Introduction and Background

Digital cameras have come a long way in the last few years. They need to start moving to the next step. Not higher resolution and larger images but depth.

Today, we will find many projects that use digital cameras as a way of scanning a real life object into a 3D object. However most of these scanners are limited to scanning in an isolated room.

Craig Munsee, an electrical engineer at Hewlett Packard wants to expand on the existing 3D scanning technologies and create a scanner that can produce 3D objects at any location.

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Mentor: Craig Munsee, craig.munsee@hp.com

The Design

Record video

Break Video into Frames

Separate Laser Line from the rest of the image

Analyze frames and camera position to piece together coordinates of object.

Convert data to a common format

3D scan of object

The Final Product

Using existing 3D scanning concepts and technology, our team will produce a 3D scanner that contains the following features:

- An easy-to-use Graphical User Program written in C++
- A Standard Hewlett Packard Digital camera
- A Red Laser Pen
- A rotating turn table

Project Description

The project is to create a 3D scanner that is portable and can scan large objects such as automobiles.

The data collected from the scanner can then be used in a variety of applications.

The scanner should work under normal light conditions and require minimal setup to use.

Our sponsor, Hewlett Packard will fund this project with a budget of $500.
The Oregon Department of Aviation has begun installing Automatic Dependent Surveillance -- Broadcast (ADS-B) statewide, part of a plan that will eventually replace air traffic control radar nationwide with more complete GPS data. With this increase in information comes the danger of pilot distraction. To facilitate a safe and efficient transfer to this technology, a Consortium of Oregon industry, educational institutions, and government will work to quickly identify ADS-B safety and efficiency issues and resolve them by way of enhanced cockpit procedures, advanced pilot training and a new generation of cockpit equipment. An important tool in this process will be a flight simulator-based testbed for investigating issues and for developing and evaluating cockpit procedures. We are developing an ADS-B console prototyping tool and air traffic simulator for this testbed.

Our team is creating an extendible display to represent ADS-B traffic that can integrate in some fashion with the existing X-Plane simulator testbed housed in Batcheller Hall. This display needs to realistically react to the actions of a pilot flying the simulator so that they can react to the traffic scenario being simulated.

There are few situations in life where the average person is as vulnerable as in air travel. We place our trust in pilots and the importance of their instruments cannot be overstated, especially in modern aeronautics. Any changes, especially one as invasive as the introduction of ADS-B must be tested thoroughly and this project will allow for the just that.
The WISE Learning Tool was started in the Summer of 2006 by Bill Brooks and Milo Koretsky. The purpose of this tool is to allow Teachers with other methods to teach students. We will be adding a few extra features and changing the existing code to be more efficient.

For the Drawing/Concept Map tool we will be using Java. This will allow us to add features that we could not do with other languages. When we go over the code we will be using the existing code. So HTML, PHP, Java Script, and MySQL.

We hope that this will allow teachers more options when it comes to teaching and in turn develop a better method for learning.

We realized that…
Introduction and Background

This project is an attempt at designing and implementing a method for damaging and destroying a simple building model in a visually interesting way for use in an interactive real-time environment, namely video games.

The need for the project stems from the ever-increasing graphical fidelity in today's games. With more realistic graphics, the need for a more realistic interaction with the environment is created. More realistic and visually stimulating building interactions is one way how we can solve that problem.

Project Description

* Implements an easy to use interface with abilities to rotate the view, zoom in or out
* Different types of damage can be done, including the possibility of building collapse
* Constructed building with multiple building blocks
* Each block is fully deformable by the user
* Block vertices are repositioned around area of impact, with adjacent blocks being slightly affected
* Building textures are drawn onto blocks, and changed when block is deformed
* With all blocks assembled into the building, they will deform according to damage physics and change textures
* Rather than rendering a whole building, multiple instances of the block are drawn to show it
  - Implemented with C++ and OpenGL

Doing The Project

How did each step turn out? What interesting problems did you encounter? What did you do about them? What interesting intermediate results did you get?

Building being damaged

Results

We found that …

Tables and graphs are always appreciated.

Conclusions

We realized that…

Bullet lists often work better than raw text here.
Did you discover new information along the way? Why did it happen this way?
Any theories you have about results.
Our group has designed and constructed an electric motorcycle. The motorcycle is battery powered, and operates at highway speeds. The drive system is chain drive. The intended focus of this project is in many areas: power management, motor control, and microcontroller programming are the main focuses.

- 50 miles of travel on one complete electrical charge.
- Reaches highway speeds
- Self contained charging system built in.
- DC motor with PWM drive system
- GUI dashboard displays essential information for rider.
- Power profiles will be implemented for power consumption, performance, etc.
- Wireless connection to accept system changes, and upload power consumption information.
Encrypted VoIP
Real Secure Communication

Introduction and Background
Most of the encryption systems used today are breakable in principle. The goal of this project is to use one-time pad keys to provide theoretically unbreakable (thus secure) communication with VoIP as our example. This method, however, can be applied to any type of data exchange (not just voice data).

Significance
The main benefit behind this project is that users are guaranteed to have truly private communication that no one can break.

Project Description
To achieve the goals of this project, two things need to be done:
- Create a key generator that will produce the one-time pads.
- Create tools that VoIP clients can use to provide users with secure communication.

Doing The Project

Results

Conclusion

Team and Mentors
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**Code3Sim Mapping Tool**

Help Firefighters Save Lives!

**Introduction and Background**

Code3Sim is a continuing project being designed by Coelo company of design. Its mission is to create a simulator for the Corvallis Fire Department that will allow fire personnel to test response times and resource distribution throughout the city and improve upon them by using past data analysis. We will be contributing to this project by adding a spatial GIS system that represent the data output of the simulator's engine.

**Project Description and Background**

We will be experimenting with an open source project called Sharpmap combined with MsSpatial and SQL Express in order to create a visual representation of the Corvallis Fire Districts. The project requirements are to:

- Be able to draw different boundaries
- Do boundary hit testing implementing rubber-banding
- Interface with existing simulator
- Create easy to use GUI
- Import / export different maps

**Doing The Project**

While doing the project we upgraded from the original .9 version of Sharpmap to 2.0 and upgraded to the new .Net 3.5. We also worked on:

- Importing and exporting different GIS map layers. (street, buildings, boundaries).
- Adding functionality to the map engine. (Zooming, Pan Scanning, Hit Testing)
- Creating an easy to use user interface

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**Importance**

The importance of this project is to better help the fire departments of Corvallis appropriate vital resources to multiple emergency situations around the city of Corvallis.

**Conclusions**

**Results**
High-Speed Coin Sorter
Getting You More Than Your Money’s Worth

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Intro and Background
Oregon Armored Services deals with millions of coins a day
Jim Vance provided the idea to work on a high-speed coin sorter to sort out valuable coins
Our goal is to design a prototype that can be modified to sort through all currency (US and non-US)

Project Description
Electrical Engineers, Mechanical Engineers and Computer Sciences worked together to integrate requirements
Design specification were built through the use of a block diagram
Initial implementation has begun
Radial Pattern matching on penny surfaces has been confirmed for optical analysis

Doing The Project
Integrating the different fields has been a challenge
Block diagrams and constant communication have provided assistance

Results
We found that …
Radial Pattern matching on a penny’s surface will determine the difference between the head (face) and tails (memorial and wheat).

Importance
Resource management will provide a higher value to the currency in circulation

Conclusions
To be continued…

Edge Detection

Radial Pattern Matching

November 26th, 2007
Web-based IM System
Next-Generation Chat Service

Our project goal is to design an IM system that provides the functionalities oriented toward customer service providers, in addition to the basic chat functions. All interface components are customizable via CSS and file importing, so all interfaces can use the OSU libraries themes. "Chat Forwarding" allows the librarians to cooperate better. "Usage Statistic Capturing" allows the administrator to have a better control of the IM system.

OSU Libraries has been using Meebo to deliver realtime customer service to students and other libraries users. However, Meebo is not designed for providing customer service, and a lot of features (such as system administration, customizable interface) are missing. "The Messengers" is aiming to design an IM system that is oriented toward site-wide customer service.

Features:
- Multiprotocol Support, including: Msn, Yahoo, AIM, ICQ, Jabber
- In-browser buddy list and windows
- Highly Customizable Interface
- Webpage-embeddable chat windows
- IM System Monitor + Administration...and more

Screenshots

Conclusion
Introduction and Background:

Paradise is a massively multiplayer online roleplaying game (MMORPG). MMORPGs is the most technically complicated game genre, requiring experience in a wide variety of Computer Science specializations.

The goal of this project is to stretch our abilities to their limits and come out of it with not only a usable piece of software, but the experience we need to succeed in the world of game design.

Project Description

The player will be free from: classes, races, predefined aesthetics, and inventory. The player will be able to decide what skills they want from a pool of abilities and powers as they develop.

Game Mechanics

In terms of the actual mechanics of the game, the primary development goal is Freedom. Players are not restricted in movement, or in any of the ways described above, that traditional MMORPGs attempt to.

The players’ actions will have consequences. In the canon, there are nine orders of angels, each with their own agendas. As the player’s character progresses through the game, its actions will affect how each order feels about them, and will become friendly or hostile as the situation dictates. Part of the idea here is to rise above the current level of “ethical choice” offered by most games (e.g. BioShock, Fable), where the player either becomes a saint, or some sort of puppy kicking monstrosity.

Results

We conducted a public beta test with our proof of concept software:

• X users simultaneously.
• Logs show a X level of system stability.
• Surveys showed a X level of satisfaction with game play elements.
• ???
• Profit

Conclusions

There is demand for a game of this type and scope. Our team will attempt to sell our prototype to a firm up to the task of making this a commercial product.
HYPP Tools
Revolutionizing Streaming Media
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HYPP – Background
What is HYPP?
HYPP stands for Hybrid Peer to Peer, and describes a technology that allows streaming live information (Video, Music, Data) from one host to many peers, with the resource requirements available with a laptop on a wireless connection.

What’s unique?
HYPP allows the stream of data to be split into several pieces, and then an "intelligently" designed mesh network allows the peers to share the info, so that every peer gets the entire part.

Visualization Tool
Description
We created a desktop tool that works with the SuperNode that will visually represent the status of a given session/HYPP mesh. With this tool, Transdigita is able to see:

• Network status
• Size of a network
• Connection Speeds (health)
• NATs

Process
Iterative
Planning Docs
Researching Technologies
Developing with graphics
Animating Real Time events

Conclusion
Created a quick and easy tool to monitor HYPP networks
Created much joy among investors

Goals
Create a usable and attractive user interface
Ability to easily diagnose network problems
Accurately display the state of the network
Update in real time
KISS principle

Web Application
Description:
When we started this project, Transdigita did not have a web presence. They needed a way for their customers to manage their accounts. Our Solution includes:

• User Management
• Session Creation
• Host Settings
• Live Statistics

Process
Iterative
Planning Docs
Choosing the technologies to use
Working with Java
Database design/integration

Conclusion
UberGeek Awards
Members obtained jobs boasting 7 digit salaries

Goals
Intuitive interface
Complete control of account
Real Time information
Easy administration interface
Ability for customer to answer questions (diagnose issues) without the need of a phone call
Programmable Stress Interface Application

Bringing Oscilloscopes to Their Knees

We undertook this project because it is a great opportunity to work with a respected Oregon company and it is a challenging project which will expand our skills preparing us for our CS careers.

Tektronix is in need of new stress testing software to replace their old testing suite from the 1980’s. This software will automate stress testing of oscilloscopes by testing combinations of commands (hardware and software) over significant periods of time.

Doing The Project

Project Description

The project will be used to stress test oscilloscopes. The user will be able to issue any available command to test in addition to running automated test scripts. The purpose of the test application is to identify memory leaks and look for combinations of commands that lock up the device. This project will run on multiples OS’s (Windows, Linux, Unix). There will be a command line interface as well as a GUI.

In theory this testing software should be able to stress test any networked oscilloscope, enabling Tektronix to test their products around the world.

Results

Importance

This software project will replace software written in the 1980’s. This stress testing software should be used by Tektronix for at least the next 15 years to evaluate their flagship products.

Conclusions

11/26/2007
Imagine the situation where a robotic limb is needed to complete a complex task in an environment that does not allow for a human presence. This limb is composed of simple robotic nodes connected together.

Upon accepting the task, the limb must perform the following without external (human, computer) input:

- Have robotic nodes collaborate
- Calculate a solution to the task
- Execute the solution of the task
  - Even if a node is removed
  - Even if a node fails
  - Without ‘damaging’ itself

The solution to this problem was a joint effort between the CS, EE, and ME departments.

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Our robotic limb was composed of four robotic nodes connected together. Each node had the same hardware and software.

Software
- RTAI, Real Time OS
- Instructions written in C++

Having identical nodes allows for high modularity

- Only need to write code for one node
- Can easily replace a node if it fails
- Easily reconfigurable

The limb completed the task!
The Problem:
- "The Data Divide". In order to make informed decisions, decision makers must have access to information. In some cases, this is not a simple task. Data-collection infrastructure may be damaged or non-existent.

The Goal:
- A cheap data collection framework that has a minimal reliance on new infrastructure.

The Reason:
- To get information to decision makers NOW so that we can bring regions that are either underdeveloped or have had their infrastructure compromised back in to the information age.

Introduction

The Flying Weasels

The Development Process

This is an overview of our deliverables and the components that need development.

User Form Generation:
- Includes design and implementation of a wizard for form generation with output in common document formats.

Data Retrieval System:
- Development of a scheme for encoding and decoding data, notifying the user of receipt of data, and storage/synchronization implementation.

Also note that these systems are developmentally disjoint, thus development will occur concurrently.

Results

User Form Generation:
- A working Microsoft Windows based wizard.

Data Storage System:
- A temporary storage system for Microsoft Windows XP Embedded 6.0 devices.

Data Retrieval System:
- An easy to understand protocol for transmitting data via cell networks from a user to a data centre or Microsoft Windows XP Embedded 6.0 device.

Conclusions

Stay tuned, folks!
Combining the information you want with the flexibility you need

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Introduction and Background

• Goal is to develop an extensible framework for a social networking site
• Features include: calendar, photos, and file storage, social aspects, etc.
• Create something to help organize information more easily and more thoroughly than any existing network
• Project provides valuable insights into developing web applications.

Doing The Project

Results

Conclusions

Project Description

• Project based around the “LAMP suite” (Linux, Apache, MySQL, PHP)
• Simplistic core components with basic social functionality
• Clean API for creating 3rd party apps to integrate with the framework
• Unlimited potential for extensions

Importance

• Different type of social network
• Business life meets real life
• Flexibility to add what you need
• Simplicity removes what you don’t need
• Larger scope than previous networks
• All of your social information accessible in one place

November 26, 2007
**Please note that the original content is in Adobe PDF format.**

### Android Application Suite

**Utilizing Google’s Mobile Application Platform**

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**Project Background**

This project grew from the efforts of the Open Handset Alliance (OHA). The OHA is a group of more than 30 technology and mobile companies who have joined together to create a mobile platform which will allow a richer user experience, less expensive hardware and an overall better mobile experience.

A key part of the OHA’s goal is to allow for 3rd party development. To encourage this, **Google** has released an **Android framework** to allow developers to begin creating Android applications now. This project is aiming to develop a suite of applications that will be compatible with this new platform when is launched in the **Spring of 2008**.

---

**Development Status**

Currently all development is done with the **Eclipse IDE** and an Android plug-in available from Google. The **Android SDK** includes an emulated version of the hardware to test the applications on until the hardware becomes available in the Spring of 2008.

Our project currently has a **technology demonstration** of an application that integrates with the popular social network **Facebook**.

---

**Description**

Our goal is develop a **suite of applications** that will help **improve the student mobile experience**. Students today balance a workload consisting of a grueling academic calendar, part and full time jobs and a busy social life. We aim to deliver mobile applications that will **ease student life** regardless of the task at hand.

---

**Market Potential**

Mobile Market Age Group 10-24:

- **340 Million** users worldwide.
- 81% of the market falls within this range.
- Largest segment growth in the **top 10** markets.
- **Gender neutral platform**.
Facing potentially lethal threats is a routine event for Special Weapons and Tactics Teams nationwide. To decrease risk both to themselves and to civilians caught in hostile situations, the Salem Police S.W.A.T. team has requested that OSU Engineering construct a reconnaissance vehicle to allow their officers to preview hostile environments.

**Project Design**

The OSU S.W.A.T Reconnaissance Vehicle team has been assembled from Mechanical Engineering, Electrical & Computer Engineering and Computer Science students with the goal of constructing a vehicle that meets the needs of Salem’s S.W.A.T. team.

Our project consists of:

- A tracked, battery powered vehicle with an arm and two cameras.
- At least one laptop to function as a remote control station (multiple controllers possible).
- A wireless access point with amplifier to ensure control signal over distance and through residential structures.

**Vehicle Features**

- Weight: 50-60 pounds
- Four-Track Drive System
- Articulating Arm
- Drive Camera between tracks
- Main Camera on Arm
- Qwerk Board mainboard
- Remote Control via Wifi laptop
- Navigates stairs and some debris

**User Interface Controls**

- Control via Keyboard or,
- Control via On-Screen Buttons
- Move Vehicle forward/back
- Turn Vehicle left/right
- Raise/lower Arm
- Rotate Arm
- Tilt Main Camera Up/Down
- Rotate Main Camera

**Graphical Capabilities**

- View live video from either Drive or Main cameras
- Take snapshots and save to jpeg
- Apply edge detection and pattern recognition filters
- Multiple windows for multiple simultaneous viewing

**Background**

The OSU S.W.A.T Reconnaissance Vehicle team has been assembled from Mechanical Engineering, Electrical & Computer Engineering and Computer Science students with the goal of constructing a vehicle that meets the needs of Salem’s S.W.A.T. team.
Tri-strip Viewer
A Triangle Strip Optimization Aid
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Introduction and Background
Buzz Monkey Software is a game development company based in Eugene. While developing games, it is important to optimize rendering as much as possible. One very common method of doing this, is stitching multiple triangles together into strips. Doing so helps reduce the total number of vertices that must be rendered. Sometimes, changing as little as one vertex in the source program (Maya for example), can reduce the total number of triangle strips greatly.

Project Description
Tri-strip Viewer accepts a variety of file formats. It renders the data from within the file, drawing each strip in a different color. It also runs some analysis on the final, and shows its result to the user. Key points for analysis are number of triangle strips and render time. The user can then make a more informed decision on whether or not the model is ready to be put into a final product. If it needs more refinement, they can go back to their source program and make further changes. Any time the source file is modified, the interface for Tri-strip Viewer is automatically updated to show changes, and the analysis is done again to reflect the new data.

Doing The Project
No significant problems have shown up thus far, but this project is still very much in its early stages. So far, we are right on schedule with the schedule we outlined for our client requirements document.

Results

Conclusions

Importance
Tri-strip Viewer will help to make game modelers more efficient. By optimizing the workflow, many modelers will be able cut a lot of time off their daily workflow, and in turn, spend more time on modeling, and less time on optimizing, which will lead to a better final product.
OLPC Voice and Video Chat

Video Communication for the Masses

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Introduction and Background
We chose this project because it's a good opportunity to put our technical skills to good use in a philanthropic manner.

The OLPC project was started to provide access to computing technology in traditionally underdeveloped portions of the world.

Project Description
Our role in the project was to develop and test an application for video conferencing using the Helix Media engine.

The first stage of envelopment was setting up our application to make use of the system's camera and microphone.

The second stage was to stream the media over the OLPC's mesh network using the DBUS message system.

Doing The Project
The biggest problem that we've run into to date is the fact that sugar breaks on a daily basis. And the Helix build system is slow to update its access permission that made setting it up a tedious process.

Results
Open source documentation really helps in projects that are rapidly updating, as you can change them as you can find errors.

The documentation for many of the components could use help to make them easier to pick up.

Conclusions
We realized that...

DBus is a very good manner for communicating over a mesh network, after you get past the initial complexity of setting it up.

Using the build systems for larger projects can sometimes be as complex as understanding the code that it is building.

Importance
As with most open source projects, the community is the driving force of the project. The OLPC project is the largest philanthropic Open Source project.