

**University of Nevada Las Vegas**

**Department of Electrical and Computer Engineering**

**EE498 Senior Design**

Spring 2020

**Project Title**

Final Project Report

**Insert project photo here inside of this box**

**Group Members:**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Name (Print) |  | CPE/EE/ME |  |
|  |  |  |  |
| Name (Print) |  | CPE/EE/ME |  |

Instructor: Dr. Grzegorz Chmaj

Faculty advisor:

**Table of contents**

All sections and numbered paragraphs must be listed here along with page numbers

**Abstract**

Write few sentences about your project (100-300 words).

Instruction on how to write an abstract: <https://faculty.unlv.edu/chmaj/forstudents#abstract>

**Introduction & background**

* Introduce the reader to the area in which your project is.
* Describe what your project is doing. Include some layman’s terms styled pictures, schematics, diagrams.
* Describe how your product can be used by the user, when, why.
* Give the examples of devices that perform similar/same functions
* Describe the specific aspects of your device, and how is it different/better than other solutions. Do this in layman-terms styled description, try to advertise your product here.
* not less than 1 page

Deep learning and neural networks

Facenet and other alternatives (VGG, OpenFace, etc.)

Google Nest, Amazon Ring, LG Smart door, and more research

FR to open door, key generator, detect force with accelerometer

*Socket programming, app*

KEEP SIMPLE HERE

Layout of the paragraph

1. Small introduction of our product
2. Comparing other products
3. CNN and deep learning
4. FR to open door, key generator, detect force with accelerometer
5. Etc.

**Current Market Solutions**

* Describe the market: is the device popular, consumer, specialized, seen only in the industry etc. Find out how many is sold each year, etc.
* Table containing the comparison of parameters, functions, prices – is very welcome.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Vendor** | **Param 1** | **Param 2** | **Function 1** | **Function 2** | **Price** | **Comment** |
| **Device 1** | V1 | 30 | 32 |  |  |  | Easy to buy |
| **Device 2** | V2 | 25 | 26 |  |  |  | Needs to be ordered and manufactured by vendor |
| **Your dev.** | You | 53 | 80 |  |  |  |  |

Table 1. Comparison of available devices

In the table, indicate the best parameter value for each device. (e.g. for Param 1, the row corresponding to Device 2 is highlighted, as it has the best value of Param 1 among all listed devices).

* Include table that contains the pros and cons of each device listed in Table 1. The table below contains the examples – insert your own there. But leave 'Strengths' and 'Weaknesses'.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Resolution** | **Battery life** | **Price** | **…** | **Strengths** | **Weaknesses** |
| **Device 1** | High | Long | Very high |  | * High resolution * Long battery life | * High price |
| **Device 2** | Low | Long | Affordable |  | * Long battery life * Affordable price | * Low resolution |
| **Your dev.** | High | Medium | Low |  | * High resolution * Low price | * Medium battery life |

Table 2. Strengths and weaknesses of available devices

**Research results**

Describe the research work you have done for your project, exclude the market research that is provided above. Research results could contain, for example, parameter testing, why the camera you wanted to use was bad, why you had to use that specific microcontroller or why the power supply that you wanted to use was not suitable.

**Specification of the project**

**Functionality & conceptual design:**

* Use diagrams and descriptions to describe **how** the device is working and **what** it is actually doing (use flow/case diagrams)
* Include use-cases:
  + You have actor1 doing action A, the system responds with the response A'
  + You have actor2 doing action B, the system responds with the response B'
  + (example) actor=user walks into the kitchen and says "coffee". System starts the coffee-maker and pours the coffee in the mug.
* Block diagrams must be here
* Modular description must be here

**Architecture:**

* Focus on architecture details in this section: describe each object and all signals
* Start with architecture overview. Provide high-level diagram, describe each component briefly, including: input(s), operation, output(s)
* Start the paragraph for each component, describe it and then expand the component into lower level, providing the diagram for that too. Repeat expand until you reach desired details level.
* Conclude with the diagram containing all the objects expressed at low level.
* All architecture details should be described in this subsection: objects, their inputs/outputs, relation to other objects.

**Design**

* Focus on the technical details in this section. Include all schematics, drawings, pictures etc. Each object mentioned in 'Architecture' should be explained here with:
  + The implementation of the object: electrical, programming, mechanical
  + Signals coming in: what type of signal, protocol used (if any), interfaces, electrical parameters etc.
  + How the object is implemented in details:
    - If you have the schematics, provide it here
    - If you have the algorithm that you will use as object implementation – provide it here
* If possible, provide schematics (or other implementation) for both high and low level objects.
* If you have PCB design, include it in this section along with the corresponding schematic.

**Simulation**

Include any simulation results that you did so far for this project (if applicable)

**Testing**

Provide the description of how to test your device, when it will be finished

* Inputs / actions to the device
* Expected outputs or reaction of the device

If you did any tests (either tests of prototype, or just some component) – include test procedure and results in this section.

**User's manual**

Write the user's manual for the end customer: how to setup, use, how to connect, etc.

**Roles & skills in the project**

Provide all the roles with skills, required in the project. Relate each role with the objects present in *Architecture* section. Each object from *Architecture* section must be listed in this table.

|  |  |  |
| --- | --- | --- |
|  | **Objects involved** | **Required skills** |
| **Role 1** |  |  |
| **Role 2** |  |  |
| **Microcontroller programmer** | * Camera image analyzer | * Knowledge of ATMEGA168 microcontroller * C++ programming * AVR Studio experience |
| **Image processing specialist** | * Camera image analyzer | * Knowledge of image processing algorithms |
| **CAD designer** | * Device case | * CAD skills sufficient to design the device case |

Table 3. Roles & skills

List all the roles mentioned in Table 3 and assign names of team member to each role:

|  |  |
| --- | --- |
|  | **Assignment** |
| **Role 1** | Name |
| **Role 2** | Name |
| **Microcontroller programmer** | John Smith |
| **Image processing specialist** | Walter White |
| **CAD designer** | Kate Brown |

Table 4. Roles assignment

**Parts list**

Include datasheets as attachments if you have them (Att. id is the attachment id – for example: “1” means “Attachment 1”. Collect all the attachments as PDF files. Merge all the attachments to the final report, so they are at the end of document in the numbered order.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Parameters** | **Picture** | **Att. id** |
| **Part 1** | Par1, par2, par3… |  |  |
| **Part 2** | Par1, par2, par3… |  |  |
| **Microcontroller** | ATMEGA168 (attachment 1) | http://www.mattairtech.com/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/d/i/dip28.jpg |  |
| **…** | … |  |  |
| **…** | … |  |  |

Table 5. List of required parts

**Project timeline**

Include general past project timeline – what happened when

* Add any interesting information
* Add the delays if solving the problems causing delays was interesting

**Final remarks**

Include anything related to the project that you want to add/mention.

**References**

Include all the documents that you cited / referred to in the whole document

[1] B. Marshall, The study of surveillance cameras,

**Marketing flyer**

Prepare the marketing flyer – at least 2 pages (so it could be printed both-sides). Include buzzwords, key functions, large, good quality and good looking pictures. Use only layman’s words in this section. Start marketing flyer at the top of new page. This flyer can be later used during the Senior Design competition day – you would just have to print it.

**Consider this template as a guideline, not as a form that you fill. Each of elements above must be included (if applicable), but I encourage you to extend this with anything that you consider worth to place in this report. Don't send the report with just tables filled and few sentences of description. This report needs to be a comprehensive description of what you have done during the semester and as complete as possible manufacturing/technical manual describing your device.**

Include all the information that you submitted in progress reports or any previously submitted documents.

Combine all the documents (diagrams, attachments etc) into one single PDF file.

The final report is the maximum comprehensive description of your project – include everything about it. Include all technical details.

Remember to name your file using the following syntax:

LastnameLastname-Project\_topic.docx

(Acceptable file formats: doc, docx, pdf).

**Remove all text in green.**