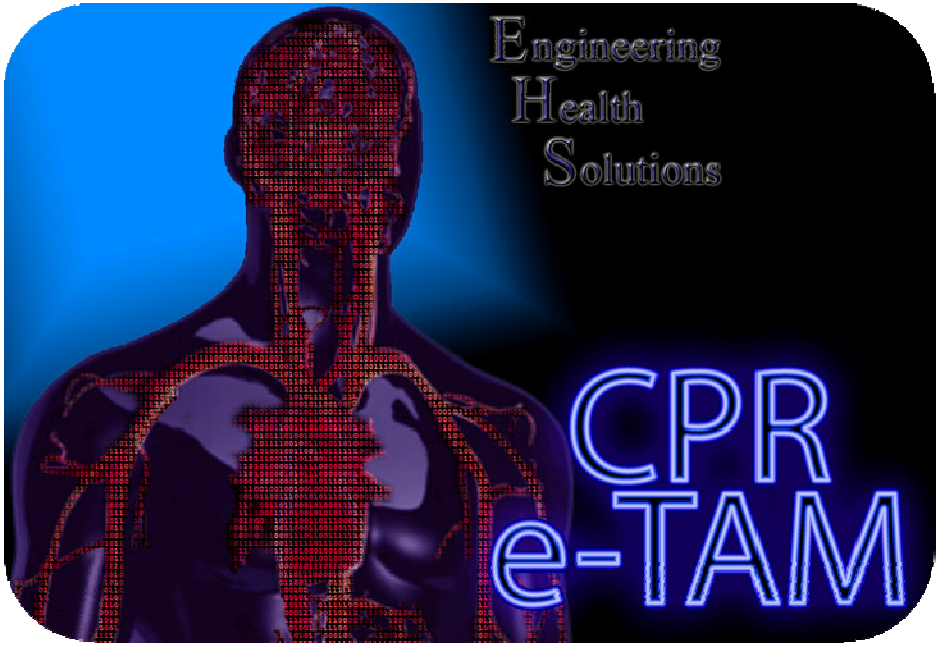
Final Report



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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

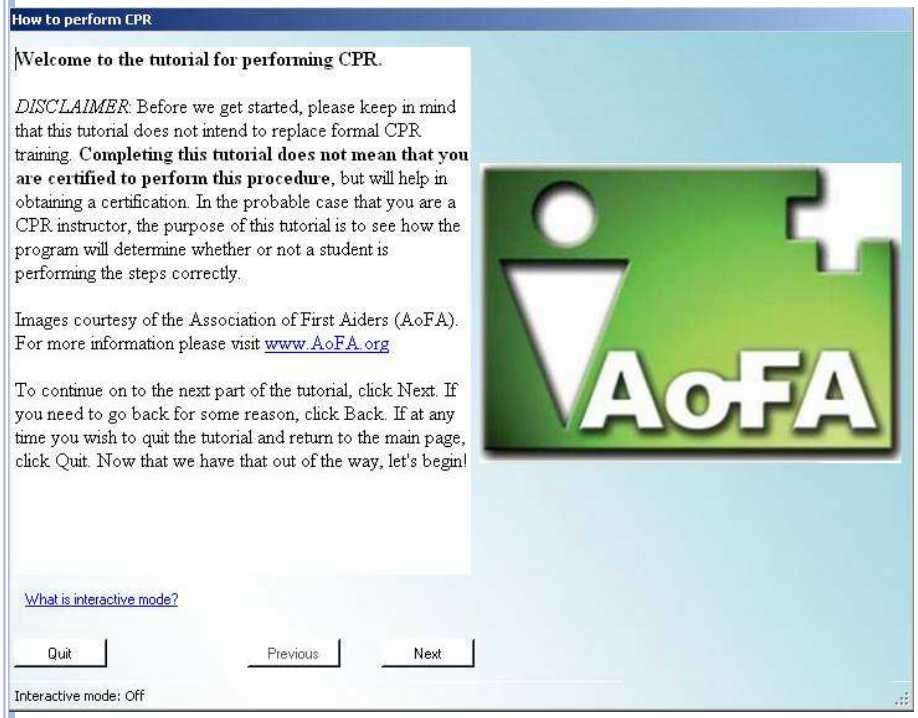
Project Management

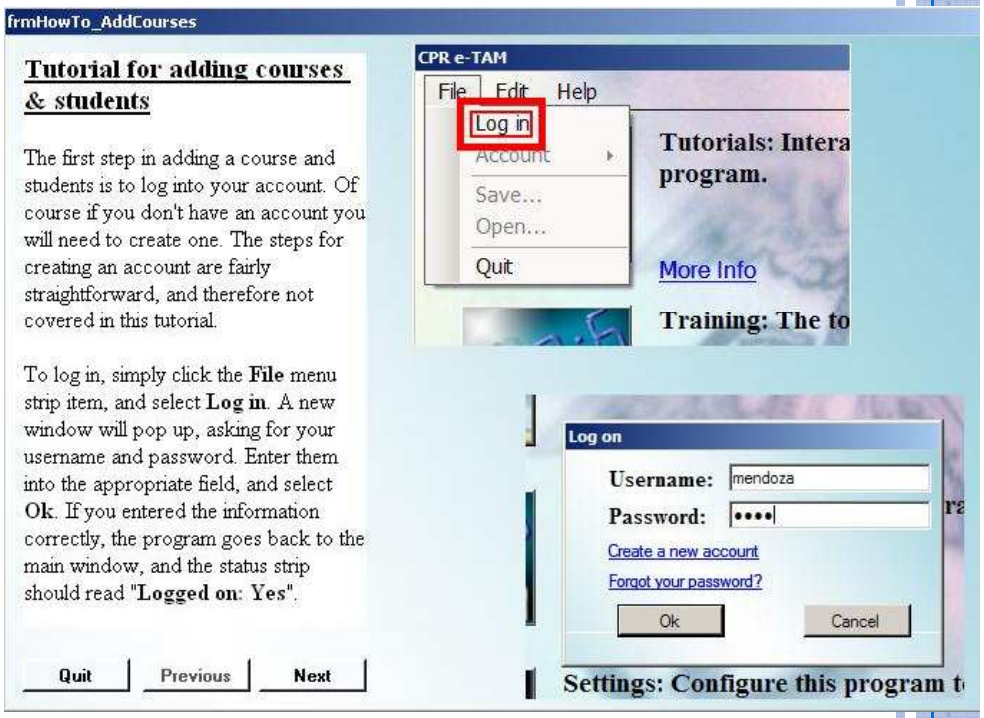
- Project time
  - February 12 to May 5
- Cost
  - Refer to budget analysis
- Resources
  - 2 Computer Engineers (Hardware)
  - 3 Computer Engineers (Software)

MODULES OF CPR eTAM

- **Module 1: How to (Tutorial)**
  - Introductive.
  - The features for this part are:
    - Tutorial session of the software,
    - Tutorial session of the CPR using the mannequin

Module 1: How to (Tutorial)

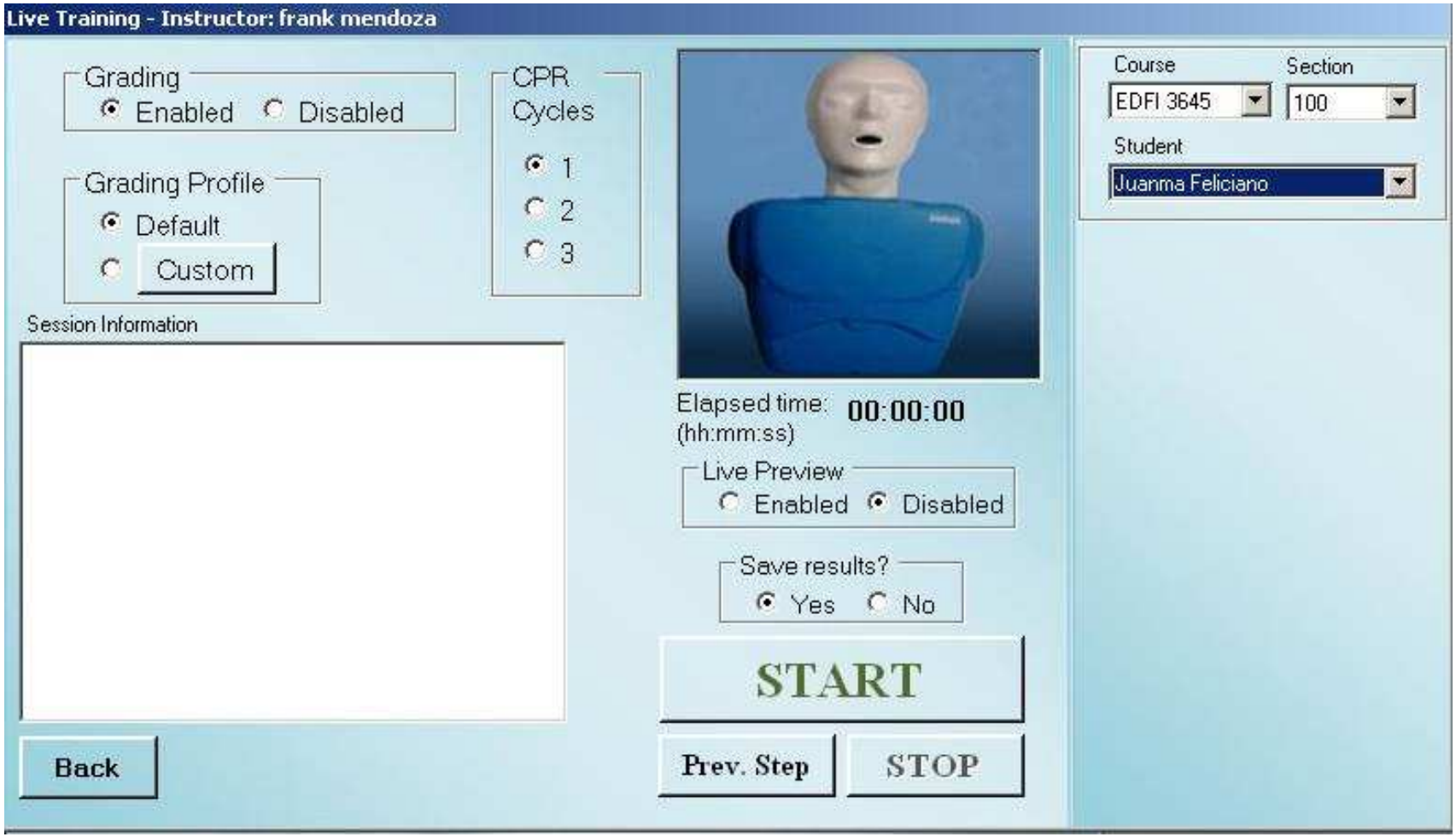




MODULES OF CPR eTAM

- **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



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.

CPR e-TAM

Evaluation report for

EDFI 3645 - 070

EHS

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	✓
Head-tilt, chin-lift	✗
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✗
Pulse check	✗
Chest compressions	✗
Head-tilt, chin-lift	✗
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✗

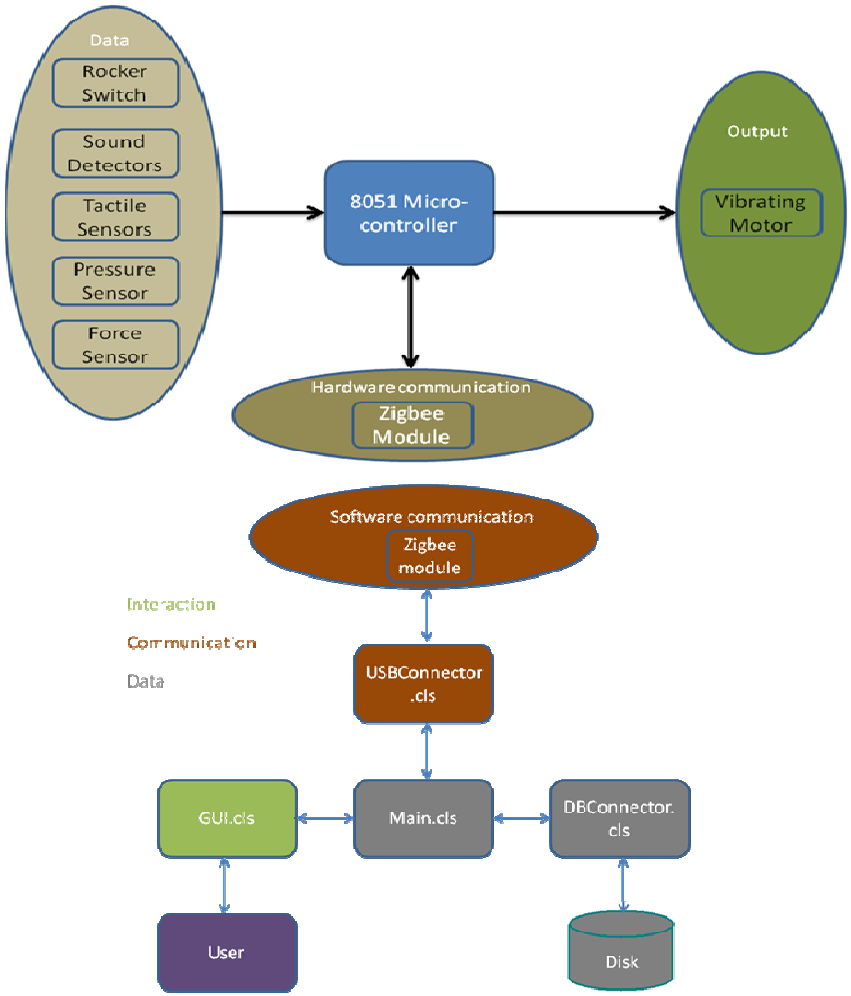
Second cycle

Head-tilt, chin-lift	✗
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✗
Chest compressions	✗
Head-tilt, chin-lift	✓
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✓

Third cycle

Head-tilt, chin-lift	✗
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✗
Chest compressions	✗
Head-tilt, chin-lift	✓
Nose pinch	✗
First rescue breath	✓
Second rescue breath	✓

System Design



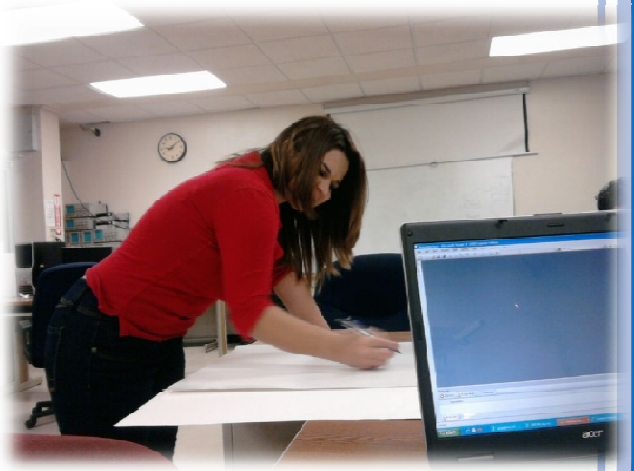
HARDWARE

- **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

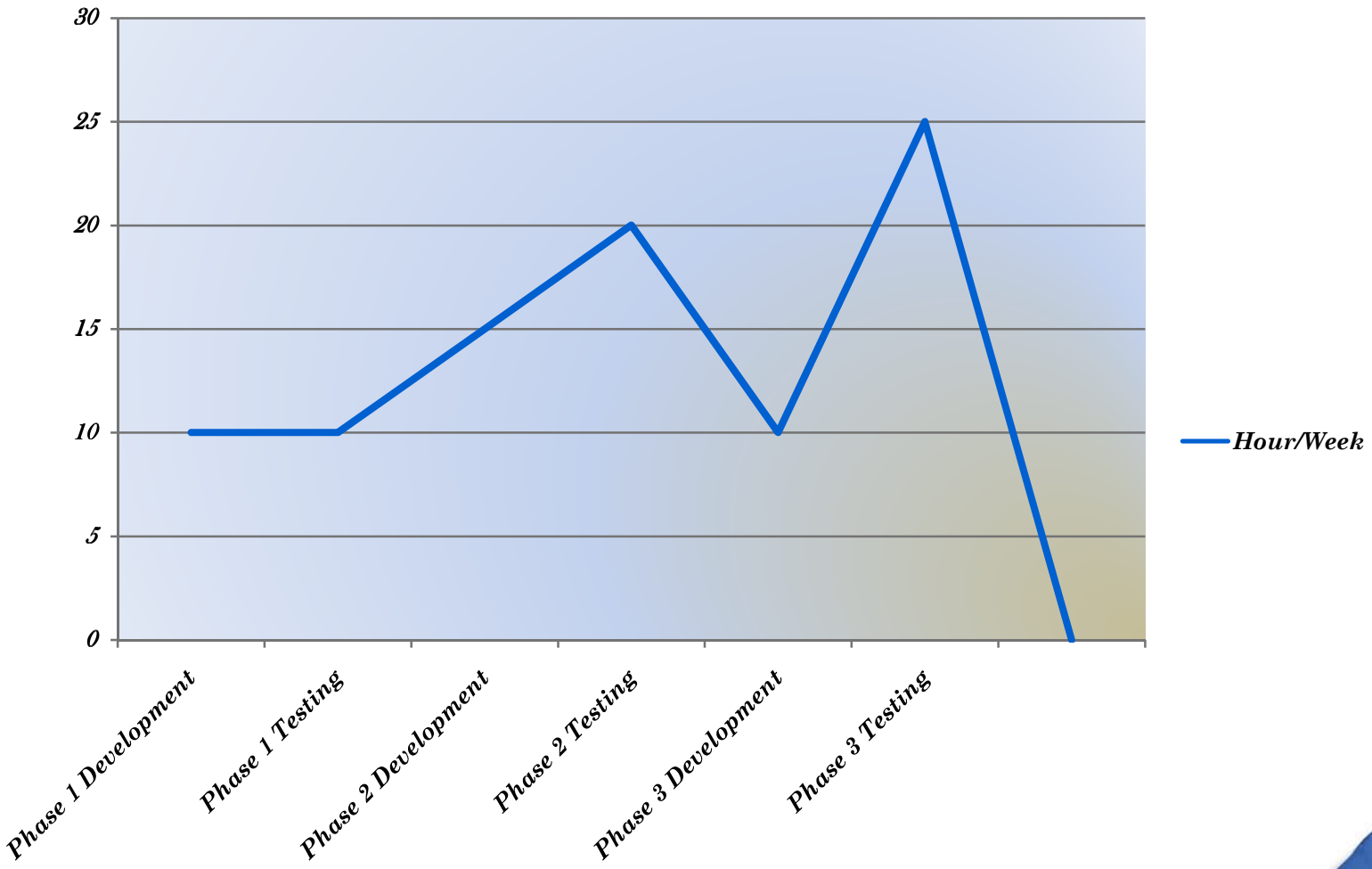
- Microcontroller
  - C language
  - Sensor polling.
- GUI
  - Developed in C#
  - Using Visual Studio 2008 express edition.
- Database
  - Server
  - MySQL support.

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
- Professor Nayda Santiago, Manuel Rodriguez, and Fernando Vega
- Silicon labs (donation)
- María Pena
- TA's of Capstone course
- José Rodriguez (Dices)
- Pablo Rebollo
- José Bermejo
- Our families & friends ☺

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