EEL 4914 SENIOR DESIGN I

Initial Project and Group Identification Document

Divide and Conquer

Create one or more documents which have a total page count limited to 10 pages which contain the following content:

1. Project descriptive title, group members with degree major identified, and identify any customers, sponsors or significant contributors.
    a. Project descriptive title:
        i. Smart Grill
    b. Group members:
        i. Thierry Alerte - Computer Engineering
        ii. Jonathon Graff - Electrical Engineering
        iii. Jeffrey Mueller - Electrical Engineering
        iv. Jonathan Schooley - Electrical Engineering
    c. Customers:
        i. None as of now
    d. Sponsors or significant contributors:
        i. None as of now
2. Project narrative description with a statement of motivation for the project, a discussion of the project goals and objectives,and a discussion of the function of the project. Reference any input from customers or marketing analysis of competitive products or projects that has been used to identify project features. This section usually has no “numbers”, the discussion is conceptual, but specific to the project. Use descriptions such as “light weight, portable, low cost, easy to use, high power, accurate, etc.” when identifying project goals.

A 2013 study conducted by the Hearth, Patio & Barbecue Association (HPBA) shows that 80 percent of all U.S. households own a grill or smoker. And, 97 percent of grill owners actually used their grill in the past year. About 14 million new grills were shipped in 2013 alone.

Our group decided to choose a smart grill as our Senior Design project because we realized all of the widespread applications, technology, concepts and knowledge that could potentially come from our smart grill project idea. We noticed that different technology like WiFi, Bluetooth, LCD screens, LEDs, phone apps, Power Management, Materials, data organization etc. encompassed the smart grill idea. When first forming ideas for our smart grill we looked at some of the things that seemed the most interesting and what applications were the most practical.

Competitors include: Bright Grill, Lynx, Breville, Cinder, The EDGE grill

FUNCTIONS - all the possible functions

Light weight, large grilling surface, that drains fats during the cooking process

Works over Bluetooth and WiFi and can be used both indoors and outdoors (since it is electric)

Uses things like integrated WiFi and thermostats to make the cooking process a little more modern

Voice commands for the grill OR speaker so grill can communicate with user

Automatically maintains the perfect cooking temperature

Accurate ETA and countdown timer for when dinner will be ready.

Automatically keep it at the perfect temperature for a period of time after cooking is complete

Choose the picture of food item from the gallery and match grilling specifications for your own meal with the ability to tweak these parameters to desired taste (works with vegetables as well)

Supposed to let you know when the meat reaches different stages of doneness so you can take it out at the right time

Touchscreen interface to manually change parameters instead of the phone app

CONTROL – all the different controllable features

Smart Remote Control – Including iPhone, Android phone/tablet and (SmartWatch?) integration

Recipe Library – Browse, build and share recipes

Smart Notifications – Next step in recipe ('flip') OR notifications when food is ready

Auto Temperature Adjustments – Excellent for searing and keeping warm

Energy Efficient – Smartly adjust electric use to minimize power consumption

Lightweight – Portability allows grill to be taken to any outdoor area within extension cord reach of a standard electrical outlet

Large Capacity – grill many things at a time

Indoor/Outdoor – Can be used in the kitchen or on the deck

Removable Grill Plate – For easy cleanup

Temperature Control – Control grill temp from phone

MONITORING – all things to gauge

Real-time cooking information such as grill temperature

Burner on/off status

Level of fuel in the tank/battery

Grill displays grate temperature, battery life of the LCD screen, fuel tank levels (via a Wi-Fi connection?)

3. A list of requirements specifications for the project as a whole. Please identify project constraints and related standards that you are aware of at this time. These will be developed further in subsequent documentation Use as many quantitative measures as possible. Answer the questions - how many, how often, how high, how long, what values, when events occur, etc.

Technical Features:

- burner output ~1.5 kW - ~2 kW
- rated at <=120 VAC
- ~15 A.
- Treg = low ~ 200 F
- Treg = high ~ 500 F (0 F to 500 F in 10 minutes)
- ~20 cubic inches and under 30 lbs
- Power IC - high power switching regulator (compact and in spec guidelines) -
- MCU - dev board - I2C Serial EEprom 24c01B, push buttons, indicator LEDS, Seven segment display, Infrared reception, RS232 Serial communication port, Stepp motor slot, onboard power regulator (accepts 9 - 12v AC/DC supply)
- Voice to text interface IC

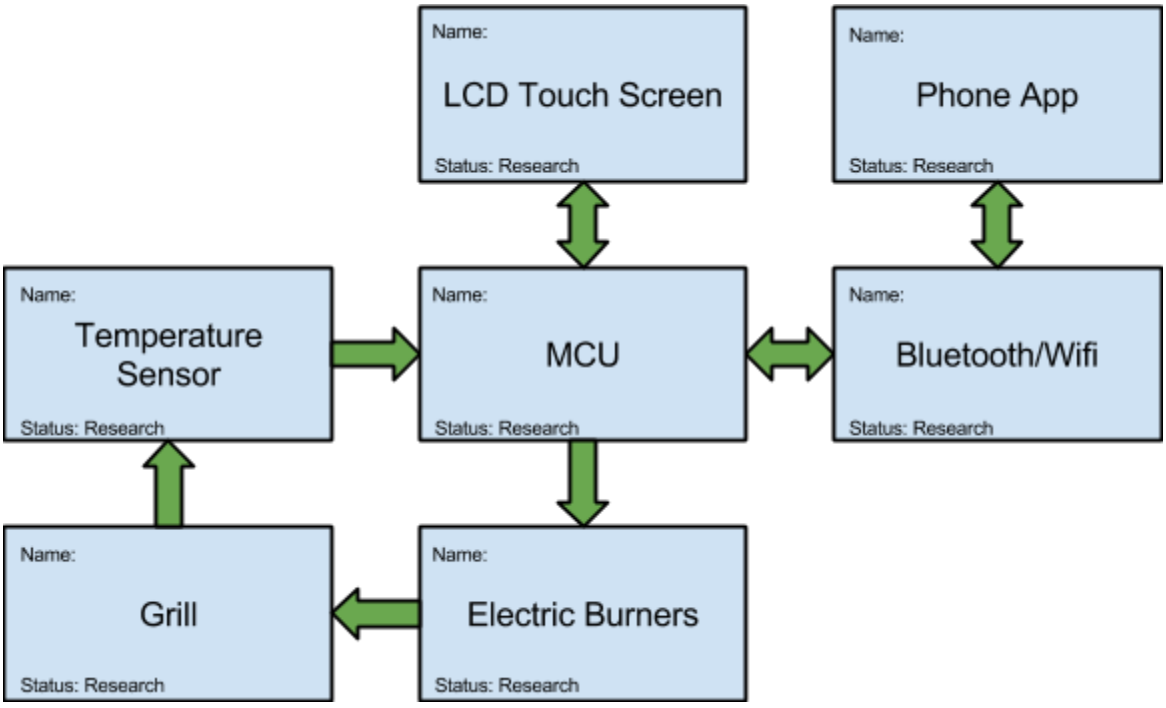
Conceptual Features:

- The smart grill should be smart enough to compensate heat with respect to time in order to keep a constant temperature. As well as a Auto 1-hour SHUTOFF and Buzzer/Reset switch.
- There will be some size LCD screen which should be blue when in STANDBY and red/orange when READY. There should be analog button/dials for durability.
- The smart grill should accept a voice command and perform certain tasks according to user application.
- The smart grill needs to be user friendly - safe, energy efficient, portable, etc

Standards:

- EN 61000-1-2: Electromagnetic compatibility (EMC). General. Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena
- EN 16001: Energy management systems; withdrawn, replaced by ISO 50001
- B70-90(2007) Standard Test Method for Change of Resistance With Temperature of Metallic Materials for Electrical Heating
- ANSI Z223.1 National Electrical Code

4. One or more project block diagrams in as much detail as possible. (see below) Include a project prototype illustration if appropriate. Sometimes a drawing will communicate more information about a specific implementation than just words. This is why patents use drawings as well as text as part of the legal description.



5. Estimated project budget and financing.

Estimated Budget: $1000.00

Financing:

Item	Quantity	Cost	Total
Grill Body	1	$50.00	$50.00
LCD Touch Screen Display	1	$150.00	$150.00
Electric Burner	2	$30.00	$60.00
Power IC	2	$5.00	$10.00
WiFi/BT IC	1	$75.00	$75.00
MCU	1	$30.00	$30.00
Buttons	2	$5.00	$10.00
Temperature Sensor	2	$30.00	$60.00
motor	1		

6. Initial project milestone for both semesters.

Process	Target Completion Date
Definition	September 15, 2015
Research	October 15, 2015
Design	December 15, 2015
Prototype	March 1, 2016
Test	May 1, 2016

7. If appropriate, include a decision matrix which lists the projects under consideration versus any parameters that will help you pick the project. These might include, but are not limited to cost, sponsorship, familiarity with the technology, educational goals, and motivation.

a. Group member administratively responsible for the block.
b. Block name, which is descriptive of its function.
c. Block status: To be acquired - meaning the block will be purchased or donated
    i. Acquired - block has been donated or purchased
    ii. Research - block design approach is being investigated
    iii. Design - block is currently being designed
    iv. Prototype - block is currently being prototyped
    v. Completed - block design is a finished prototype
d. Name each input and each output associated with each block.
e. Diagram Legend. The legend should expand all acronyms and describe all named entities in the block diagram by giving brief definitions.