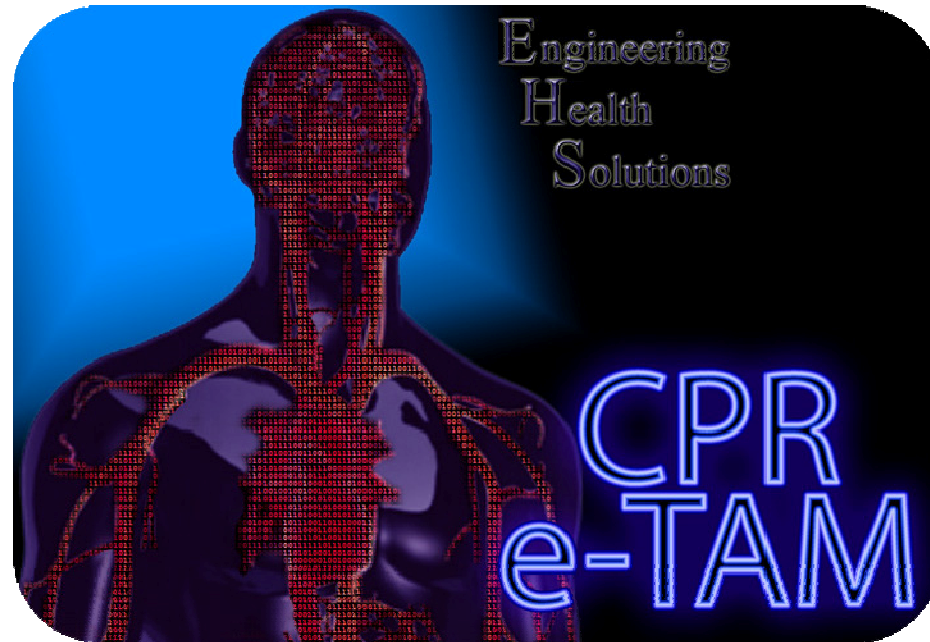


FINAL REPORT



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Juan Gorritz and Jomar Rosario
May 15, 2009

OUTLINE

- Introduction
- Objectives
- Project Management
- Modules
- Hardware
- Software
- Testing
- Budget
- Future work



INTRODUCTION

- Cardiopulmonary resuscitation (CPR)
 - Unconscious victims
 - Heart stops beating
- It consists of a series of steps
 - Rescue breaths
 - Compressing the victim's chest



INTRODUCTION (CONT.)

- In order to improve the techniques of teaching :
 - Realistic way to perform the practical exam.
 - CPR eTAM
 - Mannequin monitored and controlled by
 - Sensors
 - Microprocessor
 - Computer software



OBJECTIVES

- Create a tool to facilitate the job of the instructors
 - Monitoring students practicing CPR
 - Two months
- Provide the hardware and software to:
 - Identify when a student is not following the correct procedure
 - Display the data provided from the real time situation
 - Present the results in tabulated form
- CPR standards met



PROJECT MANAGEMENT

- Project time
 - February 12 to May 5
- Cost
 - Refer to budget analysis
- Resources
 - 2 Computer Engineers (Hardware)
 - 3 Computer Engineers (Software)



MODULES OF CPR ETAM

○ **Module 1: How to (Tutorial)**

- Introductory.
- The features for this part are:
 - Tutorial session of the software,
 - Tutorial session of the CPR using the mannequin



MODULE 1: HOW TO (TUTORIAL)

How to perform CPR

Welcome to the tutorial for performing CPR.

DISCLAIMER: Before we get started, please keep in mind that this tutorial does not intend to replace formal CPR training. **Completing this tutorial does not mean that you are certified to perform this procedure**, but will help in obtaining a certification. In the probable case that you are a CPR instructor, the purpose of this tutorial is to see how the program will determine whether or not a student is performing the steps correctly.


Images courtesy of the Association of First Aiders (AoFA). For more information please visit www.AoFA.org

To continue on to the next part of the tutorial, click Next. If you need to go back for some reason, click Back. If at any time you wish to quit the tutorial and return to the main page, click Quit. Now that we have that out of the way, let's begin!

[What is interactive mode?](#)

Quit Previous Next

Interactive mode: Off




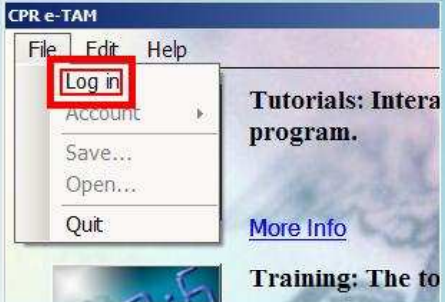
frmHowTo_AddCourses

Tutorial for adding courses & students

The first step in adding a course and students is to log into your account. Of course if you don't have an account you will need to create one. The steps for creating an account are fairly straightforward, and therefore not covered in this tutorial.

To log in, simply click the **File** menu strip item, and select **Log in**. A new window will pop up, asking for your username and password. Enter them into the appropriate field, and select **Ok**. If you entered the information correctly, the program goes back to the main window, and the status strip should read "Logged on: Yes".

Quit Previous Next



Settings: Configure this program to



MODULES OF CPR ETAM

○ **Module 2: Training**

- Main part of the project.
- Provides feedback displaying CPR steps being done on mannequin in real time
- The features of this phase are:
 - The training software.
 - Grading processing of the training session.



MODULE 2: TRAINING

Live Training - Instructor: frank mendoza

Grading

Enabled Disabled

Grading Profile

Default
 Custom

CPR Cycles

1
 2
 3



Course

EDFI 3645

Section

100

Student

Juanma Feliciano

Session Information

Elapsed time: **00:00:00**
(hh:mm:ss)

Live Preview

Enabled Disabled

Save results?

Yes No

START

Back

Prev. Step

STOP



MODULES OF CPR ETAM

○ **Module 3: Report and configuration**

- The report is an important feature of our product.
- It provides the results of the students of each session divided by sections and courses.
- This software has several options to configure like the port and the evaluation grades.





Below is the evaluation summary for the specified section. To view a detailed report of a particular student, click his or her name.

Student name	Student number	Session grades					
		Avg	1	2	3	4	5
Juanma Feliciano	802-03-1061	N/A	N/A	N/A	N/A	N/A	N/A
Magic Johnson	555-55-5555	N/A	N/A	N/A	N/A	N/A	N/A
Frank Sinatra	569-22-3265	N/A	N/A	N/A	N/A	N/A	N/A
Jerry Seinfeld	456-03-4568	79	100	96	100	20	N/A
George Costanza	456-40-5879	N/A	N/A	N/A	N/A	N/A	N/A
Elaine Benes	123-45-6789	N/A	N/A	N/A	N/A	N/A	N/A
Cosmo Kramer	987-65-4321	N/A	N/A	N/A	N/A	N/A	N/A

Click on a student's name to jump to his or her detailed report.

Session number **2**
 Grade **32/100**
 Passing grade for this session **80/100**

First cycle

Consciousness check	<input checked="" type="checkbox"/>
Head-tilt, chin-lift	<input type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input type="checkbox"/>
Pulse check	<input type="checkbox"/>
Chest compressions	<input type="checkbox"/>
Head-tilt, chin-lift	<input type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input type="checkbox"/>

Second cycle

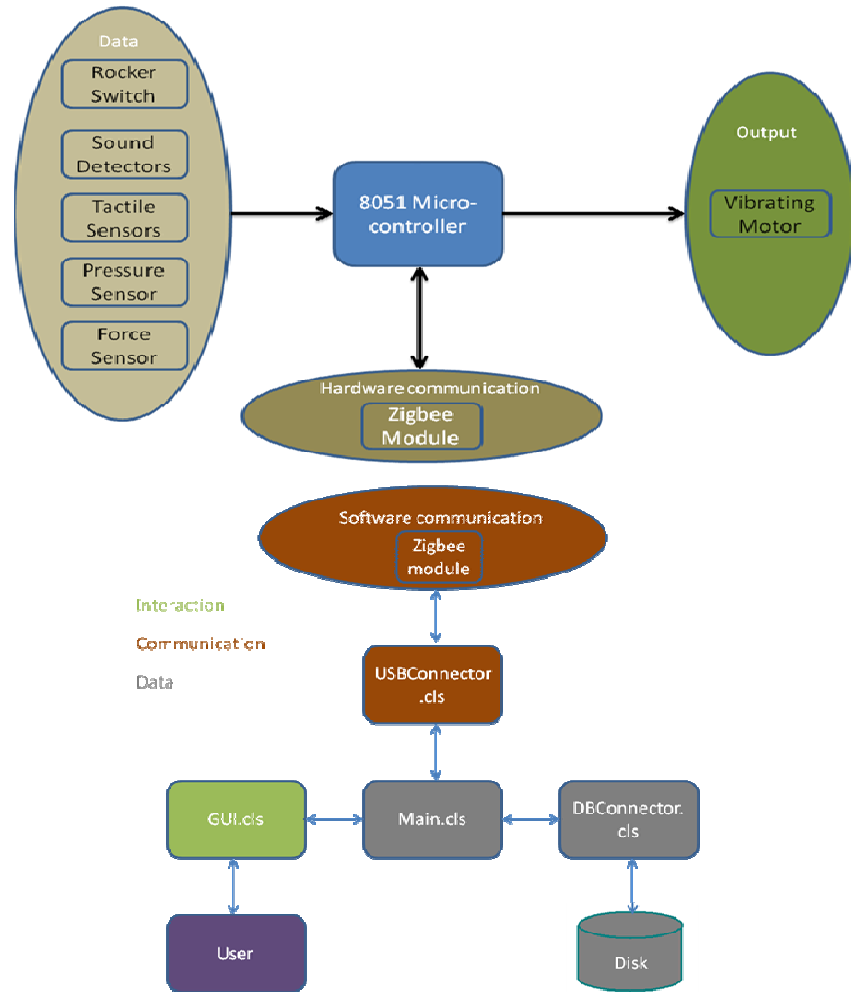
Head-tilt, chin-lift	<input type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input type="checkbox"/>
Chest compressions	<input type="checkbox"/>
Head-tilt, chin-lift	<input checked="" type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input checked="" type="checkbox"/>

Third cycle

Head-tilt, chin-lift	<input type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input type="checkbox"/>
Chest compressions	<input type="checkbox"/>
Head-tilt, chin-lift	<input checked="" type="checkbox"/>
Nose pinch	<input type="checkbox"/>
First rescue breath	<input checked="" type="checkbox"/>
Second rescue breath	<input checked="" type="checkbox"/>



SYSTEM DESIGN



HARDWARE

- **Mannequin:**
 - We bought a CPR Prompt® TMAN1 Adult/Child CPR training mannequin.



HARDWARE (CONT)

○ **Microcontroller:**

- 8051F340 development kit
 - Silabs Company
 - 2 ADC
 - 4 ports, from which we use 2 of them

○ **Sensors:**

- Sound detector sensor, for consciousness check
- Force sensor

○ **Communication:**

- Wireless Zigbee module



HARDWARE



SOFTWARE

- Microcontroller
 - C language
 - Sensor polling.
- GUI
 - Developed in C#
 - Using Visual Studio 2008 express edition.
- Database
 - Server
 - MySQL support.



TESTING

○ Unit Testing

- Verified and qualified software
- NUnit Framework

○ Stress Testing

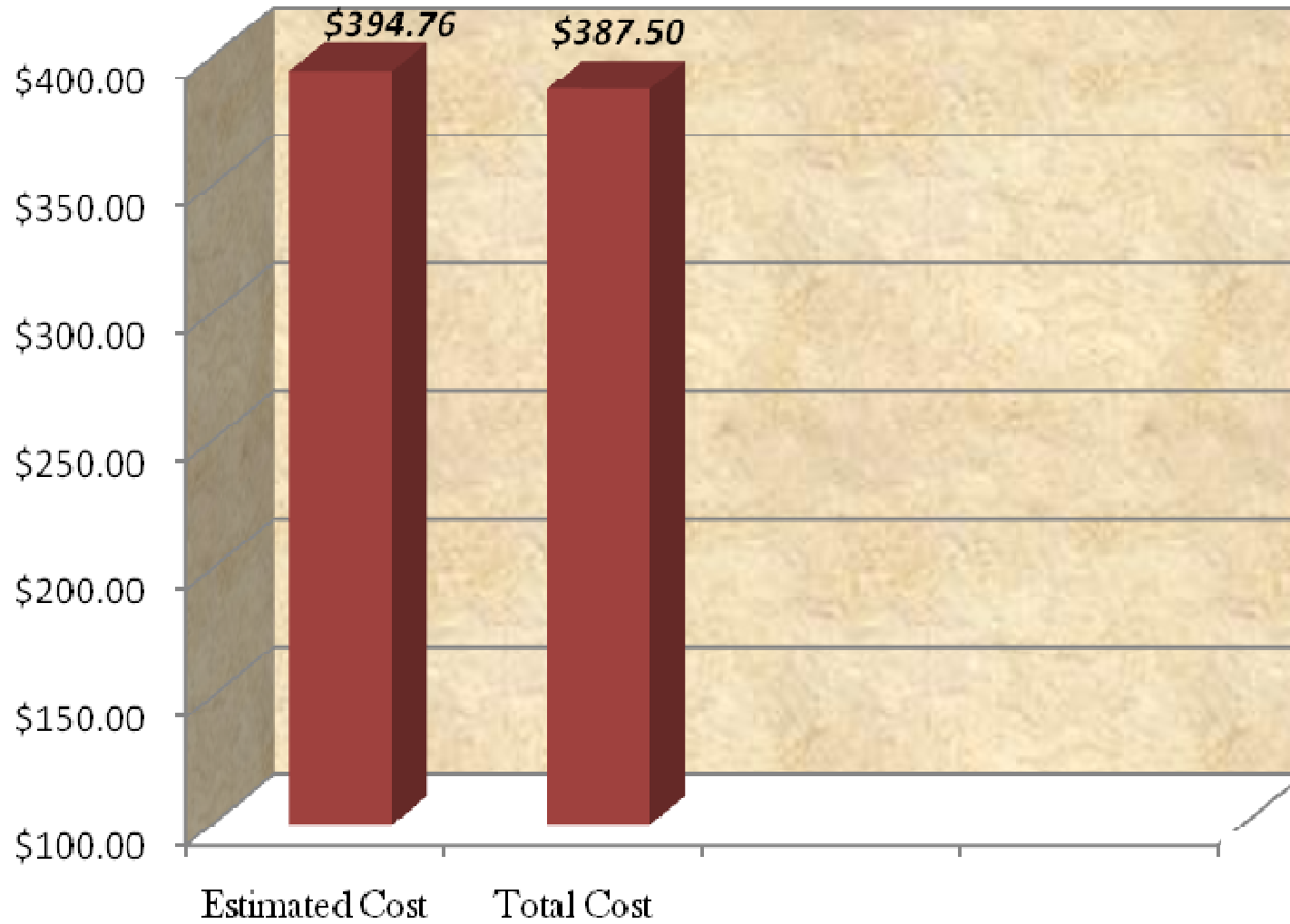
- Stress testing was applied to the mannequin to see if the sensor placement was durable and in the right position.

○ Test Cases

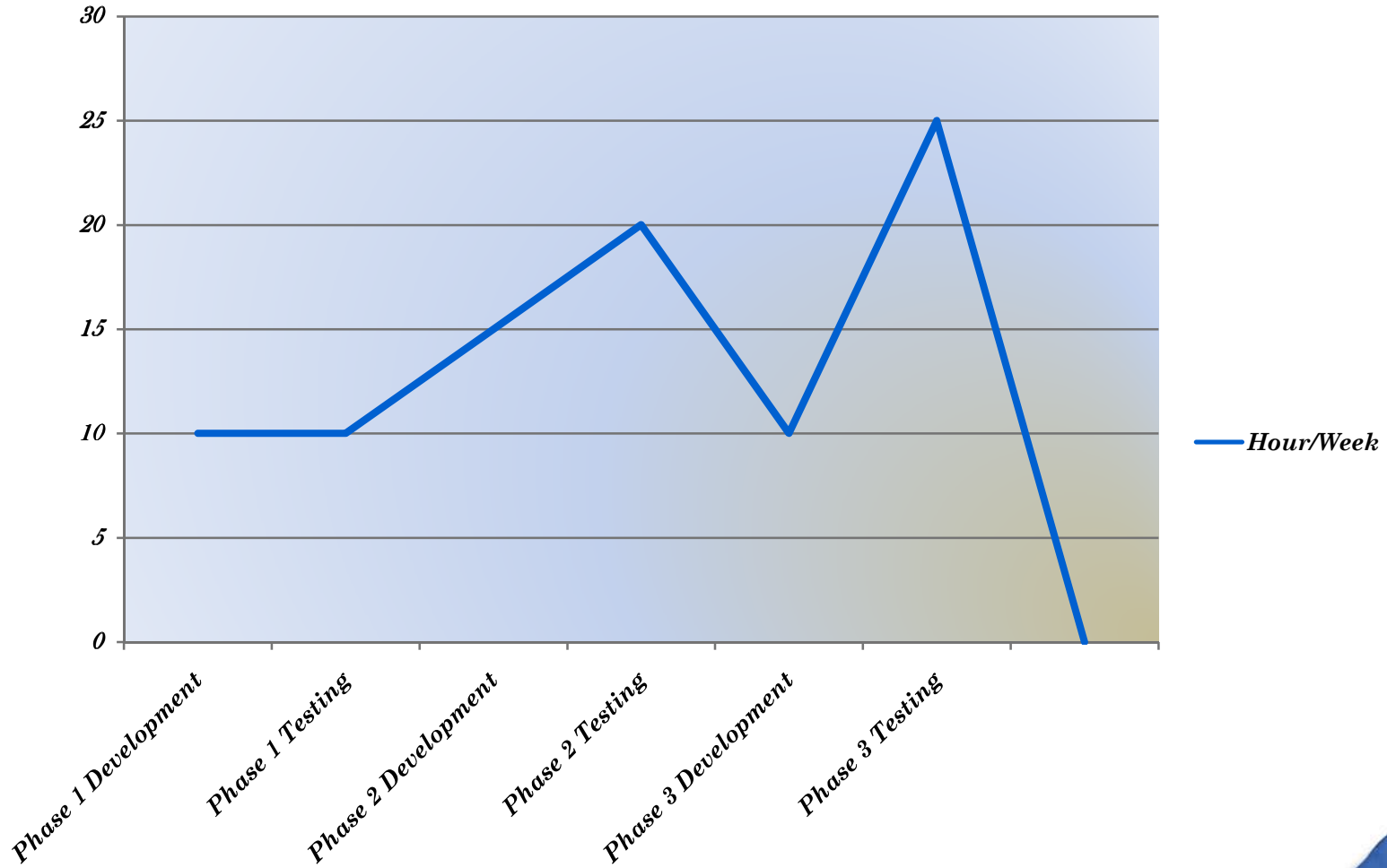
- 12 test cases.
- Identify bugs to fix
- Software and hardware



BUDGET ANALYSIS



WORKED HOURS



FUTURE WORK

○ Software

- Patches that will add functionality to the program.
 - Manual grading added
 - Mannequin recognition and the connection wizard

○ Hardware

- Sensors with better accuracy in the output (a more reliable detector)
- Microprocessor with more ADC's
- More realistic experience using tactile sensors instead of push buttons.



THANKS TO:

- Professor Mendoza
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- Silicon labs (donation)
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- Pablo Rebollo
- José Bermejo
- Our families & friends 😊



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