Load Capacity for Bridges

Introduction
The important objective of this proposed study is to develop an efficient procedure for monitoring the truck weights and verification of the actual truck load capacity of bridges.

This project offers a great opportunity to work with a combination of software design, bridge engineering and heavy trucks.

We couldn’t miss a learning experience that would be as into these real world activities.

Our main interest in this project is that few entities have successfully put trucks and bridges into a friendly user interface that can make quick calculations or load capacities.

As a team we set out to complete this task.

Project Description
Your goal is to develop a software program that analyzes bridges for the load carrying capacity. Truckers request permits from organizations to use routes that require passage over a bridge to carry their load. An analysis needs to be conducted of the weight of the truck, load, number of axles and the given specifications of the bridge (span, material, etc.) to determine if a permit can be issued.

The Federal Bridge Formula
W = 500(LN/N-1 + 12N + 36)
W = Overall gross weight on any group of two or more consecutive axles to the nearest 500 pounds.
L = Distance in feet between the extreme of any group of two or more axles in group under consideration.
N = Number of axles in group under consideration.

Results
- The system provides information about the vehicles (truck weight, axle loads, axle configuration).
- The truck load effects (moment, shear force, stress, strain and deflection) are calculated and recorded.
- Critically overloaded trucks are identified.

Conclusion
Bridges constitute an important aspect of the national transportation system. As truck loads continue to increase, the additional costs and benefits should be considered.

This project will make it significantly easier for states/counties to determine if trucks are exceeding their weight limits.

W = 500LN/N-1 + 12N + 36

Compiler Testing Tools

How fast and accurate is your computer?

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We are utilizing Suse Linux 9.2 with an Eclipse integrated programming environment to automate compiler development and create a suite of tests.

Methods
We have used open source tools such as Python, Ant, and PyDev to improve the platform for testing the speed and accuracy of the compilers.

Results
We are using open source software tools to increase productivity and reduce the costs associated with ensuring quality control during compiler testing.
Print Spot Memory
Putting Sound On Paper

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Introduction
We started this project to develop and implement a creative new use for printers and scanners.

Project Description
Print Spot Memory is a method to condense text and other data into a form that can be printed onto a small section of paper. We used a set of four colored dots to encode the data. This allows us a compression of 2 times over binary when printed onto paper.

Results
We are able to condense a short audio file into a printable format that can be easily scanned and opened.

Conclusions
Although paper is not a good long term media for long term data storage, it is an effective way to transmit short encrypted messages or audio.

Date of most recent update
Tues April 12, 2005
Resident Information System
“Creating Innovative Technologies to Improve Elder Care”
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Introduction
In Senior Center Homes caregivers spend precious time filling out forms and paperwork by hand several hours after events have occurred. Paperwork is hard to file and even harder to use. Our PDA technology is the solution!

Project Description
Our resident information system is a tool caregivers can use to provide a higher level of support in senior homes. This can be done by supplying caregivers with current information about residents. Using a PDA, a caregiver can access the resident information system anywhere in the facility. Examples of the information that can be accessed include medication residents take, activities they participated in, and other data that is pulled from daily reports.

Results
We found that providing caregivers quick, easy access to resident information allowed them to do their jobs better and in less time, and increased the quality of care given at Oatfield Estates Senior Home.

Conclusions
We realized that working with a client is an important skill that requires persistence, patience, and good communication skills.

Advanced Advising System
Better Academic Advice in less time.
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Introduction
A lot of time spent with an advisor is time spent verifying that a student has met certain requirements. Our goal is to reduce the time spent verifying, so that students could use their time with an advisor more efficiently.

Project Description
The original system was developed in Microsoft Excel and Visual Basic macros. That design did not allow for efficient implementation of new features that were sought by our client. Since Microsoft Access is much better suited for the task, we decided to re-implement everything in Access, and add some new features as requested by our client.

New Features
• Automation of decision-making regarding transfer courses
• ‘Learning component’ to make the system more flexible
• Generalized report preparation algorithm

Results
Final product will be presented at the Engineering Open House.
OSU Artwork Database
We put the ‘work’ in Artwork
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Mentor: Kent Sumner, MU Marketing Director

To create a database-driven web interface to track the inventory and information of the artwork collection owned by the OSU Memorial Union.

The web interface allows for adding, updating, and removing artwork information, locations, artist information regarding each piece of art.

Each piece of art will have regular condition and cleaning reports that will be archived in order to track the condition of each piece of art.

The database will allow for information to be pulled to public and promotional websites including the public section of the OSUArtworkDB.

This section of our web interface will allow public users to browse the 300+ pieces of artwork owned by OSU Memorial Union.

A database with an interface via the web is easily created with MySQL and PHP.
Both are free to use.
With a web-based interface, data can be accessed from anywhere on the internet.
Data from the database can be used in webpages (pictures, artist biographies, etc.)

By storing the artwork data in a database format and adding a simple web interface, artwork information can be pulled for use on public websites and can be easily maintained and updated.

March 8, 2005

Action Item Tracking Tool
We Track Your Work When You Don’t Want To.
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We took on this project because we were very interested in creating an application that utilizes a database. Tracking information has always been important in society whether it pertains to stock quotes or action items within an organization. To be able to create an electronic tool for this purpose was an opportunity that we couldn’t turn down.

The Action Item Tracking Tool was implemented for Tektronix. This tool enables their vast network to be organized and efficient. We created a tool that allows virtually any organization to integrate the use of action items into their systems. In doing so, personnel within a company will be able to create an action item, assign the item to another person, edit it, close it, query the database for other items, and be warned about upcoming due dates through an auto-email response. This tool was divided into two major components, the database and the user interface.

We successfully built a tool that integrates an attractive user-friendly front end with a powerful and scalable back end. A robust feature set was included enabling functions such as e-mail notification, querying, searching, and modification of action items. The final implementation is amazing and suitable for any company’s use!

March 09, 2005
Online Lab Signup
Bringing Organization To Lab Reservations

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This project will be developed to provide fair opportunities for students to signup for the CS 372 lab. Having gone through the problem of lab signups, we see this project will be so beneficial for students by minimizing signup conflicts.

Our vision of the Online Lab Signup is a PHP based web site with a MySQL backend. It will tie in with other OSU services by having the same look and feel as the OSU homepage. It will also validate users using ONID username and passwords. Instructors will be able to set up courses and add lab equipment to the database for students to reserve. These features will greatly improve upon the current "pencil and paper" based system being used by the EECS department.

Results and Conclusions

We found that the subtle complexities of this project will require precise coding and some ingenuity in design. At the heart of the program lies a three way relationship between user, lab equipment, and the date/time. Extending the project to support other courses besides CS 372 will require another relationship between user/equipment and course/lab.

Date of most recent update: 4/12/2005

UAV Vision System

Real-time object detection

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Computer vision is an exciting and relatively new field within artificial intelligence. The OSU DARPA Grand Challenge team is interested in this technology, giving us an opportunity to participate in their program.

Create a functional system that takes images from a camera system and runs them through filters to detect objects ahead.

- Line detection
- Gaussian filter
- Sobel edge detection
- Canny edge detection
- Stereopsis
- Object detection

The vision system adds an entire new dimension to UAV navigation.

Results

March 9, 2005
Robotic Road Discovery

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About
Our project is part of the larger Unmanned Autonomous Vehicle (UAV) project that is being undertaken by OSU students. The ultimate goal is to build an autonomous vehicle that can be entered into the DARPA Grand Challenge in October.

We are developing the software that the vehicle will use to detect roads. Once the roads are detected, they will be uploaded to the vehicle’s sensor map and be used by the path planning software to determine the best path between waypoints.

Roads are being detected using a vision system composed of video cameras and light detection and ranging (LIDAR) sensors. The video data is analyzed frame-by-frame by our software. Roads are detected based on certain common conditions that our software detects, such as the fog lines.

If the object we are looking at matches these conditions, it is labeled as a road and its coordinates and the direction it runs in are posted to the sensor map. Our software also gives a preference number to the road depending on whether it looks like a paved road or a dirt road so the path planning software can determine the most efficient path.

U.A.V. Path Planning
We Put the 'A' in U.A.V.

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Introduction
The United States Department of Defense mandates that a third of all military vehicles be unmanned within ten years. In an effort to reduce government spending, the bill has been passed to the public. There are several military uses for such a technology, as well as an important step for the private sector in building the unmanned transportation systems of tomorrow. We are designing the final solution to the unmanned ground vehicle problem.

By utilizing and modifying standard Artificial Intelligence algorithms and aligned with various sensors, we plot optimal paths under hazardous conditions with the use of splines. The development of this project consists of a mixture of C and Objective-C programming, utilizing the GNUstep foundation library, SQLite3, an incredibly small and extremely fast database is used as an intermediary between the software and hardware systems. The entire project is open source, and designed to run on any POSIX machine.

Project Description
Current performance results promise unprecedented performance. We can successfully create a series of maps connecting several waypoints. Within those waypoints, the map quickly plots optimal paths around obstructions.

Results
Conclusions
With reduced graph complexity, we managed to increase performance with limited loss in complete functionality. This implementation is designed for racing, with little thought to the occurrence of backtracking.
Davinci Days Online

Saving Time and Money For A Local Non-Profit

The main reason we undertook this project was that we wanted to help a local non profit organization save money and time. They currently keep track of all their information on paper, which is very time consuming. They need a more centralized, faster, easier way to do this.

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We designed and implemented an online management tool for the Davinci Days Cultural Festival management team. The front end website that management uses is designed in php. The back end which stores information is built on a mysql database. The management tool allows the users to keep track of contacts, events, and anything else they want to keep track of in a central area and very quickly as well.

We found that with the help of our mentor Pam Van Londen that much of our goals were reachable and we were able to complete them. The capabilities of php are enormous and with minimal study a programmer can start to utilize these capabilities and produce very worthwhile products.

March 7, 2005

Holodeck Client Server

Letting you bring your 3D visualizations to the world

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Our goal was to create a collaboration tool that allows people to share 3D visualizations remotely. Currently there is no standard for transmitting this kind of information across networks.

The original drive of this project was to send graphical data from one computer to another one, equipped with a true 3D display device (Actuality System's Perspecta), since porting and recompiling existing programs requires much work. This would allow professors and students to quickly and easily to view real world images or data from a simulation from any angle, not just a flat monitor image.

We produced an easy to use, well documented library that supports both volumetric data and a subset of OpenGL commands, with compression to save network bandwidth and encryption for confidential information.

After witnessing visualizations in their full perspective splendor, we doubt anybody will ever be content with flat screens for analyzing information. We foresee this new means of viewing graphics will slowly but surely be adopted in coming years.
Introduction

Our goal was to produce a system that would simulate gathered tsunami data and allow for a closer observation of the given data.

Project Description

We created a user interface and drawing system using OpenGL, Glut, and Glui. We used C++ because it interfaces best with OpenGL and renders images faster than the Java equivalent. We created the system with as much modularity as possible to make it easier to reuse and modify in the future.

Results

We were able to create an easy to use interface and display tool that allows researchers to run through a given simulation with speed and accuracy while giving the user the ability to analyze the data’s wave height and flow.

Conclusions

We found that simulating the results in a fast and accurate manner can be a difficult task when needing to render the images in real time. A compromise must be accomplished in order to make the system productive.
Online Parts Store

Replacing the Written Word

Introduction

This project’s goal is to create a fully functional online automotive parts ordering store with integrated inventory and order management functionality, to replace the current pen and paper system.

Results

So far we have secured web hosting, designed and implemented the basic website layout, drawn up the needed database schema, and created the requisite tables in MySQL. To the right you will see the schema for our database, which is shown to the right. We have also implemented the needed forms to add information to the database. We are currently developing the inventory and order management functionality. Our current progress can be viewed at www.dnvauto.com.

Conclusions

Now that we have the web site up and running, and the input forms we need we can begin to add test data and start programming the functional part of this project, the administrative functionality.

Mocap Web Repository

Capturing Motions for Animation Research

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Introduction

Motion capture data is a key component for modern computer graphics. Our goal is to create web application that stores and provides access to current motion capture data.

Project Description

To create a web application that will simplify the storage and retrieval of motion capture data and videos. The web application will be implemented using PHP and MySQL. The web application will include a form that will allow the input and modification of data. In addition, a search mechanism will be created to allow queries to the database.

Results

The web application will provide an organized source for motion capture data and videos. The web application will be easy to navigate and use by both administrators and end-users.

Conclusions

We were able to successfully create a motion capture web application...
Circuitscape
A Powerful Tool for Predicting Gene Flow

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Introduction
Circuit theory can be used to predict how a species’ genes flow across a given landscape. We are re-implementing the Circuitscape program to address issues present in the original version.

Conceptual Basis
Gene flow is increased by multiple connections and pathways...very much like conductance in a circuit

Why Circuit Theory?
Implemented in C++ to increase speed, especially for sparse matrices.
Enhanced reliability by improved handling of large datasets.
Eliminated program defects.
Streamlined usability by simplifying data input.
 Added new options to the user interface.

Project Description
Circuitscape 1.0 offers accurate tools to aid in biological conservation efforts. Our improvements increase user confidence in the analysis results.

Conclusions
Circuitscape 1.0 offers accurate tools to aid in biological conservation efforts. Our improvements increase user confidence in the analysis results.

OSU School of EECS
Team: Jonathon Swearingen, Kevin Riker, Trevor Kellogg
Sponsor: John Schmitt

PROBLEM
Oversized classrooms have created a learning gap between students and instructors

Instructor Evaluation
Instructors struggle to understand how well their students grasp course material

Solution
Utilizing wireless technology during class increases communication and interaction

Anonymous
Students can ask questions anonymously. Reducing peer judgment anxiety
Anonymous polls let students express how they really feel about the course

Self Evaluation
Graphical results of in-class quizzes allow students to evaluate understanding of course material in relation to the class

Instant Feedback
Real time grading gives instructors ability to change in class lectures to better fit students understanding
Automatic ranking of student questions by importance

Course Objectives
Objectives can be incorporated in each class activity
Relations can easily be made between student performance and particular course objectives

“Helping Learning to Happen, Now”
Complex Artificial Intelligence is imperative to many current video games. We are studying human game solutions of the simple game “Sokoban” to build smarter artificial intelligence algorithms.

In order to collect data for AI algorithms, we're making our game web based. Sokoban lovers can log into our website and play the game. The photo in the center shows a sample game level that players would have to solve. All their solutions to the puzzle are recorded and used for AI research. Alan Fern’s AI planners analyze large numbers of the solutions we gather looking for common themes to use in algorithms.

Sokoban is one game that computers currently can’t play as well as a human. We hope we’ll find clues to increasing a computers capability with this game.

Solitaire is easy to play, but difficult to master. To that end, AI planning should be simpler to implement and study than other games, but just as rewarding.

With an interface of Spider and Thoughtful solitaire, a user can play the type that suits them most. When a user completes a successful game, the initial card configuration and all of the moves made throughout the gameplay are saved to a file on the server.

We hope that this proves to be a useful tool in the field of AI, specifically as it interacts with computer games. The saved data exported in the AI planning language of PDDL can be used by anyone familiar with the language. As more successful games are completed, the AI planner should become better at planning successful games.
Virtual Fabrication Lab

Boosting education and saving money

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Introduction

Have you ever seen how a computational processor is made? The goal of our project is to make it easier to learn how processors are made through visualization.

Project Description

The virtual fabrication laboratory is a virtual environment that allows students to learn how to process wafers without the need for an actual fab. The project will allow students to gain experience in a fab without the cost of running real fabrication equipment and saving resources.

Results

Studies have shown that learning in such a virtual environment helps people to understand the processes as a whole. Being able to interact with the environment is much more interesting to students, as opposed to conventional teaching methods.

In Action

In the fab users are able to approach a workstation and run a process on machinery. After inputting data the users are then able to see what happens while a process is running.

Loss Prevention Database

“We Put the L.I.D.* on Loss Prevention”

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Introduction

Loss Prevention Incidents (including theft and trespassing) are increasing. Retailers and consumers are carrying this burden.

Project Description

Our Project is to store and track loss prevention incidents in a retail environment

• Research and collaboration with outside Agencies
• Produce Reports from entered data
• Retrieve prior incidents by various criteria

Results

Management and security personnel at store-level found this system easy, intuitive, and a welcome addition to their loss prevention arsenal. By having data entered at store level, L.I.D. improves the overall accuracy of incident reports.

Conclusion

Use of this software will improve prosecution and decrease the overall cost to the retailer and consumer from loss prevention and allow the retailer to get back to what’s important, the customer.

* Loss Prevention Information Database

Updated: April 11, 2005