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CS 207

Project Proposal

Ultimate Alarm Clock

0) Identify your team members.

Just me in my group.

1) Identify a project (and provide the source)

I decided to build a touchscreen alarm clock with a few modifications to the original plan to make it a little better. Link to the original project can be found here.

2) Suggest a modification to the project.

Original project future a touchscreen TFT screen with a Real time module and a Mp3 player. I decided to add WIFI for an internet connectivity, Bluetooth audio module and mercury tilt switch to snooze the alarm. As well as an FM Radio Module and speakers to extend my hardware functionality. Also I want to 3D print clock body. On the software side I will concentrate on adding a new screen pages to control new devices as well as adapting whole code to display additional menu items. Potentially linking my Google calendar account with the device if time that is left will allow me to do this. As a bonus a solar panel and a charging regulator may be added to the whole if time left is allowing this improvement's.

3) Describe your motivation behind the project you've identified / the modifications you've decided upon.

   My motivation is to wake up to school on time. My current alarm clock has served me a whole eternity by the technological standards. Almost six years of continues work without a need to even switch batteries. Perhaps because of the solar penal, perhaps because it come from a dollar store it was my best friend for a longer period of time. On the negative side it has no touchscreen or an option to change the alarm sound, and to top it all up, a few weeks ago my background light ceased to work. What deems it almost non useable at night. This was the moment I decided to build my own super alarm clock instead of getting something widely available on the market.
   On the end of the day, when this project is accomplished, I will be able to add or modify any of the functions or buttons in a menu and that's cost more than any alarm clock ever made before me.

4) A list of materials required.
   - Arduino AtMega2560;

- DS3231 Real Time Clock;
- BY8001-16P MP3 Module;
- 3.2″ TFT Touch Display + TFT Shield (Second 3.5" inch TFT screen is on order);
- XS3868 Bluetooth Stereo Audio module chip;
- TEA5767 Mini FM Stereo Radio Module;
- 2 Speakers is a default configuration but I think I can use 4 of 0.5W 8 Ohms Speakers instead of two if I add the power supply board or even 2 x 2W 8 Ohms.
- Solu ® 5a 40v 75w Dc-dc Adjustable Step-down Buck Voltage Converter Module
- Mercury tilt switch (Magic light cup module KY-027);

5) At least four (4) realistic milestones and corresponding dates and a fifth "reach" milestone. More is good. Less is bad.

   - Wi-Fi Connection established with Arduino. Server is active and receiving updates. **Date 10/28/2017**
   - Remote interaction with Arduino Board to control basic functionality over TCP IP. **Date 11/4/2017**
   - Touch screen menu is connected and default functionality test is passed. **Date 11/18/2017**
   - New hardware connection and communication. (Mp3, Radio, Bluetooth, Tilt switch) **Date 25/18/2017**
   - New user Interface accommodates changes and additions made to a hardware. **Date 12/02/2017**
   - Alarm Clock body design and 3D printing of a plastic body. **Date 12/09/2017**
   - Additional functionality such a Solar Panels and charging board as well as a Google calendar and weather updates are connected and tested. (Additional functionality will be implemented If I have enough time.) **Date 12/16/2017**

6) Identify the role of each team member (if you're in a team).
   I Am alone in my team. So the whole scope of work belongs solely to me.

7) Provide a summary

   This project is an example of a sophisticated technology that bring together the best of available consumer grade electronics with extensive knowledge of an open source Arduino platform to build an ultimate alarm clock what can double as a radio, Bluetooth audio channel and a mp3 player. Aside from a clock and music functionality my project will future tilt switch sensor to snooze the alarm. Touchscreen interface will provide flexibility on a functionality expansion side and will allow a relatively quick and easy way to modify user experience, add or remove functionality such a calendar support or a RSS news feed. Ultimately I would like to add a solar panel and air quality monitor to this design but do to a limited time frames I will mark this additional functionality as a secondary bonus goals. Special attention is required for speaker's configuration as I plan to power Arduino with 9V battery or 12V DC cable. From the Arduino power rale, I plan to connect voltage step down

module and trough it a 3.3V rale for mp3 player, Wi-Fi and speakers. I will use a separate battery charging board and connect a solar panel and charge batteries from a greed. But this again depends on the shipping speed and development speed. The hardest part will be to create a new menu page for the Radio or Bluetooth. That's perhaps the biggest obstacle in my project.

8) Provide any citations

Nedelkovski, D. (2017). *Arduino Touch Screen Music Player and Alarm Clock Project - HowToMechatronics*. [online] HowToMechatronics. Available at: http://howtomechatronics.com/projects/arduino-touch-screen-music-player-alarm-clock-project/ [Accessed 29 Oct. 2017].

Room-15.github.io. (2017). *ESP8266 - AT Command Reference · room-15*. [online] Available at: https://room-15.github.io/blog/2015/03/26/esp8266-at-command-reference/#AT+CIPSTART [Accessed 29 Oct. 2017].

altLab Documenta. (2017). / *altLab Documenta*. [online] Available at: http://altlab.org/d/s/tools/hardware/sensors/ [Accessed 29 Oct. 2017].

Ebay Mp3 specification

In-text: (Vi.vipr.ebaydesc.com, 2017)
Your Bibliography: Vi.vipr.ebaydesc.com. (2017). Ebay Mp3 specification. [online] Available at: http://vi.vipr.ebaydesc.com/ws/eBayISAPI.dll?ViewItemDescV4&item=171764659608&t=1484021661000&tid=10&category=36802&seller=wu81-for-hy&excSoj=1&excTrk=1&lsite=0&ittenable=false&domain=ebay.com&descgauge=1&cspheader=1&oneClk=1&secureDesc=0 [Accessed 29 Oct. 2017].

eBay. (2017). *Solu ® 5a 40v 75w Dc-dc Adjustable Step-down Buck Voltage Converter Module Digit | eBay*. [online] Available at: http://www.ebay.ca/itm/Solu-5a-40v-75w-Dc-dc-Adjustable-Step-down-Buck-Voltage-Converter-Module-Digit/232510717269?ssPageName=STRK%3AMEBIDX%3AIT&_trksid=p2057872.m2749.l2649 [Accessed 29 Oct. 2017].

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