Pycon, BLR

Python, Arduino & Connected Objects

28.09.2014

me@ankitdaf.com

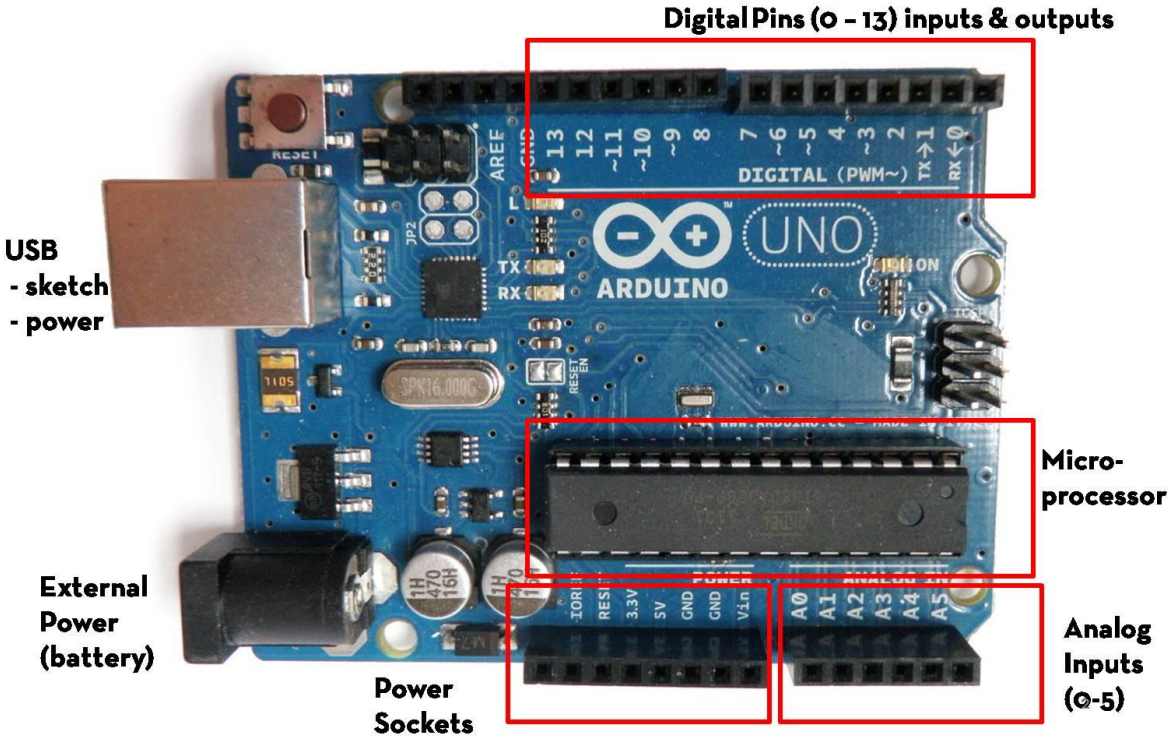
Pycon, BLR

28.09.2014

Arduino - Possibilities

me@ankitdaf.com

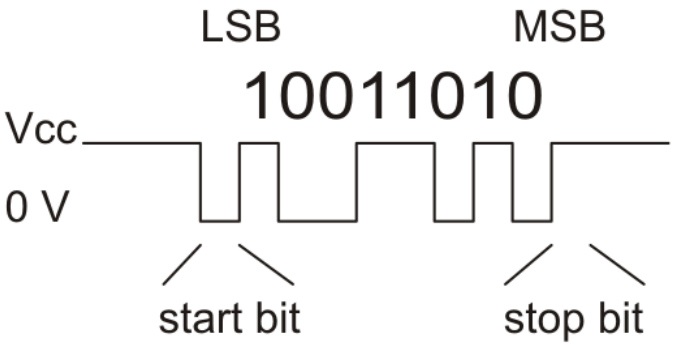
- ✓Analog
  - ✓Read
  - ✓Write
- ✓Digital
  - ✓Read
  - ✓Write
- ✓Communication
- ✓Timing / Counting



Serial Data

me@ankitdaf.com

1. UART
2. SPI
3. I2C
4. Hardware



28.09.2014

me@ankitdaf.com

1. Using Pyserial
   - Send data from computer to Arduino
   - Receive data from Arduino to computer
2. Using matplotlib
   - Plot sensor data
3. Using pyFirmata
   - Protocol for hardware control using computer interfaces

28.09.2014

me@ankitdaf.com

```
void setup() {
  Serial.begin(9600);
}
```

```
import serial
ser = serial.Serial('/dev/ttyACM2',9600)
```

```
ser.readline()
```

```
Serial.println(sensorValue);
```

```
ser.write(input())
```

```
if(Serial.available()) {
int c = Serial.read();
}
```

Pycon, BLR

Matplotlib – Plotting live data

28.09.2014

me@ankitdaf.com

```
fig = plt.figure()
ax = plt.axes(xlim=(0, 100), ylim=(0, 1023))
a0, = ax.plot([], [])
a1, = ax.plot([], [])
anim = animation.FuncAnimation(…)
```

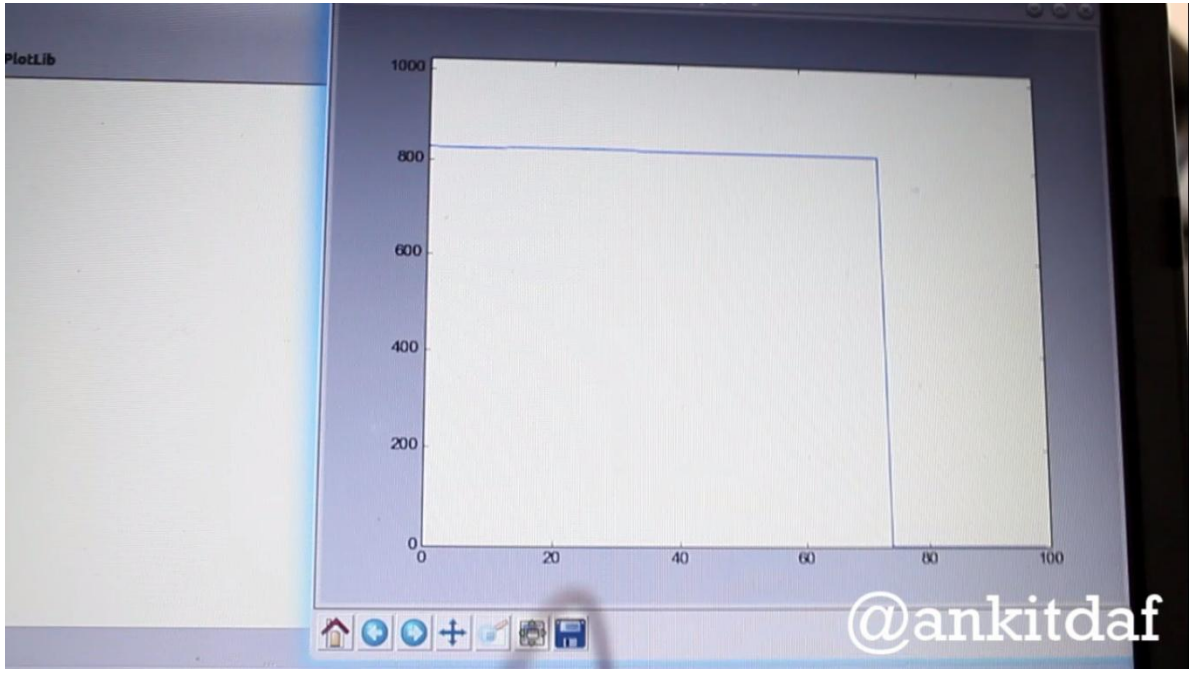
```
void loop() {
…
Serial.println(sensorValue);
}
```

Pycon, BLR

28.09.2014

Matplotlib – Demo

me@ankitdaf.com



Matplotlib – Code Walkthrough

me@ankitdaf.com

```
fig = plt.figure()
ax = plt.axes(xlim=(0, 100), ylim=(0, 1023))
a0, = ax.plot([], [])
a1, = ax.plot([], [])
anim = animation.FuncAnimation(…)
```

```
void loop() {
…
Serial.println(sensorValue);
}
```

pyfirmata – Computer interface for hardware

28.09.2014

me@ankitdaf.com

- ✓Firmata is a generic communication protocol for connecting microcontrollers to computers
- ✓It is intended to work with any host computer software
- ✓The aim is to enable people to completely control the Arduino from the computer itself
- ✓There is standard code running on Arduino, and custom code on the computer
- ✓Pyfirmata is a software package in Python for using Firmata

Pycon, BLR

pyfirmata – Code Walkthrough

28.09.2014

me@ankitdaf.com

```
from pyfirmata import Arduino,
board = Arduino('/dev/ttyACM0')

board.digital[13].write(0)

it = util.Iterator(board)
it.start()
board.analog[0].enable_reporting()
board.analog[0].read()
```

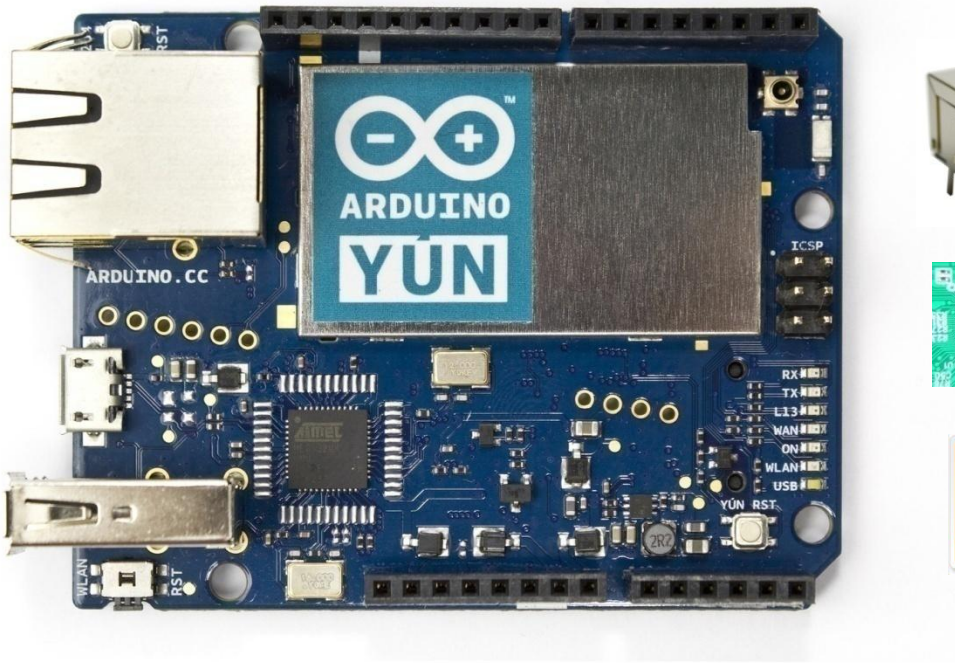
File > Examples > Firmata > StandardFirmata

Pycon, BLR

28.09.2014

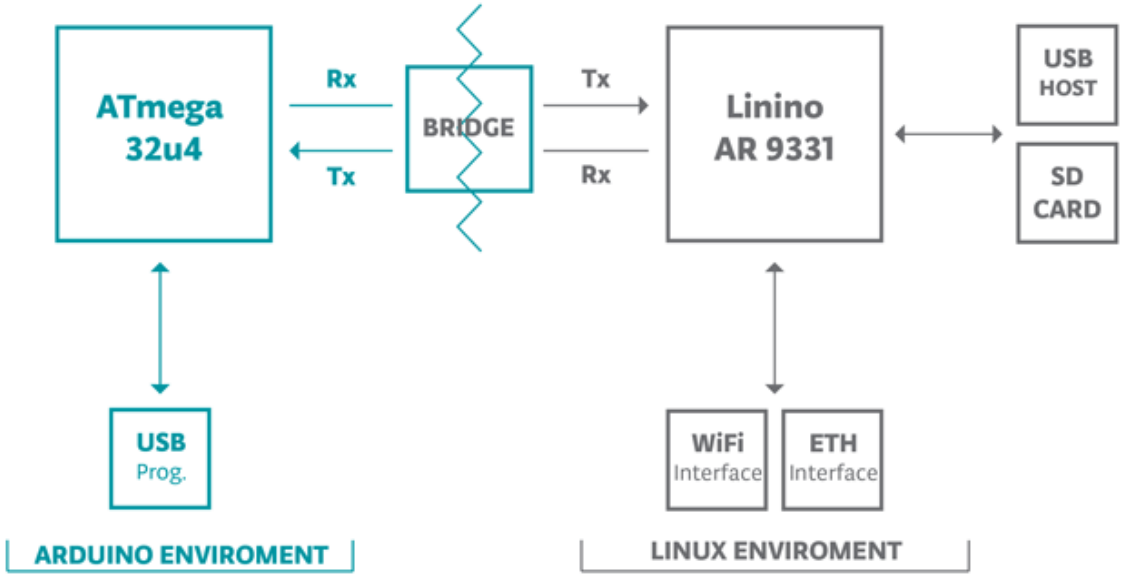
Schematic : Inside the Yun

me@ankitdaf.com



Schematic : Inside the Yun

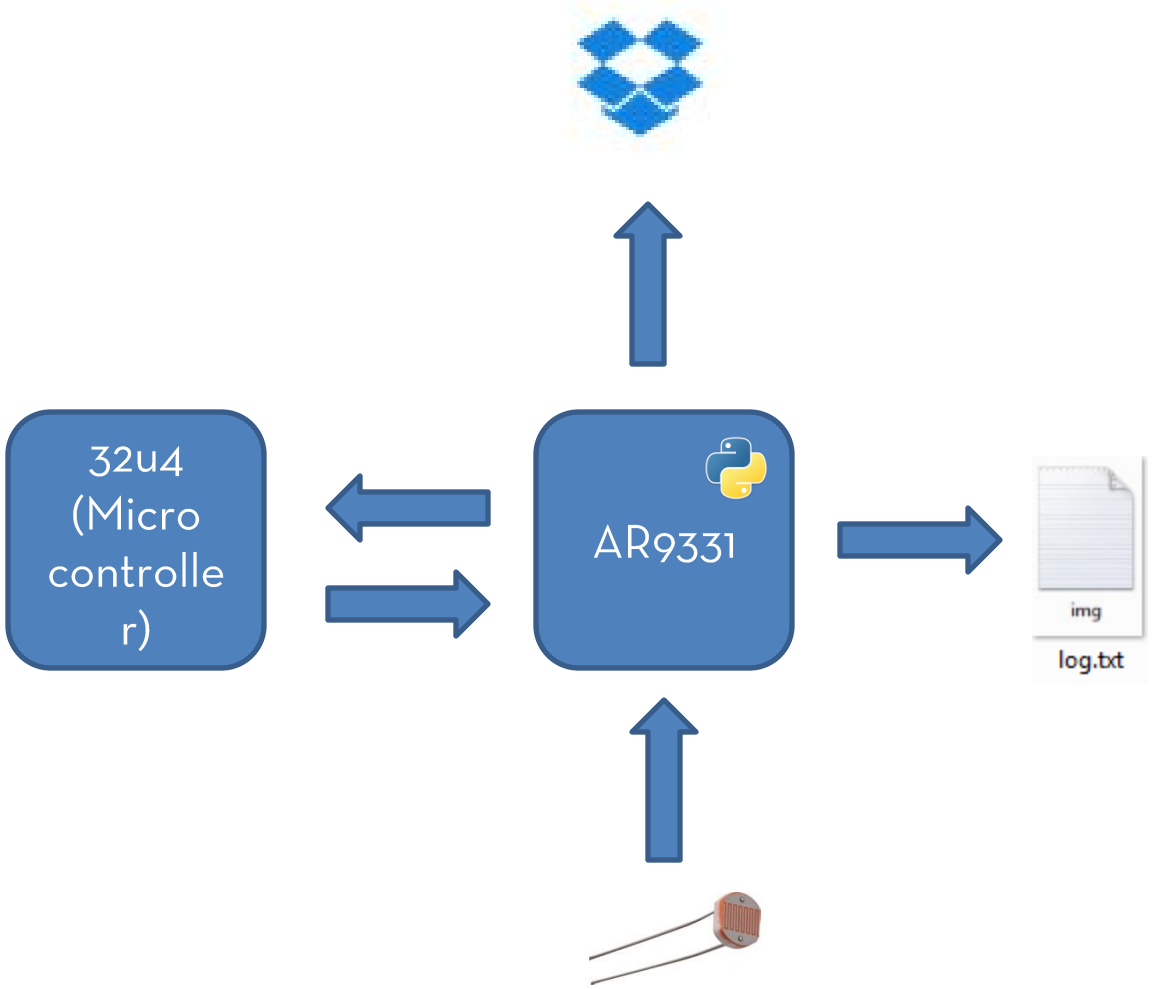
me@ankitdaf.com



Data Logger

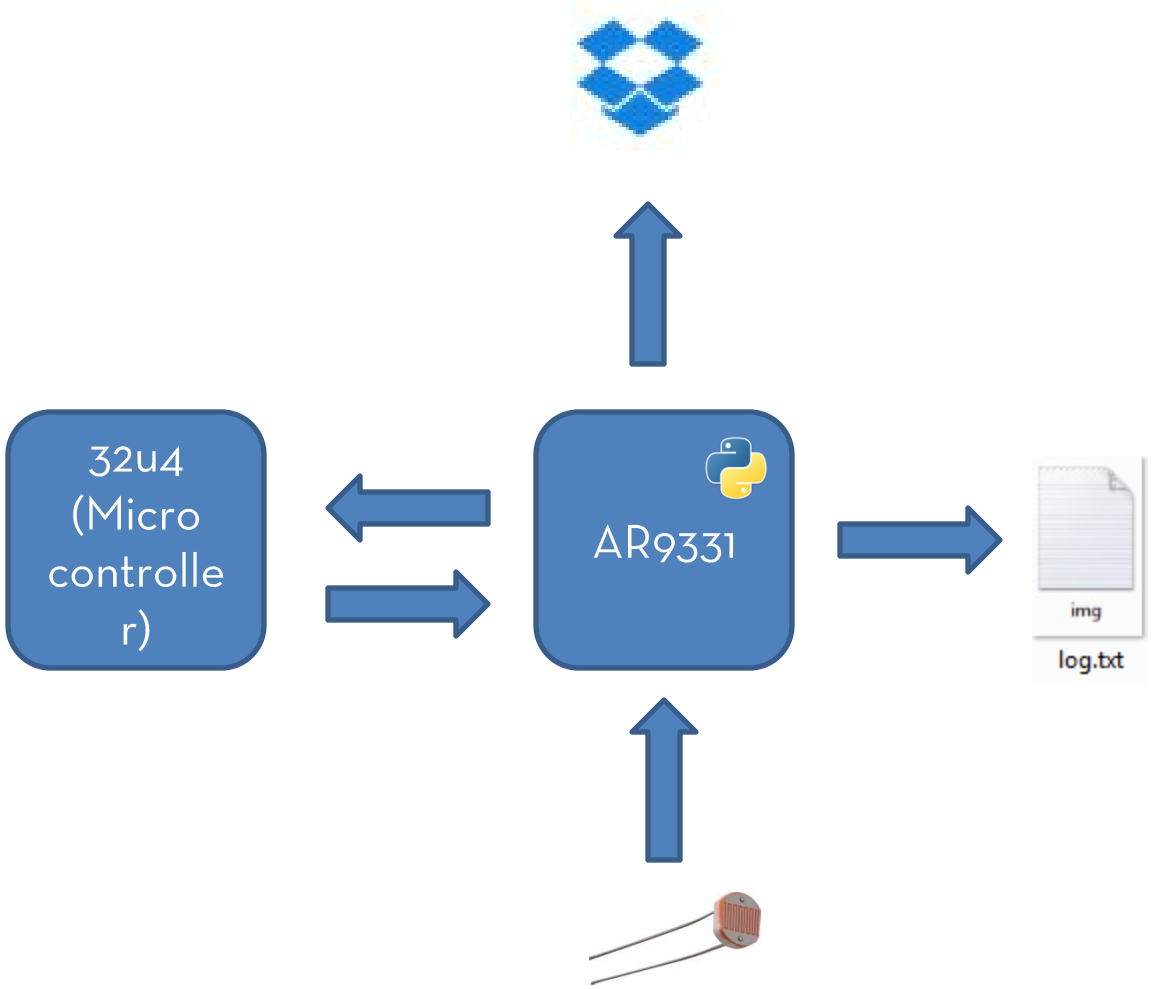
me@ankitdaf.com

- ✓Setup Dropbox API in script configuration
- ✓Plugin SD card, setup folders structure
- ✓Copy script to SD Card
- ✓Upload Arduino sketch



Data Logger : Code Walkthrough

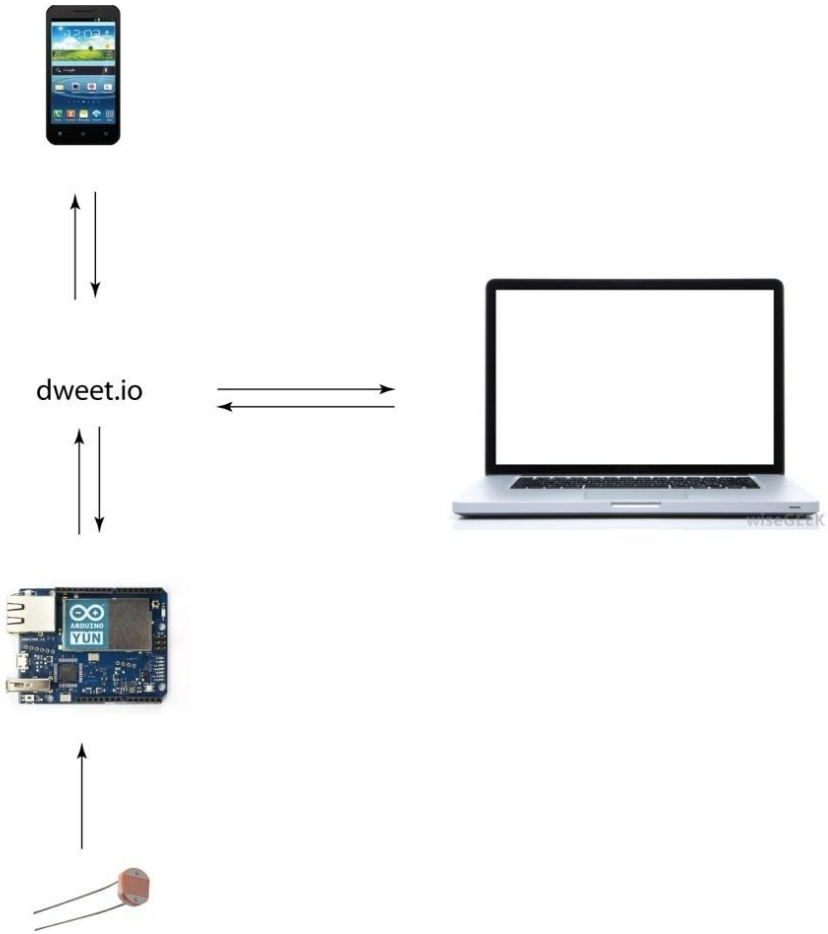
me@ankitdaf.com



28.09.2014

me@ankitdaf.com

- ✓No setup, just pick a unique string id
- ✓Make GET and POST requests to send and receive data
- ✓Data is passed as json



pydweet : Code Walkthrough

me@ankitdaf.com

https://dweet.io/dweet/for/yourownprivatefreeunsecureserver?where=pycon&when=Sunday

{"this":"succeeded","by":"dweeting","the":"dweet","with":
{"thing":"yourownprivatefreeunsecureserver",
"created":"2014-09-28T08:53:41.316Z",“
content":{"where":"pycon","when":"Sunday"}}}

pydweet : Code Walkthrough

me@ankitdaf.com

https://dweet.io/get/latest/dweet/for/
yourownprivatefreeunsecureserver

{"this":"succeeded","by":"getting","the":"dweets","with":
[{"thing":"yourownprivatefreeunsecureserver",
"created":"2014-09-28T08:53:41.316Z",
"content":{"where":"pycon","when":"Sunday"}}]}

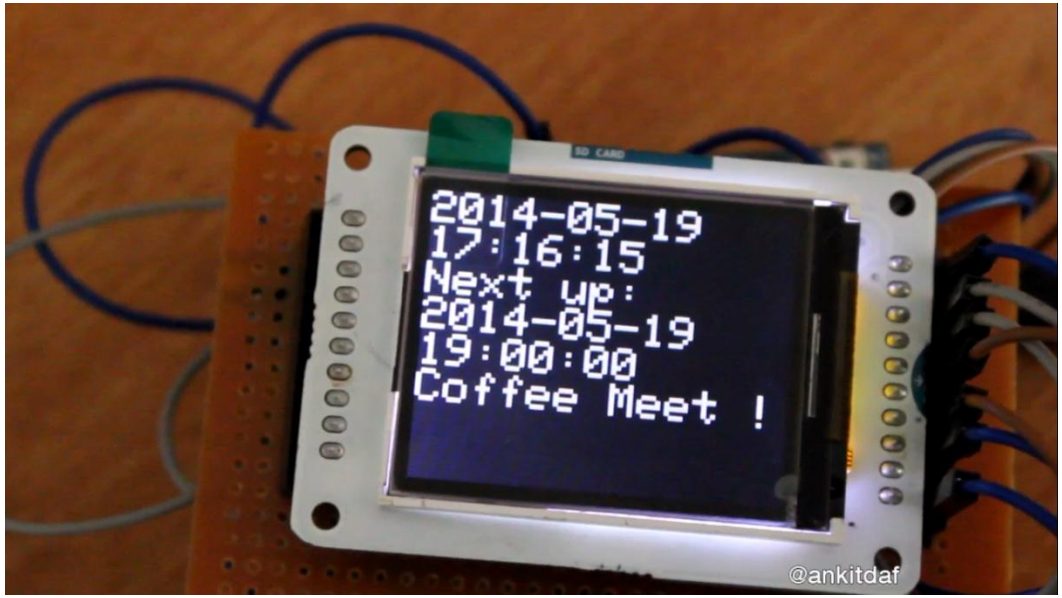
Pycon, BLR

28.09.2014

Connected Calendar

me@ankitdaf.com

- ✓Use Gmail Oauth
- ✓Fetches the selected calendar
- ✓Fetches the events
- ✓Diplay, blink,beeps

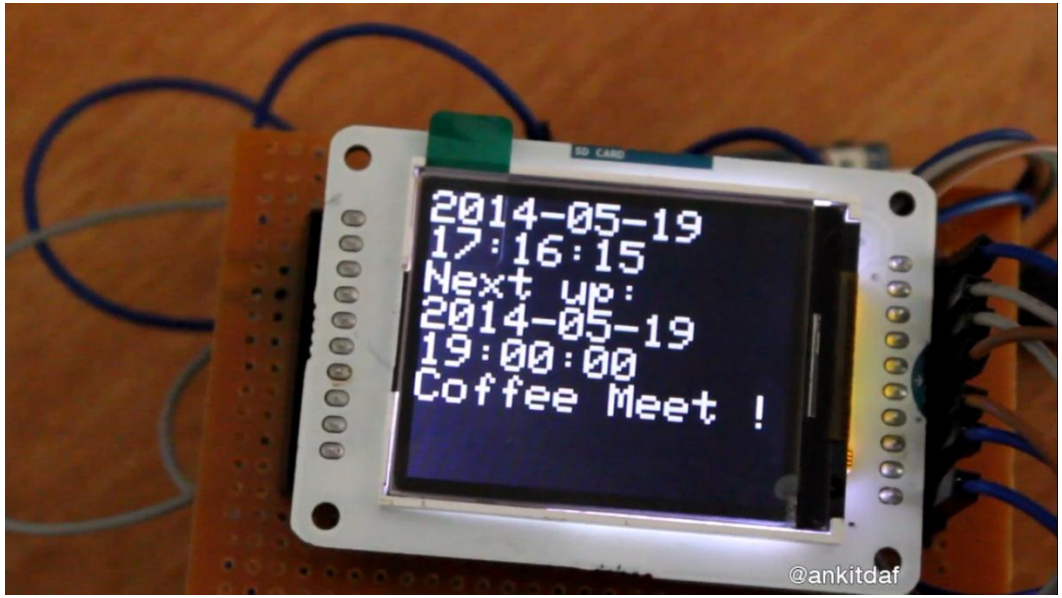


Pycon, BLR

28.09.2014

Code Walkthrough : Connected Calendar

me@ankitdaf.com



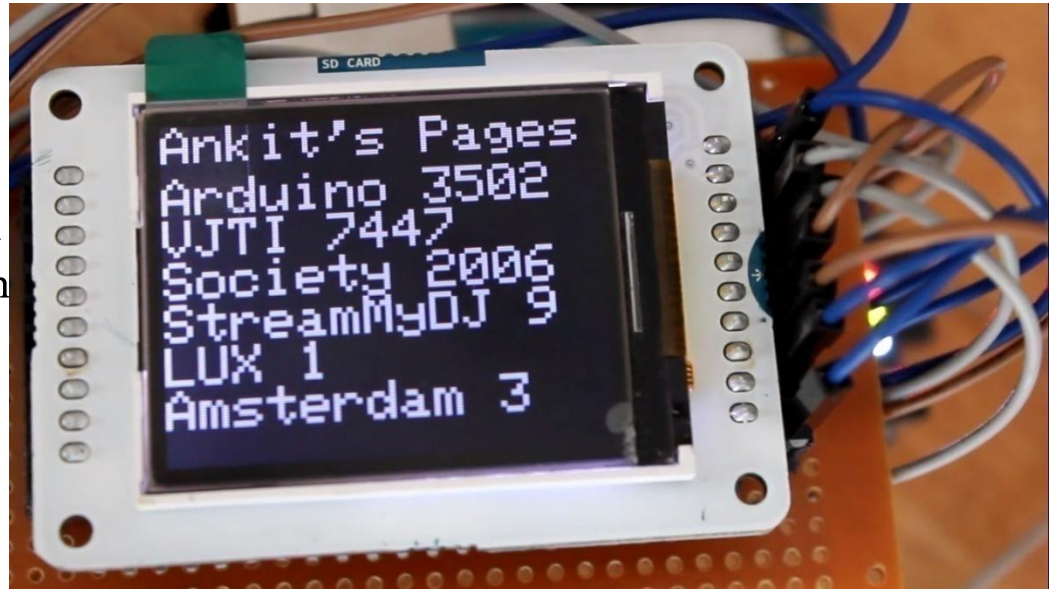
Pycon, BLR

Facebook on tiny screens

28.09.2014

me@ankitdaf.com

- ✓Use FB Python SDK
- ✓Use Graph API with "Manage Pages" perm
- ✓Call Python code from microcontroller
- ✓Process text and display on TFT



28.09.2014
me@ankitdaf.com

Link:
go.ankitdaf.com/pycon2014