Wiisel

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What is Wiisel?
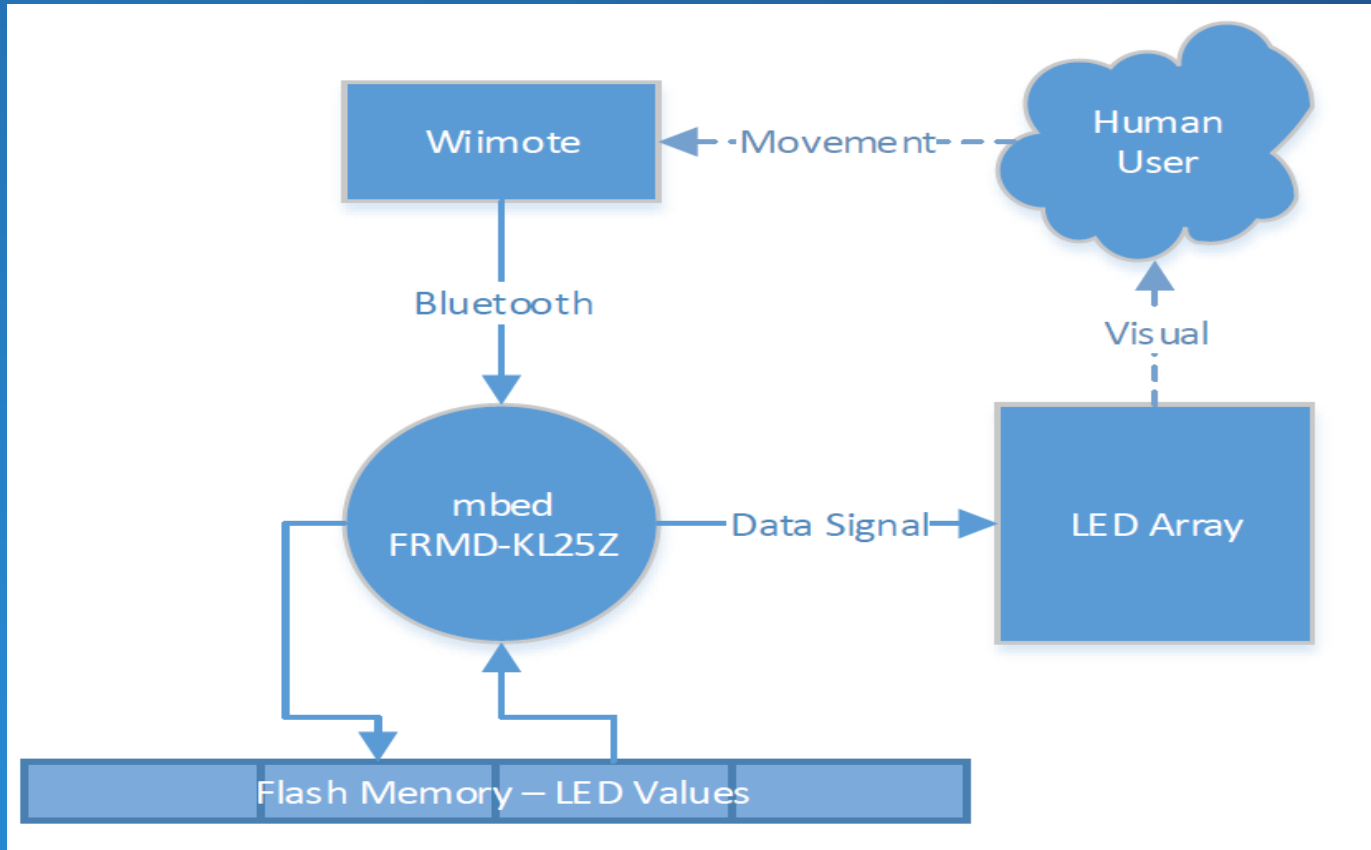
Wiisel = Wiimote + Neopixel Screen
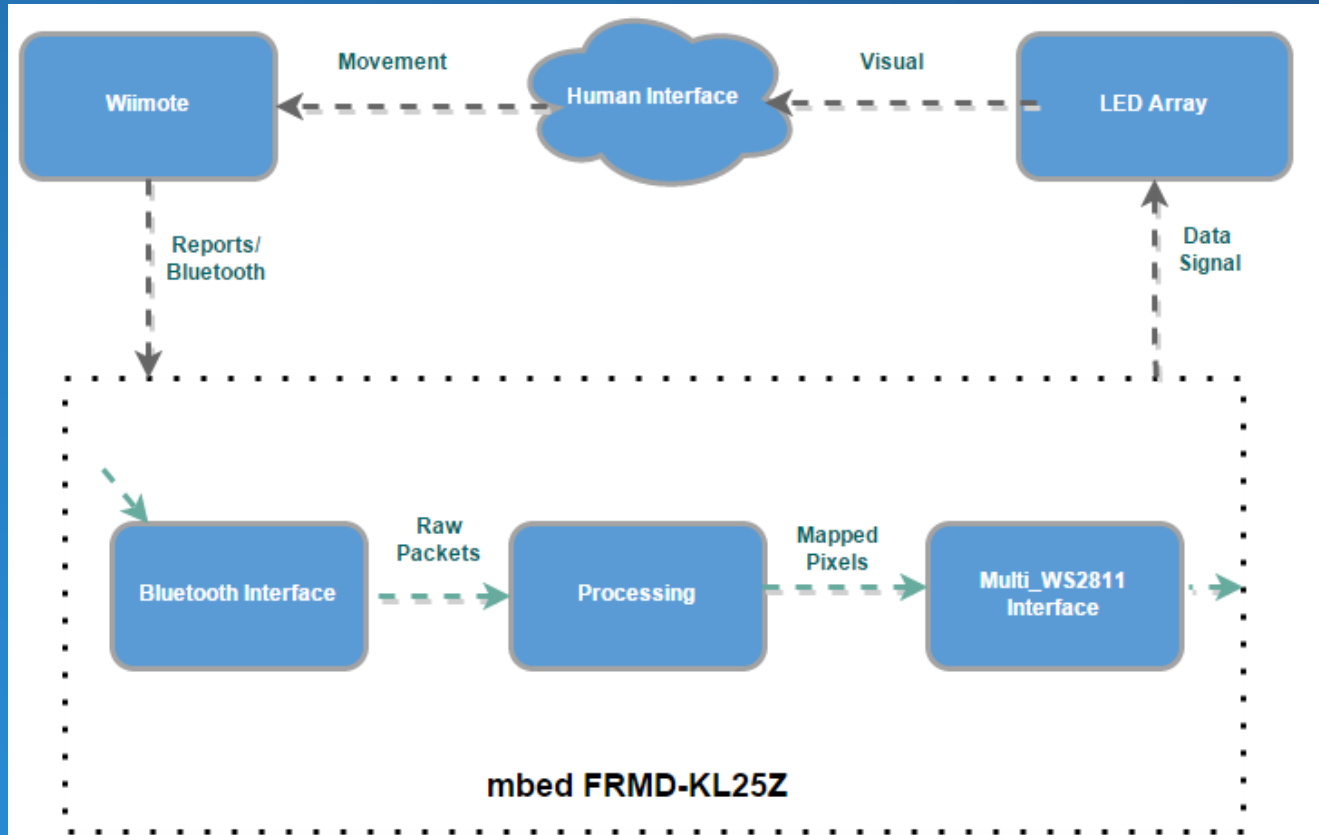
What is Wiisel?

Original Goal

- **Use a WiiMote to draw on a large screen of LEDs changing colors depending on drawing mode and sensor input.**
- **Drawing modes could include:**
  - **monotone**
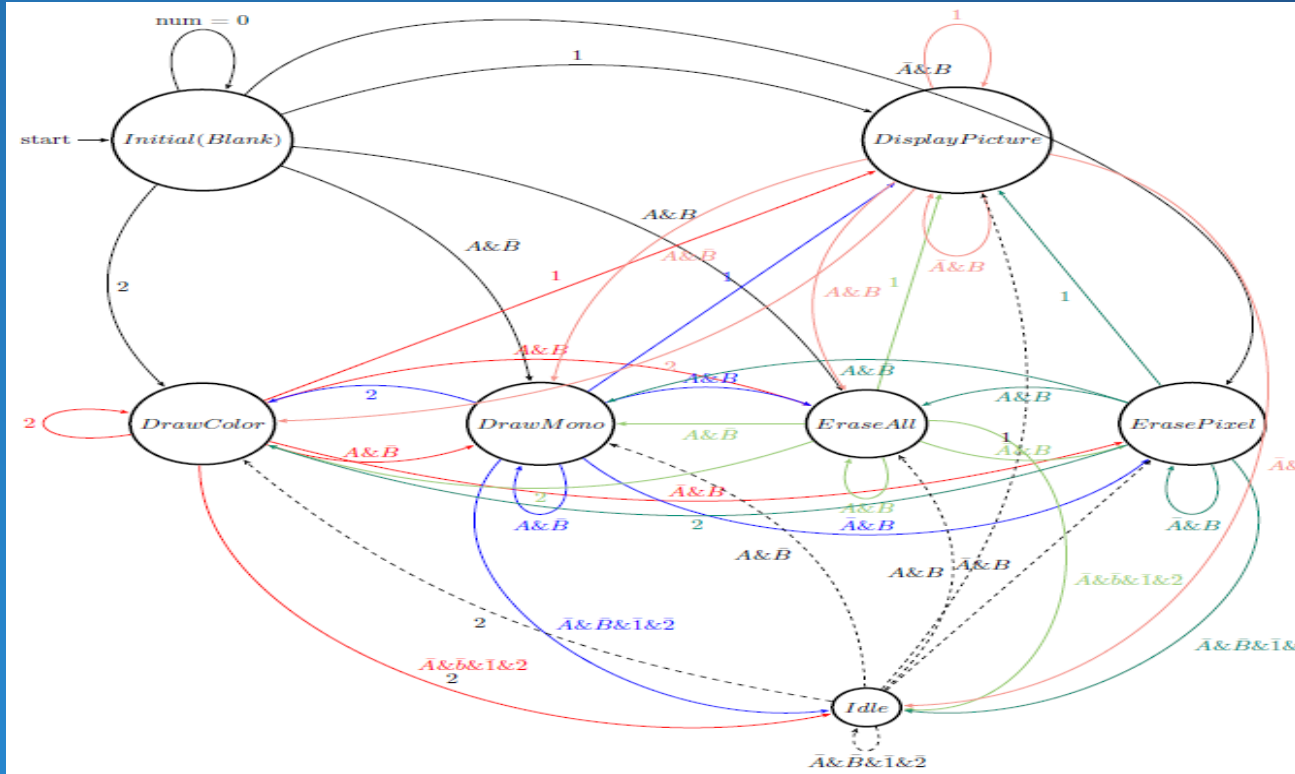 - **color based on how fast the WiiMote is moving or rotating**

Project Structure

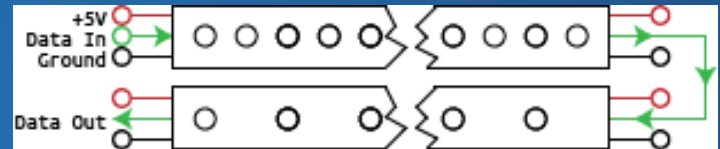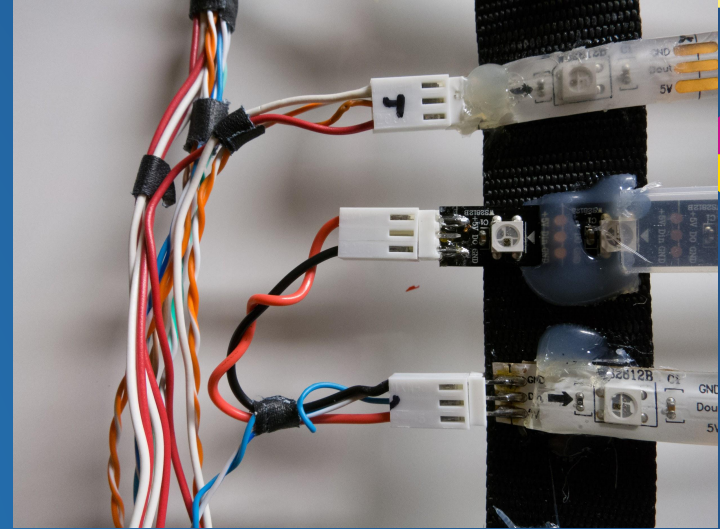# Project Structure - Details

Processing - FSM

Components

- 30 M of NeoPixels
- Freescale KL25Z board
- Wiimote
- Bluetooth 4.0 USB Dongle

Components: Screen

- 15m of 30 LED per meter
- 15m of 60 LED per meter
- Software handles mapping

Components: Screen

- Designing and Building the screen >250 hours
- Final Screen was easy to roll and carry around but needs ~10 minutes to set up.

Components: Screen

Power

- Theoretical current draw: 18 A - 54 A at 5V

- Reduced Peak usage by adjusting brightness of the LEDs in software

Red Full Brightness	93 W
Red 15% Brightness	37 W

Components: Screen

Software:
- Multi_WS2811
  - Library allowing up to 16 strings of WS2811 or WS2812 LEDs to be driven from a single board.
  - Uses the board's DMA to do full 800 KHz rate without much CPU burden.
  - By Ned Konz

Components: Screen

Library	Multi_WS2811	Modified Multi_WS2811
Percentage of RAM	98 %	59 % by moving constant array to flash and compressing colors
Number of Strips	16 Strips	16 Strips
LEDs per Strip	80 LEDs per Strip	90 LEDs per Strip

Components: Wiimote

- Mean of communication between screen and user.
- Communication between Wiimote and Mbed is done over Bluetooth using USB 4.0 Dongle.
- Roll + Pitch + Buttons of Wiimote are used as control input

Components: Wiimote

- **KL46Z - USBHost**
  - Simple USBHost library for FRDM-KL46Z (FRDM-KL25Z)
  - By Norimasa Okamoto
- **KL46Z-BTstack_example**
  - Bluetooth Stack that is built on top of KL46Z-USBHost
  - Supports L2Cap protocol which is needed for Wiimote
  - By Norimasa Okamoto

What did we accomplish?

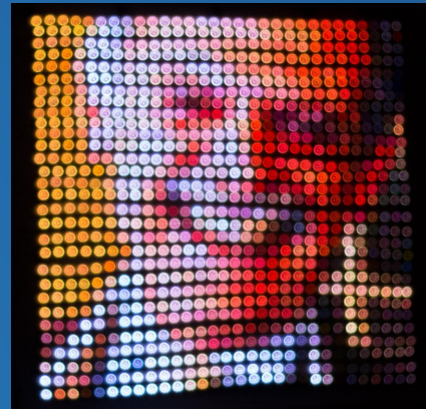- [Video1](#)
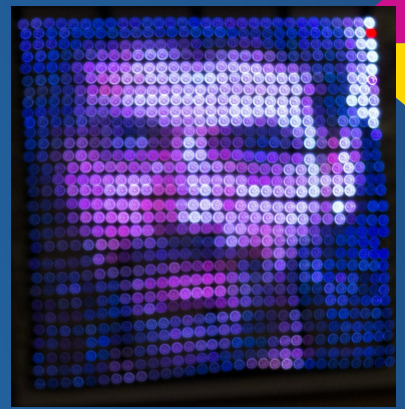- [Video2](#)

Extra: Bitmap Images!

42 Watts

33 Watts

40 Watts

25 Watts

Challenges

- Building the screen took a long time
- Soldering and Wiring
- Noise in Drawing mode
- Lack of documentation on libraries
- Memory Constraints

Future Work

- Use more sensors to make pointing and drawing easier.
  - IR sensor
- Display Text using simple text input
- Save drawings on an SD card