Senior Design I

Initial Project and Group Identification Document: Divide and Conque

1.
Project title: Game feeder cam
Group Number: 11
Group Members: Richard Kelly (EE), Joseph Rosario (EE), Daniel Guzman CE), Anthony Crosby (CE)
Customers: Hunters, outdoors enthusiasts
Sponsors: None Yet

2. Project overview and motivation

The motivation for this project was having the experience with what is on the market already and the desire to incorporate the list of improvements that came to mind while waiting in the stand.
The objective is to create a product that integrates a wild game feeder and wild game camera together. The use a of game feeder and camera is to scout an area in the off season for game activity with the use of feed and a camera to document activity. Some states allow the use of feed during the actual hunt with requirements to how long the feeder is placed prior to the season will other states restrict the use of feed during the season, either way a hunter will use this feeder a camera to maximize efforts in locating game for the season. A driving factor for this system proposed is the average hunter now will buy a game feeder, game camera, portable SD card viewer as well as the batteries and SD card for the equipment. The batteries usually consist of one 6 volt battery for the feeder and 6 to 9 C batteries. Also the typical feeders setting are adjustable through external controls, which although encased to be water proof are accessible to program. This need for accessibility causes the water proofing to be insufficient at times causing damage to internal components over time. Now considering most property used for hunting requires a drive to get to as well as a hike once in the wooded area, a compact system with fewer components to remember would greatly help. Also most hunters who go long distances to hunt want to have a feeder of a higher capacity to reduce the amount of trips to refill, but what is the use if the power system for the feeder or the camera do not last the duration of the amount of feed stocked. The goal is to design a standalone system that combines the key features of the currently available separate systems on the market. The features that could be added to this product to make it stand out is app based programming for the feeder motor and camera system. Another feature would be a rechargeable battery system that would reduce the need for multiple size batteries as well as cost of batteries.The systems rechargeable battery could have a separate container and plug into the main electronics container allowing the system to be sealed better. The apps functions would be to open the feeder door and turn on the feeder motor at two prescribed time each day It would also control the duration the door and motor will turn as well as the revolutions per minute the motor will turn. The app will also set the sensitivity of the motion detectors, the time lapse between the

pictures and would enable the user to view the pictures taken. To best design this system there should be a separate controller for the feeder system as well as the camera system. This will allow easier troubleshooting and parts replacement. The app controls would make access to the main electronics unnecessary, also allowing the main components to be better sealed reducing the risk of water damage.

3. <u>Requirement Specifications</u>

Project Constraints: The amount of energy gathered from the solar panels. Not having enough memory storage for statistics and pictures. Weight and dimensions of the feed, Not having cellular signal (3G/4G), Bluetooth signal distance limitation. How high power consumption is.

Related Standards: Bluetooth, Programming Languages, Android SDK, 4G/3G, Solar Power, MathLab.

Quantitative Specs: 15 Hours of battery use for feeder without recharging (low light hours). Motor rotation speeds. Sensors sensitivity (fast reaction/slow reaction).

4. Prototype Illustrations and Description:

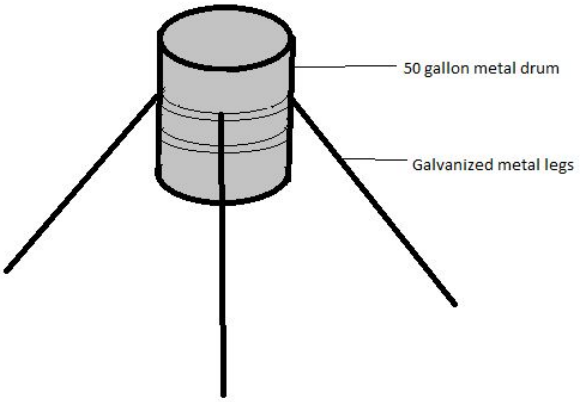


Fig 1

The design will be based upon the basic fifty gallon drum with three welded on brackets that will hold legs made of galvanized steel to keep the electrical components off of the ground and out of reach from hungry animals as seen in fig 1. The 3 legs will be galvanized metal to prevent rust and the 50 gallon drum and brackets will be painted to prevent rust.

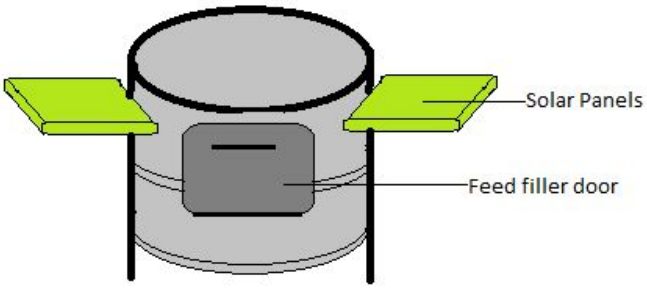


Fig 2

There will be a solar charging system on the feeder which should be best mounted on the sides of the drum as seen in fig 2. This would require the use of a rechargeable battery for the project.

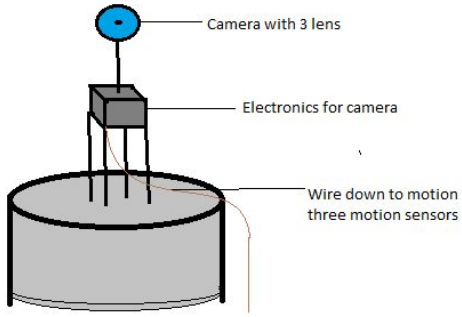


Fig 3

The camera system will be mounted on the top of the drum along as seen in fig 3. The motion detectors would be arranged in multiple directions and code written to control the direction of the camera based upon the area the motion was detected. The motion detectors will be mounted on the bottom of the feeder as seen in fig 4a. The app would be the source to view the pictures on the game camera.

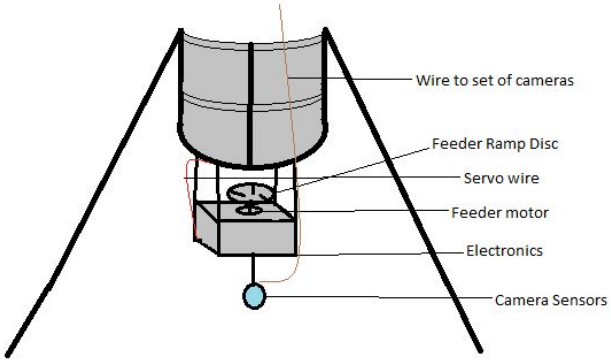


Fig 4a

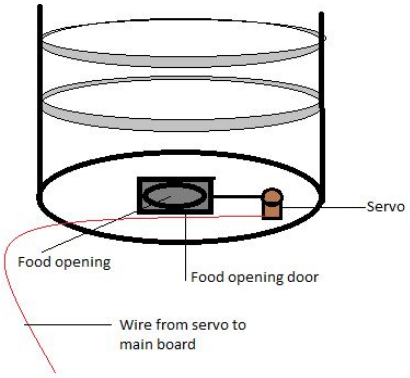


Fig 4b

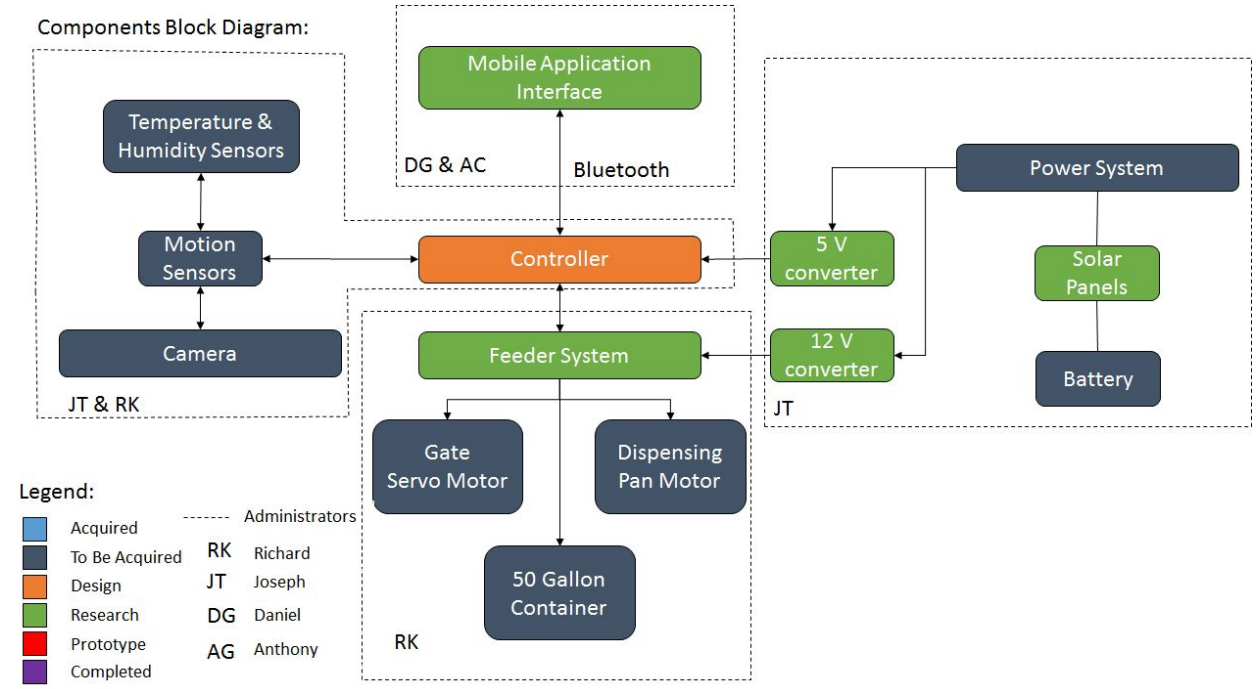
The actual feeder component shown in fig 4a and fig 4b has a servo and feeder motor both controlled through an app. The servo is attached to a door covering a cut out opening in the fifty gallon drum. The door will be constructed of aluminum which is lightweight and will allow a smaller servo requiring less power to run. At the feeding time programmed the motor turns at the selected revolutions per minute and the servo will open the door allowing the feed to drop from the drum onto an aluminum disc with fins which is mounted to the motor. The speed of the motor determines the distance the feed is thrown outward from the feeder by centrifugal force.

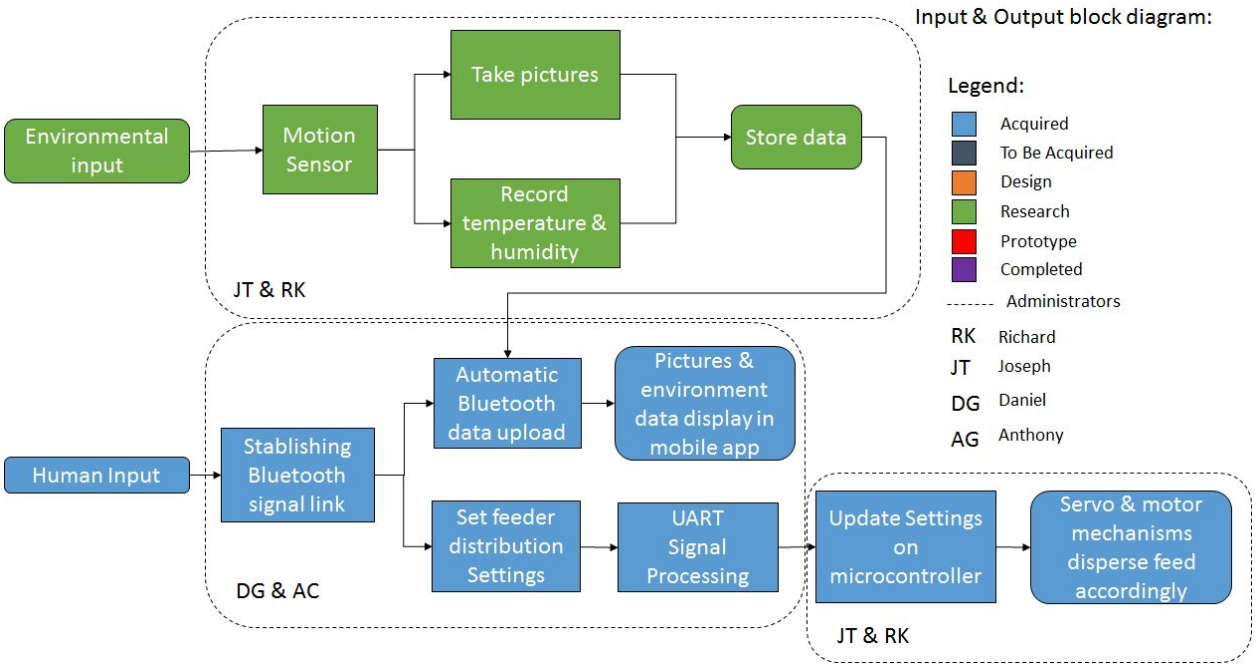
Labor Distribution:

Electric component design:
Joseph Torres-Rosario – Solar power system
Richard Kelly – Motor system
Joseph Torres-Rosario & Richard Kelly – PCB board design

Android phone Software design:
Daniel Guzman - User interface
Anthony Crosby – Hardware/software linking

Block Diagrams:





5. Budget:

Item	Cost
50 Gallon Container	$100
360º Camera	$600

Servo Motor	$30
Stand/Mount	$100
Circuit boards and components	$75
Housing	$80
Programing/Design Software	$200
Motor in disk assembly	$20
Solar panel power system	$80
Battery	$20
Motion sensors	$75

According to our rough estimates of the necessary components the total price for the design will come out to roughly $1380.00. Our ideal financing strategy would be to find a sponsor that would pay for the project expenses. However if that is not possible it would also be possible to cover the expenses with a combination of paying out of pocket or by receiving donations through networking.

6. Milestones:

Semester 1:

- Learning and understanding how to program with the Android SDK
- Learning Bluetooth communication between app-servo-board
- Research on Solar energy power system
- Designing android phone application
- Gather all Hardware and Software components

Semester 2:

- Building feeder mechanism
- Finalize Android Application Development
- Establish Bluetooth or Cellular communications with the servo motor.
- Successful integration of all hardware components into feeder design
- Successful integration of mobile application.

7. Project Decisions

Below are some project considerations that have yet to be decided.

Application Name	Requirements to Build	Cost
Dispensing mechanism	Completion of dispensing motor mechanism (6V brushed motor)	$12
Dispensing mechanism	Completion of dispensing motor mechanism (12V brushed motor)	$20
Dispensing mechanism	Completion of dispensing motor mechanism (6V brushless motor)	$30
Dispensing mechanism	Completion of dispensing motor mechanism (12V brushless motor)	$45
Feeder stand	Assembly and welding of leg attachment (galvanized steel legs)	$50
Feeder stand	Assembly and welding of leg attachment (steel legs)	$40
Power for motor mechanism	Attachment of battery to power the dispensing motor (6V)	$16
Power for motor mechanism	Attachment of battery to power the dispensing motor (12V)	$35
Barometric pressure/ Temperature sensor	Barometric pressure/ Temperature sensor board	$20