will become available not through retirement but through retrenchment. Retrenchment will require training. The energy workers of the future will be filling positions that do not exist today.

The training for this new industry, including upper-management and administration, will be borne by higher education, with a major focus on community colleges.

Keywords: Green IT, Sustainable Energy, Wind Power, Solar Power, Wave Power

From Walls to Steps: Using Online Automatic Homework Checking Tools to Improve Learning in Introductory Programming Courses

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We describe the motivation, design, and implementation of a web-based automatic homework checker for Programming I and Programming II courses. Motivated by a problem-based-learning approach, we redesigned our first course to have over 70 short programming assignments. The goal was to change conceptual "walls" into "steps", so that students would not feel overwhelmed at any point in time. At each step along the way, it must be clear where the student is and the next step must feel attainable. Over the last 3 years, we have learned much about proper "step-size" and sequencing of problems. We describe how current computer science technologies both hurt and help our students. We conclude by a critique of the system, recommendations for undergraduate programming courses, and our goals for the next release.

Keywords: Homework Checker, Problem Based Learning, Step Size, Just-In-Time Instruction

Presenting a Web-Based MS Office Course to the Masses Using MyITLab - Lessons Learned

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To meet the UT System requirement for an office productivity course, faculty coordinators are faced with effectively delivering material to large number of students. UTSA chose MyITLab to standardize delivery of course content. We will present the lessons learned to the challenges we faced. Some of the issues we will discuss include the behavioral dynamics of the student population, course delivery issues, administrative issues relevant to both faculty and administrators, and technical requirements including vendor selection and relationships. A fundamental difference in this delivery system stems from the fact that instructors are managing the course rather than teaching it.

Keywords: Web-Bases, Course Delivery, Course Management, Student Issues, Technology

Data Archiving Based on the Integrated Rule-Oriented Data System

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Nowadays, querying historical data from multiple heterogeneous web databases in real time is time-consuming and sometime impractical. Our goal is to archive historical data in an appropriate location. Thus we can quickly and easily get the data we want. An approach towards data management system based on the dynamic execution of rules is discussed. By building upon the experiences gained with an existing data archiving system, iRODS (integrated Rule-Oriented Data System) data grid, a scalable rule-based data management system can be designed.

The iRODS is a software middleware that organizes distributed data into a shared collection, while enforcing management policies across the multiple storage locations. The iRODS system is a generic software infrastructure that can be tuned to implement any desired data management application, ranging from a data grid for sharing data in collaborations, to a digital library for publishing data, to a preservation environment, to a data processing pipeline, and to a system for federating real-time sensor data streams. What we have already done so far is something fundamental but necessary. Such as, we are able to archive regular text files and images. We can also use the specific web browser to implement the client application. The further work is to figure out how to integrate and archive relational databases in the iRODS system.

Keywords: iRODS, Data Integration and Archive, DBMS, Historical Data Query

Workshops

Using Camtasia Studio as a Desktop Recording Software to Enhance Teaching – Workshop

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Students have different learning styles. To alleviate the explaining of certain ideas, one of the suggested solutions is to use desktop recording software, like Camtasia. The software is able to capture audio and video, keep track of the mouse and keyboard inputs, and add narration to PowerPoint presentations.

As educators, we are constantly searching for more effective ways to deliver different subjects. Some of the topics, especially the technical ones are better presented visually. The ability of Camtasia to capture text, sound and video from a computer desktop can be very effective way to deliver hard to teach and grasp concepts. In addition to this, these topics can be available to students at any time.

This purpose of this tutorial is to demonstrate the ease of using desktop recording software to enhance teaching. Audiences will be introduced to the needed knowledge, skills, and tips to start recording their own lectures to CDs, publish them on a server, upload them to Blackboard and create instructional supplements that will be available after the regular class time. Camtasia will make all of that possible with minimal effort. If a picture is worth more than a thousand words, a video is worth much more.

Keywords: Camtesia, Effective, Video, Capture, Desktop

Learning Logic with LEGO MINDSTORMS – Workshop

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The objective of the workshop is to illustrate how to utilize a LEGO® MINDSTORMS NXT robotics kit as a teaching instrument. Robotics is a popular, fun, and effective way for teachers to introduce important areas of Science, Technology, Engineering, and Mathematics (STEM) curricula. LEGO® MINDSTORMS NXT robotics kit provides both hardware and software that enables students to build a simple artificial intelligent machine or robot. Students will be able to design how to make their machine or robot to intelligently navigate through its surroundings or perform specific tasks via a computer program.

LEGO® MINDSTORMS NXT provides a drag and drop programming language that permits students to easily and intuitively create such a program to control their machine. We believe LEGO® MINDSTORMS NXT is an effective tool to offer learning experience in STEM areas. The workshop participants will have a hands-on experience in building a simple robot as well as creating programs to control the robot through provided lessons.

Keywords: Robotics, LEGO MINDSTORMS, STEM, Programming

Student Presentations

Student Presentations Second Place Winner

Transportation-caused Air Pollution in Mexico City: A Drastic Public Policy Plan

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Our matrix of objectives for this project is to contribute substantial public policy initiatives to make positive changes in the quality of the air environment in Mexico City, as that megalopolis has impaired the health of both its citizens and its neighbors. A primary cause of Mexico City's air pollution problem is transportation. Because of the congested traffic, the time a car spends on the road per outing, overcrowded roads and the continued use of dirty gasoline; the air quality has continued to negatively affect the population. Using best practices models, we will investigate the major problems and solutions of transport-caused air pollution in Mexico City as well as estimate the viability of continuing present public policy initiatives.

Keywords: Air Pollution, Public Policy

Student Presentations First Place Winner

INSPIRED Instructional Materials for Engaging High School Students

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Faculty Mentor: Dr. Peggy Doerschuk

Many of the students in high school already have an idea of what they would like to do after they leave high school, whether they go to college or enter the workforce. By that time, computer science may or may not be of interest to them, therefore, the student must be introduced and engaged in computer science. The INSPIRED (Increasing Student Participation in Research Development) Program is a National Science Foundation Broadening Participation in Computing Project. INSPIRED hosts a single high school robotics academy each year to attract students, particularly those from underrepresented populations, females and minorities, to computing. As the main focus, robots are used to spark their interest first. To add variety and interest to the academy, there is a webpage building session called WebLab to introduce the students to the creative side of computing.

This project presents the development, use, and assessment of instructional materials for teaching high school students basic webpage building. Most people around the world, including the high school students, use the internet on a daily basis and are constantly seeing carefully and creatively designed web pages. The WebLab focuses on teaching the students the fundamentals of web design and HTML using notepad and Microsoft Expression© Web 2.

The materials teach students in a computer lab setting to build their personal web pages using templates and HTML. The materials were used in a week long academy for high school students at the beginning of June 2009. A formal assessment is still pending, but from the prior year's academy, there will hopefully be a statistically significant increase in the knowledge of webpage building.

This multimedia presentation will include PowerPoint slides used to teach HTML and Expression Web 2, sample templates, web pages developed by the students, and pictures from the academy.

Keywords: Outreach, webpage building, computer science, high school, academy

Student Presentations Third Place Winner

DrugChem: Web-based Data Integration Software

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Faculty Mentor: Dr. Longzhuang Li

DrugChem is a web-based data integration application that allows users to query unique chemical structures using drug names (ex. Advil) or active ingredients (ex. Ibuprofen). Query results include the description, chemical structure, molecular weight, standardized identifiers, and chemical formula related to the queried element. This Java-based project employs the Global-as-View (GAV) integration approach and uses a custom-developed *HTML Parser* library. This alleviates the need for a local database.

DrugChem integrates data from three data sources 1) Wikipedia (http://wikipedia.org/). This data source provides the general description of the queried element. 2) PubChem (http://pubchem.ncbi.nlm.nih.gov/). This is the data source for the molecular weight and IUPAC identifier. 3) NIST WebBook (http://webbook.nist.gov/chemistry/name-ser.html). DrugChem extracts the chemical structure, chemical formula, and further chemical details from this data source.

Keywords: Data integration, HTML Parsing, Global-as-View

Student Presentations Honorable Mention

Solving Some Classical Geometric Problems in the New Models of Computation

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Faculty Mentor: Ovidiu Daescu

Traditionally, algorithm design and analysis has considered models associated with the current computing devices (e. g. a sequential computation random-access memory, RAM, model corresponding to a desktop computer). Emergence of a conceptually new computing tool, like a multi-core platform, that is now becoming a standard in mobile devices, high-performance computing systems, even home workstations, dictates the need to develop the algorithms to take advantage of the features of that new tool. In the multi-core model there are several processors having private cache, sharing common cache and global memory. Another recent model of computation is the multi-pass model, corresponding to the devices with a limited available memory that read large size input data stored externally (e. g. on disks or tapes) and are allowed to pass over the input several times.

Many important sequential and parallel algorithms do not map directly to the multi-core or multi-pass models of computation. Seeking a way to characterize algorithmic techniques that could be used across different models of computation and a generic way to design algorithms that would take advantage of a particular model, we consider a fundamental geometric problem, computing the closest pair of points in the input set, in multi-core, multi-pass and RAM models of computation. We describe the algorithms for the former two models, highlight their differences and give an analysis of the time and space requirements.

Keywords: Multi-core, multi-pass, model of computation, computational geometry

Student Presentations Honorable Mention

The Rehabilitation Professionals' Utilization of the Nintendo Wii as a Therapeutic Modality by Survey

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In the early 1980's researchers began finding evidence to suggest the use of video games in patients' rehabilitation sessions. The Nintendo Wii is currently used in rehabilitation sessions. However, there is little evidence of scientific studies having been performed. The purpose of a survey reported in this presentation is to find common trends in the therapeutic usage of the Nintendo Wii by rehabilitation professionals and determine what characteristics of the Nintendo Wii, and its games, do rehabilitation professionals view as being important. Data is being collected in survey form. From the preliminary findings of the surveys and from literature, the presenter will provide preliminary data on the utilization of the Nintendo Wii in rehabilitation settings with more specifics on both rehabilitation professional and patient populations along with a list of Wii games to support rehabilitation modality use. Preliminary data suggest appositive trend in rehabilitation professionals' utilization of the Nintendo Wii in patients' rehabilitation sessions with rehabilitation professionals' video gaming experience. These surveys also provide new additions to the known lists of therapeutic physical activities incorporating the Nintendo Wii, the patient populations the Nintendo Wii is being utilized with, and the Wii games chosen by the rehabilitation professionals.

Keywords: Nintendo Wii, physical therapy, occupational therapy, rehabilitation, video games

Student Presentations Certificate

Spatio-Aware Data Integration of Ocean Observatory Systems

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Faculty Mentor: Dr. Longzhuang Li

Environmental, hydrographic, meteorological, and oceanographic data have been collected by numerous local, state, and federal agencies as well as by universities around the Gulf of Mexico (GOM) coast. Without an adequate system and personnel for managing data, the magnitude of the effort needed to deal with such large and complex data sets can be a substantial barrier to GOM research.

The presentation presents a database integration system that is able to retrieve data from multiple ocean observatory systems in the Gulf of Mexico with a uniform interface. The system answers complex queries by employing a mediator-based approach, called Global As View (GAV), to access the underlying distributed and heterogeneous data sources of various locations. The integration system can not only answer the traditional keyword-based queries, but also take into consideration the qualitative spatial terms/concepts in the queries. The system is feasible and easily extendible while adding new ocean observatory systems.

Keywords: Data integration, qualitative spatial features

Student Presentations Fourth Place Winner

Unpredicted Educational Use of Video Games

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Many computer games have recently been examined for educational benefits. The work presented here looks at popular video games that are not characterized as educational and suggests possible knowledge and skills that may be supported or enhanced by playing these games. A scoring process is presented to calculate the educational potential of a video game. The summarized results of applying this scoring process are presented with the potential educational areas for over 350 games. It appears that role-playing games may have the best potential for educational uses and that the top benefits include improving reflexes, planning and strategy skills. Furthermore, games with the Electronic Software Review Board (ESRB) rating of T for Teen had an overall higher average than other ESRB scores. The data suggests that each game should be considered on a case-by-case basis for any potential educational purposes and benefits.

Keywords: Gaming, Education, Video Games, Survey

Student Presentations Certificate

INSPIRED Summer Academy Program Encouraging Students to Participate in Computer Science Activities

Daniel Vincent and Valerie Juarez

Lamar University in Beaumont

Faculty Mentor: Dr. Jane Liu

By the time most students leave high school, they have already lost interest in Computer Science. Those with no interest probably have no idea of how big of an impact Computer Science has on our daily lives. Cars, cellular phones, PCs, all contain some form of computer software and computer hardware. Even non-computer related goods were created or processed by machines ran by computers such as soda.

The INSPIRED (Increasing Student Participation in Research Development) Program is a National Science Foundation Broadening Participation in Computing Project. The INSPIRED program holds summer academies to expose middle school and high school students that may not have been introduced to Computer Science in general before. During the course of a one-day academy, middle school students engaged in hands-on labs involving the use of autonomous robots, web development software, and animation development software.

This presentation will cover the general topics discussed during the INSPIRED 2009 Middle School Academies. All materials, teaching resources, and equipment used will be included. Videos, photos, and additional media will be included to demonstrate the activities as well as fom an assessment of the success of the program.

Keywords: Middle School, Broadening Participation, Academy

Student Presentations

Data Archiving Based on the Integrated Rule-Orientated Data System

Li You

Texas A&M University-Corpus Christi

Faculty Mentor: Dr. Longzhuang Li

Nowadays, querying historical data from multiple heterogeneous web databases in real time is time-consuming and sometime impractical. Our goal is to archive historical data in an appropriate location. Thus we can quickly and easily get the data we want. An approach towards data management system based on the dynamic execution of rules is discussed. By building upon the experiences gained with an existing data archiving system, iRODS (integrated Rule-Oriented Data System) data grid, a scalable rule-based data management system can be designed. The iRODS is a software middleware that organizes distributed data into a shared collection, while enforcing management policies across the multiple storage locations. The iRODS system is a generic software infrastructure that can be tuned to implement any desired data management application, ranging from a data grid for sharing data in collaborations, to a digital library for publishing data, to a preservation environment, to a data processing pipeline, and to a system for federating real-time sensor data streams. What we have already done so far is something fundamental but necessary. Such as, we are able to archive regular text files and images. We can also use the specific web browser to implement the client application. The further work is to figure out how to integrate and archive relational databases in the iRODS system.

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