Amun-Ra Solutions

By James Heisler, Eleanor Mershon, James Blaha, and Christopher Short

Problem Description

- Skin Cancer has more diagnoses over the last three decades than all others combined
- Claims a life every hour in the United States
- Most preventable form of cancer

Melanoma

- The most advanced stage of skin cancer
- The only major form of life threatening cancer whose rate of incidence is increasing
- Damage is often sustained through childhood
- Expensive and invasive to be treated

Additional Concerns

- Cosmetic effects of sun on skin
- US cosmetic industry nets over 50 billion dollars in revenue annually
  - Skin care is the largest component netting over 23 billion annually
  - Largely, this is to reverse the damage and “age” caused by the sun

Proposed Solution

Electronic device that can:

- Measure UV radiation
- Communicate this information in user friendly manner
- Track this information over a long period of time

Proposed Solution

Portable device that is able to communicate with a software application allows the user to have access to tangible data for their risk

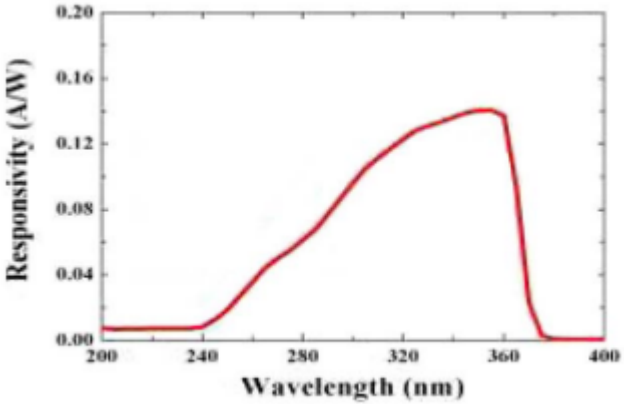
Software application can then be analyzed by user and health professionals in the future

Demonstrated Features

- Data Collection via UV Photodetector
- Data Transfer
- Andriod App
- Rechargeable Battery

Demonstrated Features

- Data Collection
  - how the photo detector samples and collects data points
  - expose the device to broad spectrum light, only records <380nm
  - Don’t have to filter/process light that isn’t harmful, decreasing required memory and processing time



Demonstrated Features

- Data Transfer
  - via Bluetooth, from device to application
  - transfer data every time the photo detector samples
    - access to information almost in real time
    - requires less on board memory

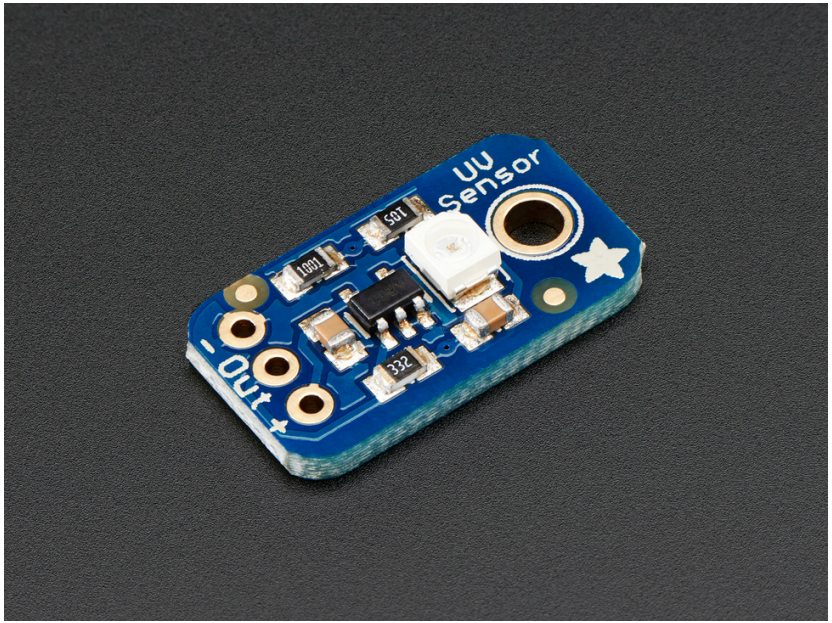
Demonstrated Features

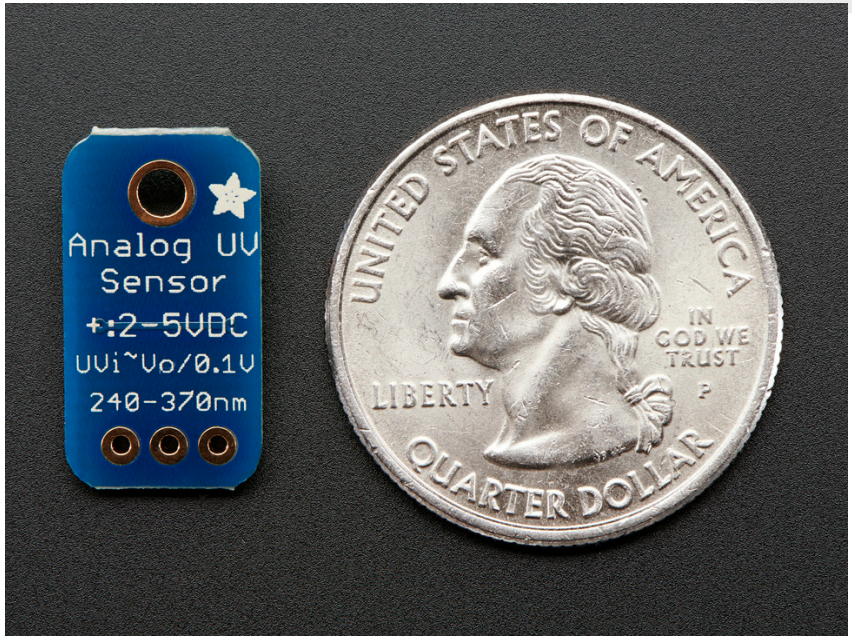
- Android Application
  - graphical and numerical
    - needs to be understandable and easy to read
  - store exposure levels over a long period of time, which can be accessed at later dates
  - supports multiple user profiles (1 photo detector device can be use by multiple people)

Demonstrated Features

- Rechargeable Battery
  - recharge using a microUSB cable
  - allows the battery itself to be smaller
  - no swapping new batteries every time they die

Available Technologies





Available Technologies

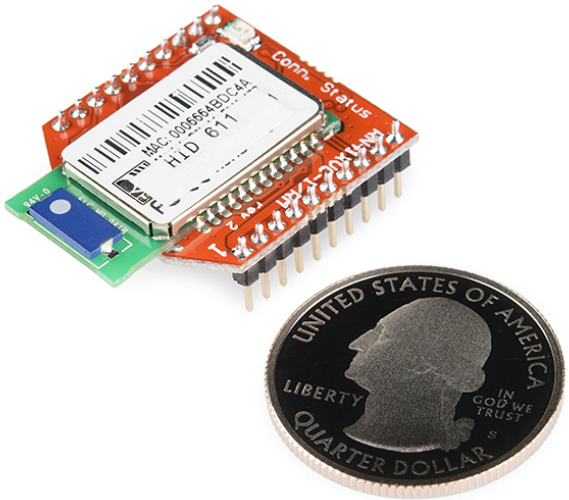
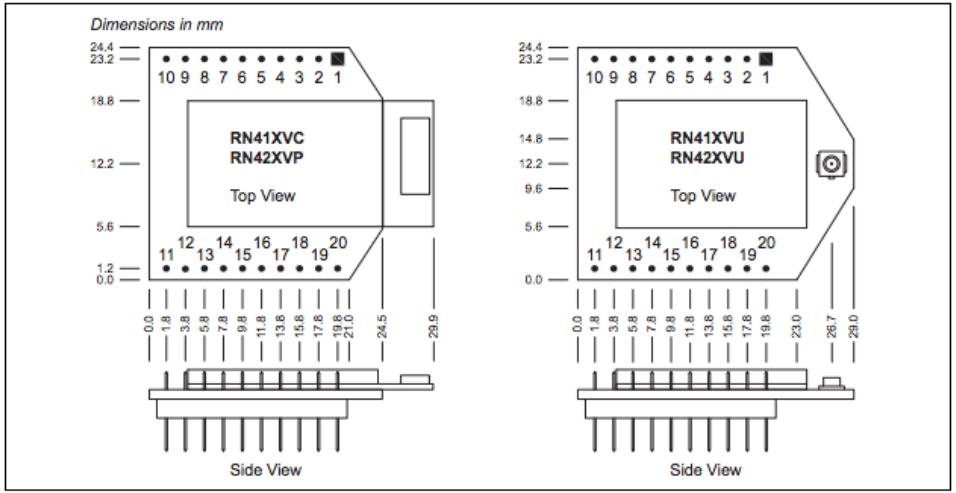
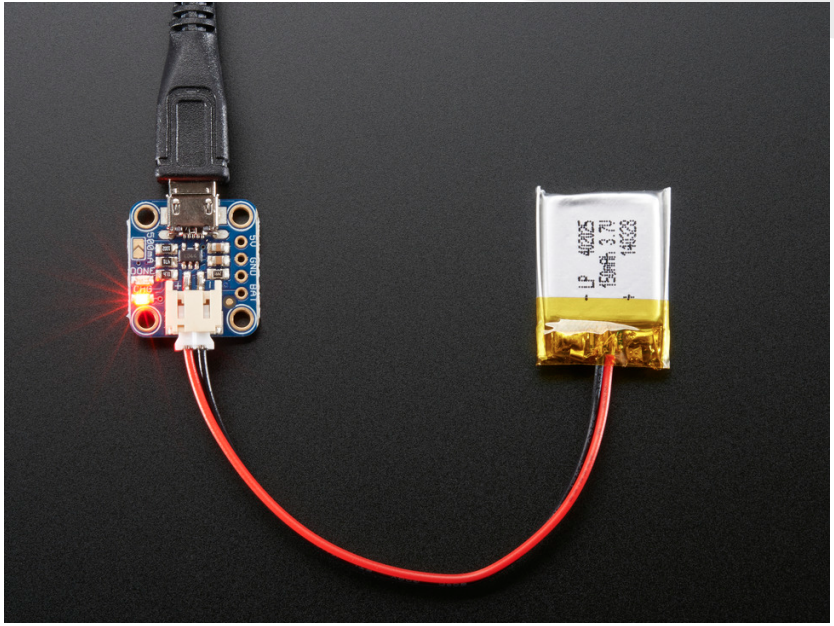


FIGURE 2-1: RN41XV & RN42XV DIMENSIONS



Available Technologies



Engineering Content

- UV Photodetection system
  - testing/ calibration
- Processing Signal
  - Generating clean output signal
  - Classification Algorithm
    - based upon calibration data
- Powering
  - adds to board design complexity

Engineering Content

- Bluetooth Communication
  - Understanding 5 protocols: LMP, H2CAP, SDP HCI, and RFCOMM
- Mobile App Development
  - JavaScript or PHP
  - User selected output using graphs and metrics
  - Data storage/recollection

http://www.youtube.com/watch?v=09BqrSAHbTc