

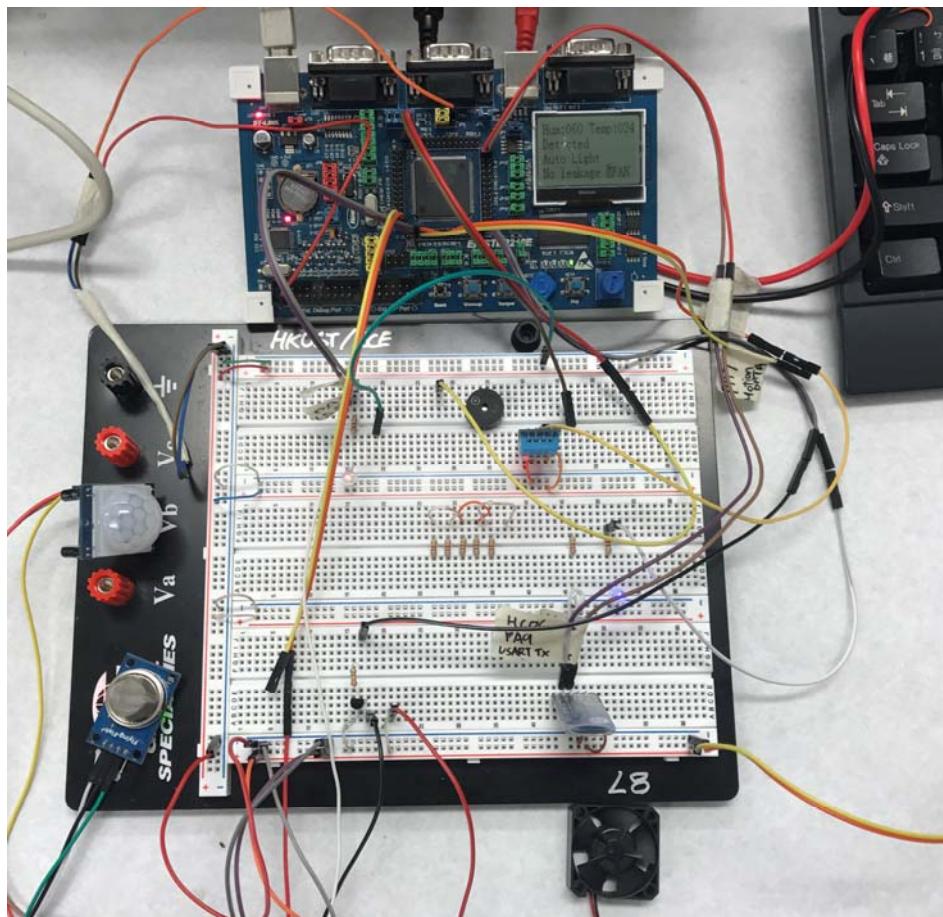
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	1
Project Title	Intelligent Hall
Name of Student 1	Suen Chung Leung
Name of Student 2	Chan Sin Tik

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Detect Temperature, Humidity, Toxic gas and Body movement in real time.
- Temperature and Humidity sensor:DHT11; Bluetooth Module:HC-06;
- Motion sensor:HC-SR-501;Gas sensor: MQ-2
- All of parameters can be displayed on LCD.
- Turn on a fan when temperature over the range automatically
- Turn on LED when movement is detected.
- Buzzer will turn on when toxic gas detected.
- Temperature and Humidity can be displayed on mobile phone via Bluetooth.
- Bluetooth connection to switch between Auto and Manual control mode.
- Bluetooth connection to control fan on/off and light on/off manually.

ELEC 3300 Project Summary Sheet

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Group Number	2
Project Title	Piano Note Maker
Name of Student 1	Wong Man Ting
Name of Student 2	Pang Hong Ching

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Produce music like a normal piano with eight physical piano keys;
- Display the music notes you played on an external LCD-monitor at a specific position on the five-line staff;
- Show different type of notes(e.g quarter note, whole note) according to the duration you pressed the key;
- Add or delete the notes that on the LCD-monitor by pressing a physical button;
- Play the song according to the music score you created on the LCD-monitor;
- Play the song by touching the virtual play button on the screen;
- Have two pages of five-line staff can display up to 60 notes and can flip pages via touching the button on the screen;
- Show the current page number at the upper-left corner;
- Save the music score data to a SD-card through touching the button on the screen;
- Reload the music score data from a SD-card through touching the button on the screen

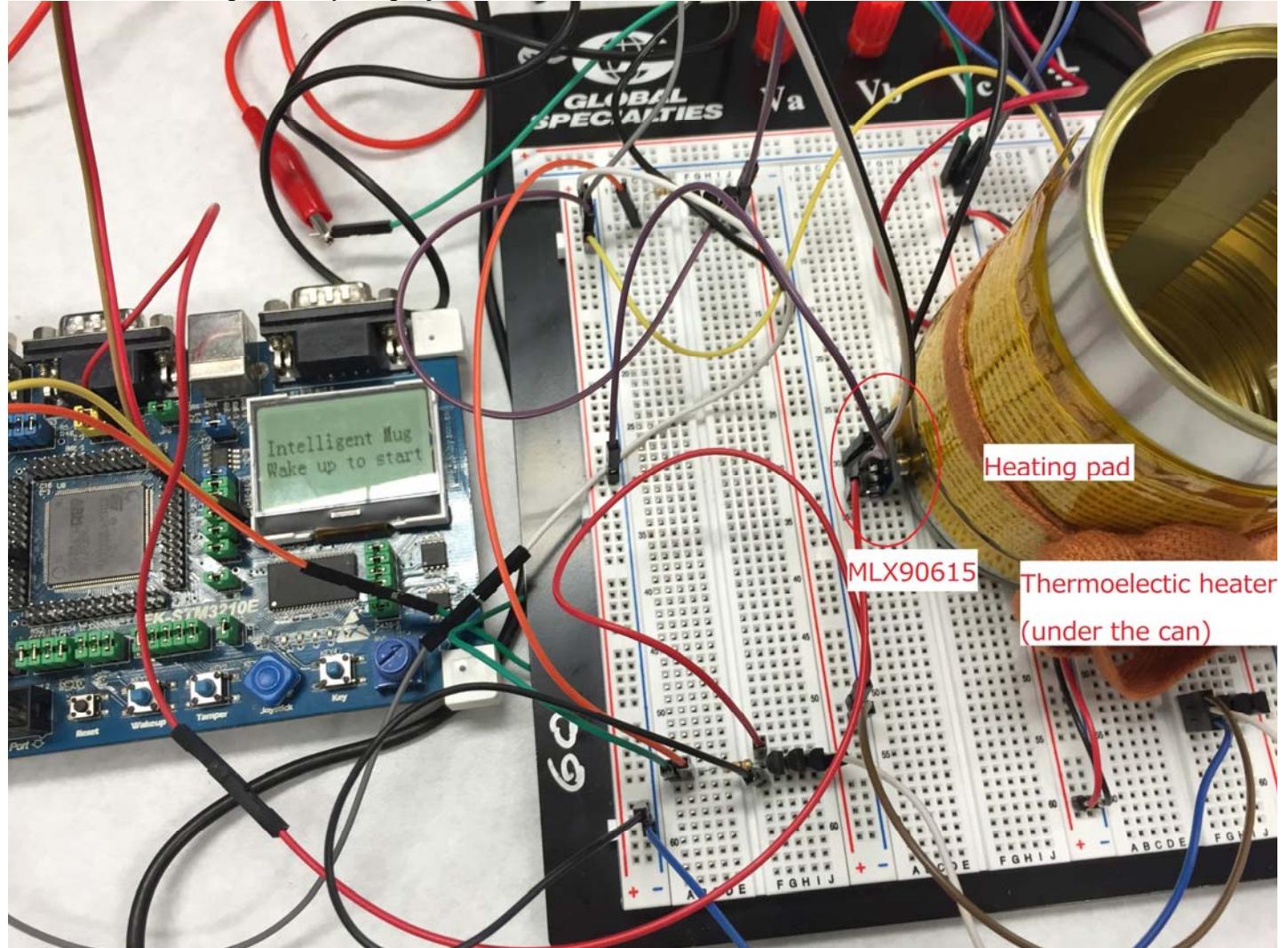
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Group Number	3
Project Title	Intelligent Mug
Name of Student 1	Chan Ming Him
Name of Student 2	Chung Chi To

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Use the Joystick from the STM32 board to allow the user to adjust the temperature he want his drink to be
- Use IR temperature sensor (MLX90615) to provide temperature of drinks and surroundings
- Use the LCD display embedded to display the requested temperature from the user, and the temperature of his drink and the surroundings.
- When the temperature of the drink is lower than the user's requirement, the STM32 will turn on the heating pad (COM11289) and the thermoelectric heater to heat the drink until it reaches the requirement of the user.

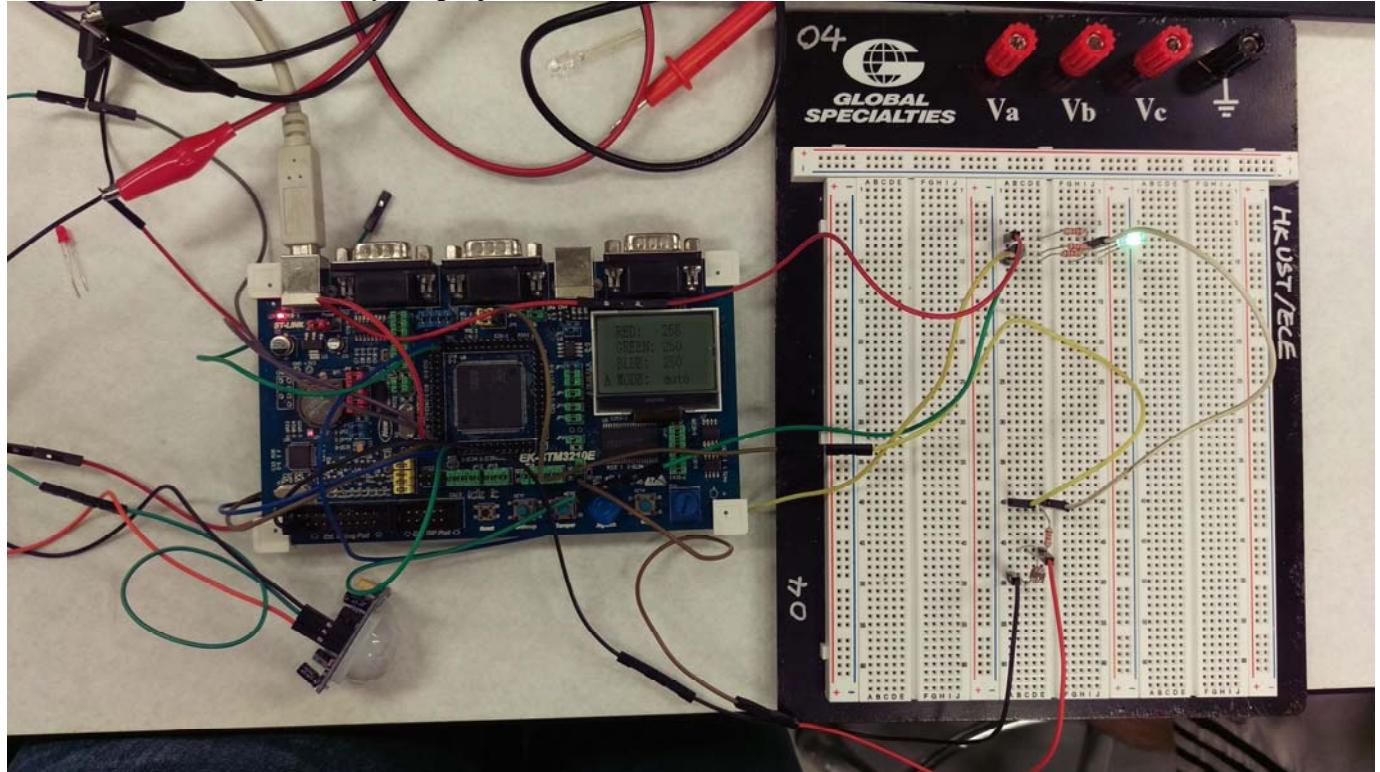
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Group Number	4
Project Title	Smart Lamp
Name of Student 1	CHIU Samuel
Name of Student 2	LO Kwun Hok

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The LCD of the STM32 will display the information of the current status within four aspects: RED value, GREEN value, BLUE value and selected MODE.
- The joystick is an interactive input device for user to adjust all status and value.
- Three different modes are available
 - Normal mode: the user can adjusts the LED color by tuning the RGB value between 0-255 via the joystick
 - Sleep mode: the IR sensor purposes on detect the user wakeup or not then turn on the LED while the user did any motion.
 - Auto mode: according to the surrounding light density, the brightness of the LED will be adjusted automatically.

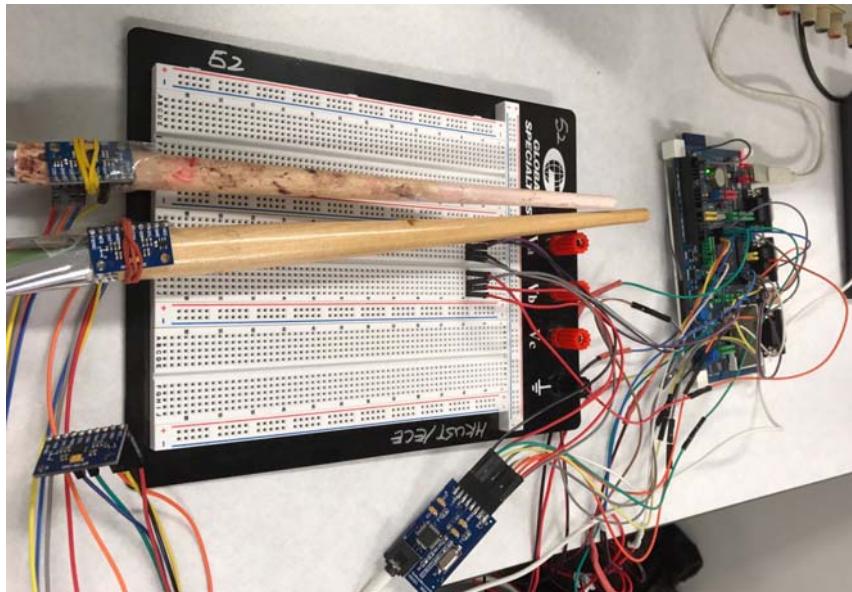
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Group Number	Group 5
Project Title	Air drum (virtual drum)
Name of Student 1	Li, Wing Heng
Name of Student 2	Tong, Hau Kei

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The function of MPU6500:
Read angular velocity gravitational acceleration along x, y, z-axis and record the speed so as to detect the orientation of each stick and so as the force applied on it.
- The function of drum classification
Depending on the orientation of the sticks, we can assume the corresponding region is hit where 3 areas are classified to each stick and also with one more pedal (= total 7 sounds)
- The function of SD card and MP3 decoder (VS1011)
Sound files of each drum will be loaded into STM32 and MP3 decoder will decode the corresponding file and play it on the speaker.
- The function of changing the set of drum:
User can assign preferred drum sound to the individual slot and the information set will be shown up on the screen of STM32 to make our air drum user-friendly.

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Group Number	6
Project Title	Smart Alarm
Name of Student 1	CHAN CHEUNG HIN
Name of Student 2	HUI CHUN PONG

Please attach ONE photo of your project here



Please list the functions of your project in point form

- **1602 LCD Display** →display the message send by the apps in our android apps
→display information of humidity and temperature, also time
- **HC-06 Bluetooth Module** →receive signal from the android apps
→android apps send the message through Bluetooth
→use the apps to set the alarm clock through Bluetooth
- **LDR Light Sensor** →buzzer will stop alarming when laser shoot the light sensor
- **SG-90 Servo** →when the target shot, it will turn down 90 degree
- **Buzzer** →alarm function
- **Button and Variable Resistor** →use to stop the Buzzer and other input select function
- **DH11 Temperature and Humidity Sensor** →sense the temperature and humidity

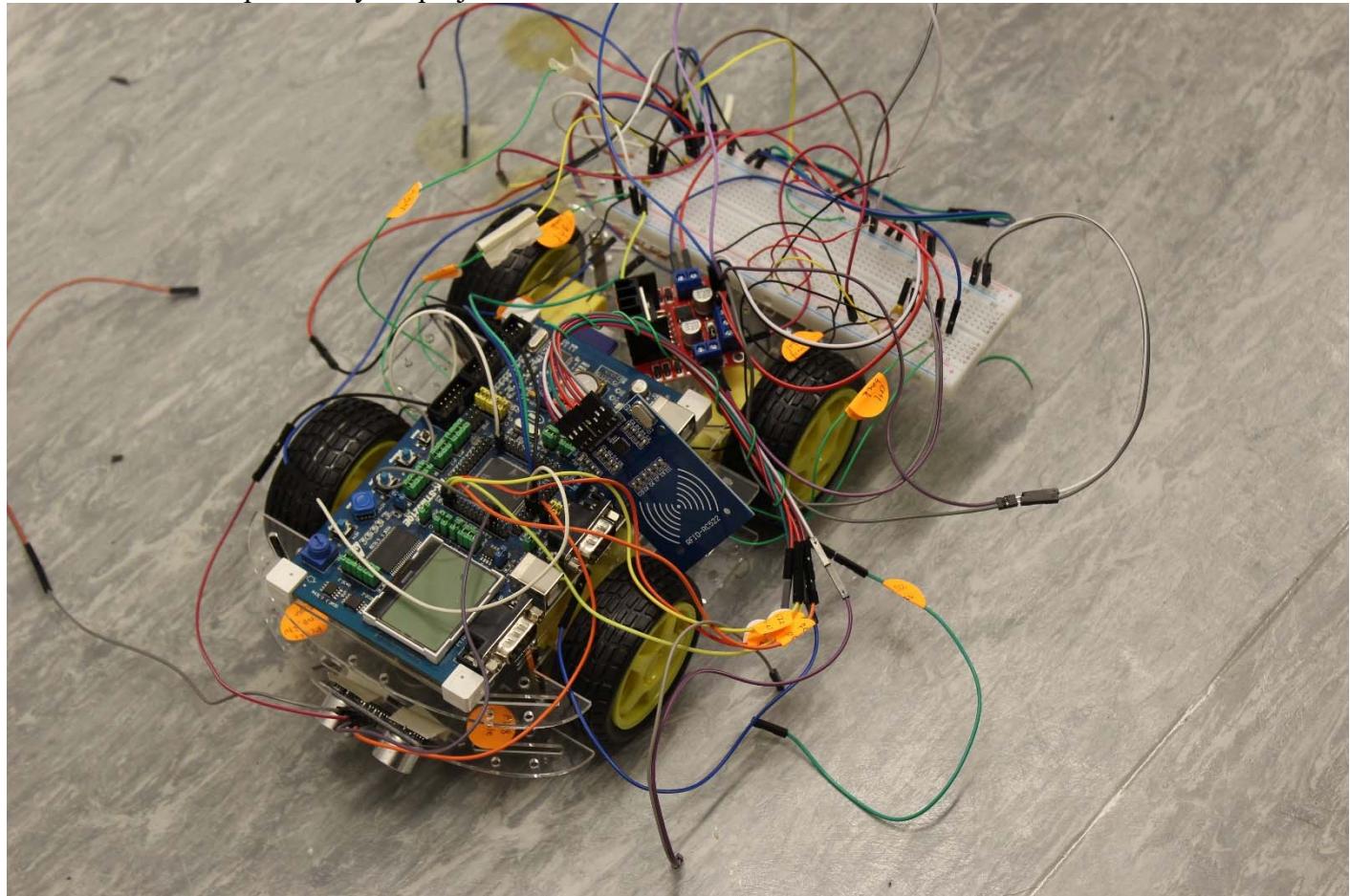
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Group Number	Group 7
Project Title	Library Assistance Robot
Name of Student 1	NG, Mai Nguyen Thao
Name of Student 2	WONG, Cheuk Ping Germaine

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Identify "book items" with RFID module and send the book code through SPI to STM32
- Set anti-collision mode for RFID so that the tags can be identified one by one
- Detect distance between robot and bookshelves with HCSR04, and to maintain a 2-3cm distance so that the RFID reader can detect the RFID tags
- Drive the movement of motors with L298N
- Store the book sequence into SD card

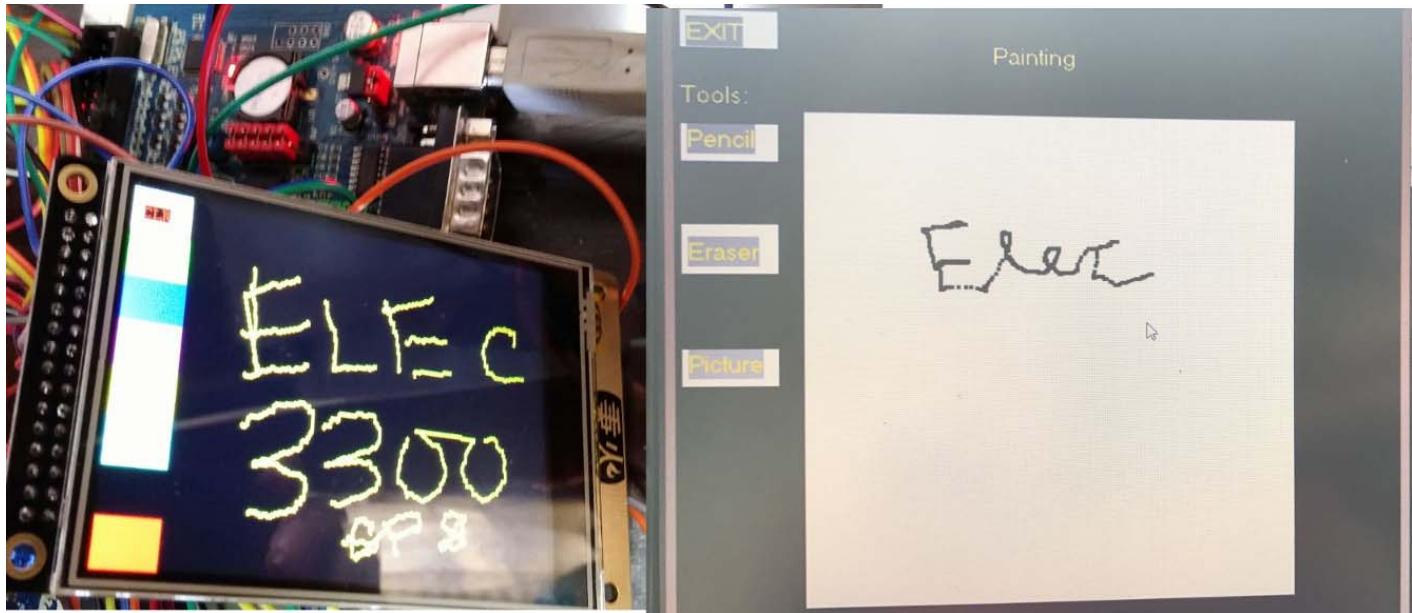
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Group Number	8
Project Title	Teaching assistant board
Name of Student 1	Leung Kiu Fung
Name of Student 2	Man Yuk Fai

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Use touchscreen and computer program to do the writing function
- 2 mode: pencil for writing and eraser for erasing
- Both touchscreen and computer can display the result immediately
- STM32 do the communication between the writing pad and STM32 board

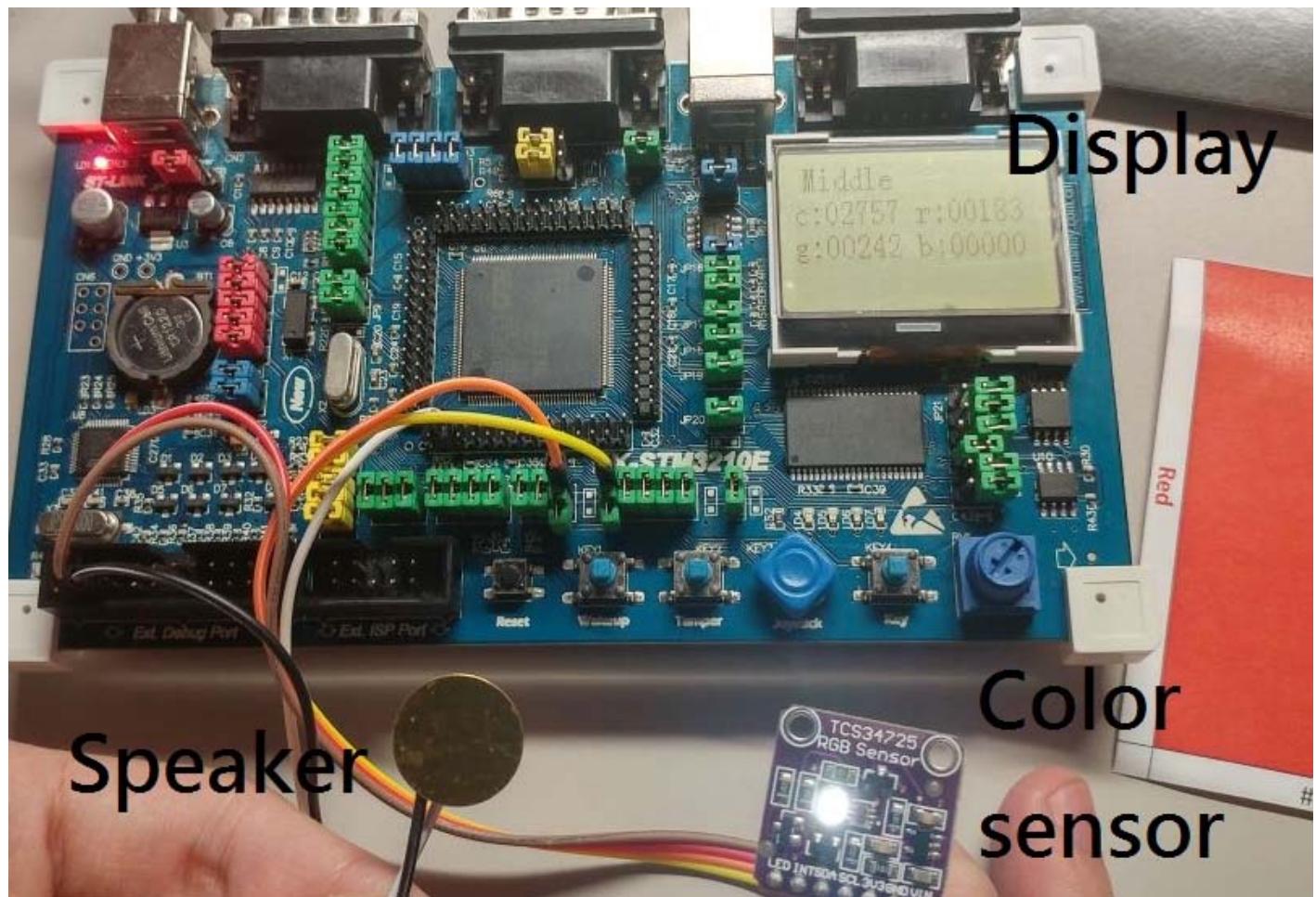
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Group Number	9
Project Title	Color Player
Name of Student 1	Lai Chun Wai
Name of Student 2	KING, Kai Yin Christopher

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The color sensor can detect the color of the picture
- Then the display will show out what is the color
- At the same time, the speaker will give out different sound due to the color of the picture
Like, “red” = “do” ; “yellow” = “me” ; “green” = “fa”
- The joystick can change the level of the sound like “High”, “Middle” and “Low”
- We can use this function to play a song with the color bar containing different color

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Group Number	10
Project Title	Smart lighting control system
Name of Student 1	SHEK, Wing Chun
Name of Student 2	WONG, Yi Lun

Project Summary

Smart lighting control system

We usually turn on light at stairs and corridor and we leave it in a hurry. In this project we are going to design a lighting control system which works on IR sensors and only turn on the lights when someone is present at there. The system can be used to save power and it can be used as a calculator on energy consumption to improve people's awareness of energy saving.

Methods of Implementation:

Polling and interrupt:

We are using 8 motion sensors HCSR501 as the inputs, it is based on infrared technology. When a person entered the sensing range, the output is high, otherwise the output remain low if it leaves the sensing range.

Triggered in repeatable way: the sensor output high, the delay period, if there is human activity in its sensing range, the output will always remain high until the people left after the delay will be high level goes low.

Implementation results:

Results of implementation show that we can trigger on the particular LED light according to the output of the corresponding IR sensor. In the system, we designed the instruction of each triggering is to turn on the corresponding light and the light near it. When the 1st sensor are triggered, the 1st and 2nd LED turn on. Next, when the 2nd sensor are triggered, the 1st, 2nd and 3rd lights will turn on and so on. As a result, we can achieve the fundamental function of the lighting system which only turn on the light if there is someone present near the sensor.

Moreover, the number of energy consumption are calculated and shown on the LCD monitor. The computation is based on the power consumed of the output power. There are two parts that shown on the monitor. One is the energy consumption without controlling the format of lighting. Another part is the energy consumed by this system.

Limitations and Improvement:

Some of the limitations include: the default block time of the IR sensor is one of the difficulties which may affect the accuracy of the triggering. The complexity of controlling the format of lighting could be increased as to enhance the performance of the energy saving and also the flexibility to works on different situations.

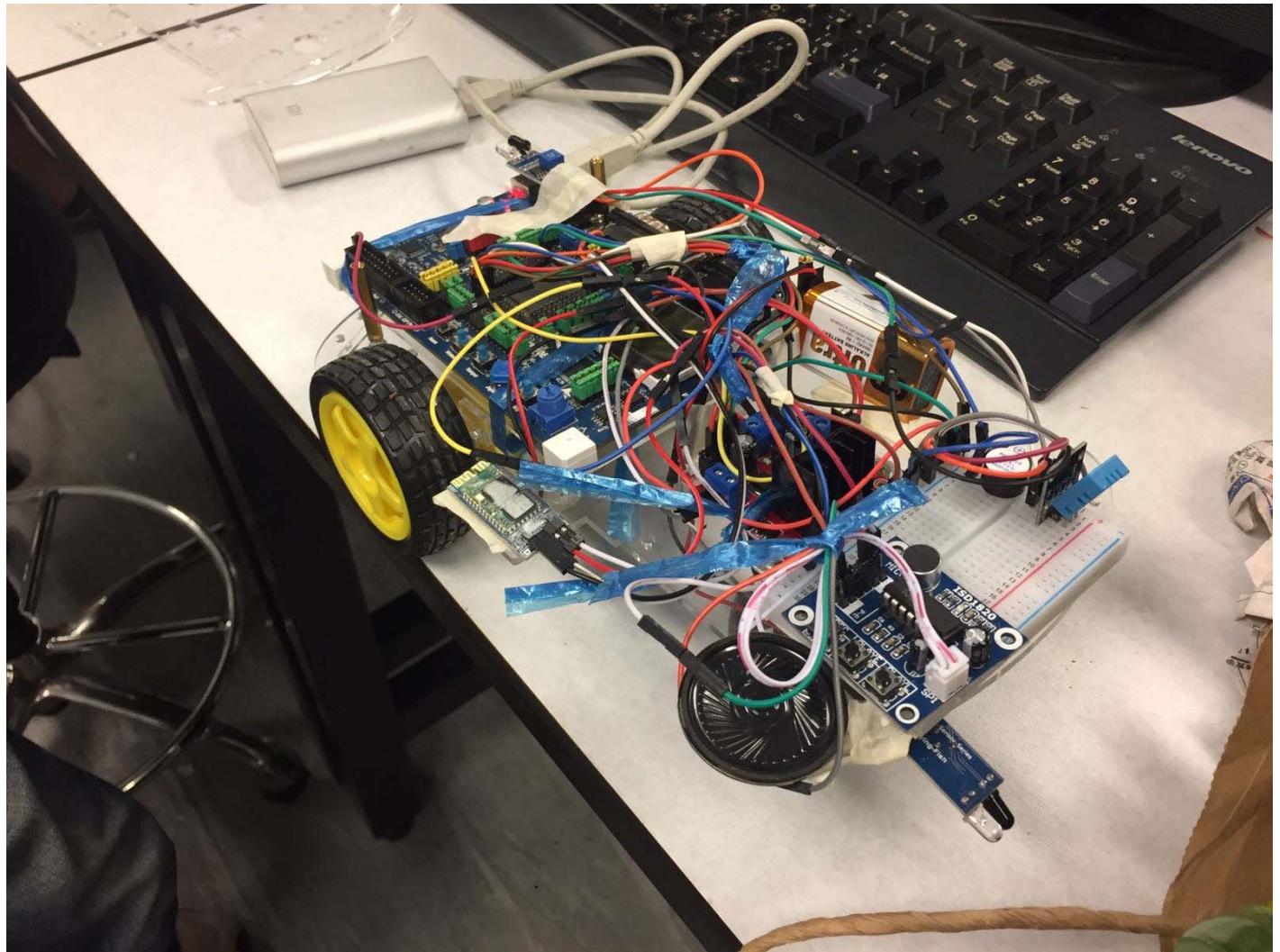
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Group Number	11
Project Title	Adventure Car
Name of Student 1	SUEN, Ka Chun
Name of Student 2	TANG, Marco Kwan Ho

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Remote the car by using Bluetooth app to control 2 motors of the car to move to different directions
- Remote control the car to play song that we have been recorded
- Disable the motion of the car and enable the buzzer when the car encounter obstacles

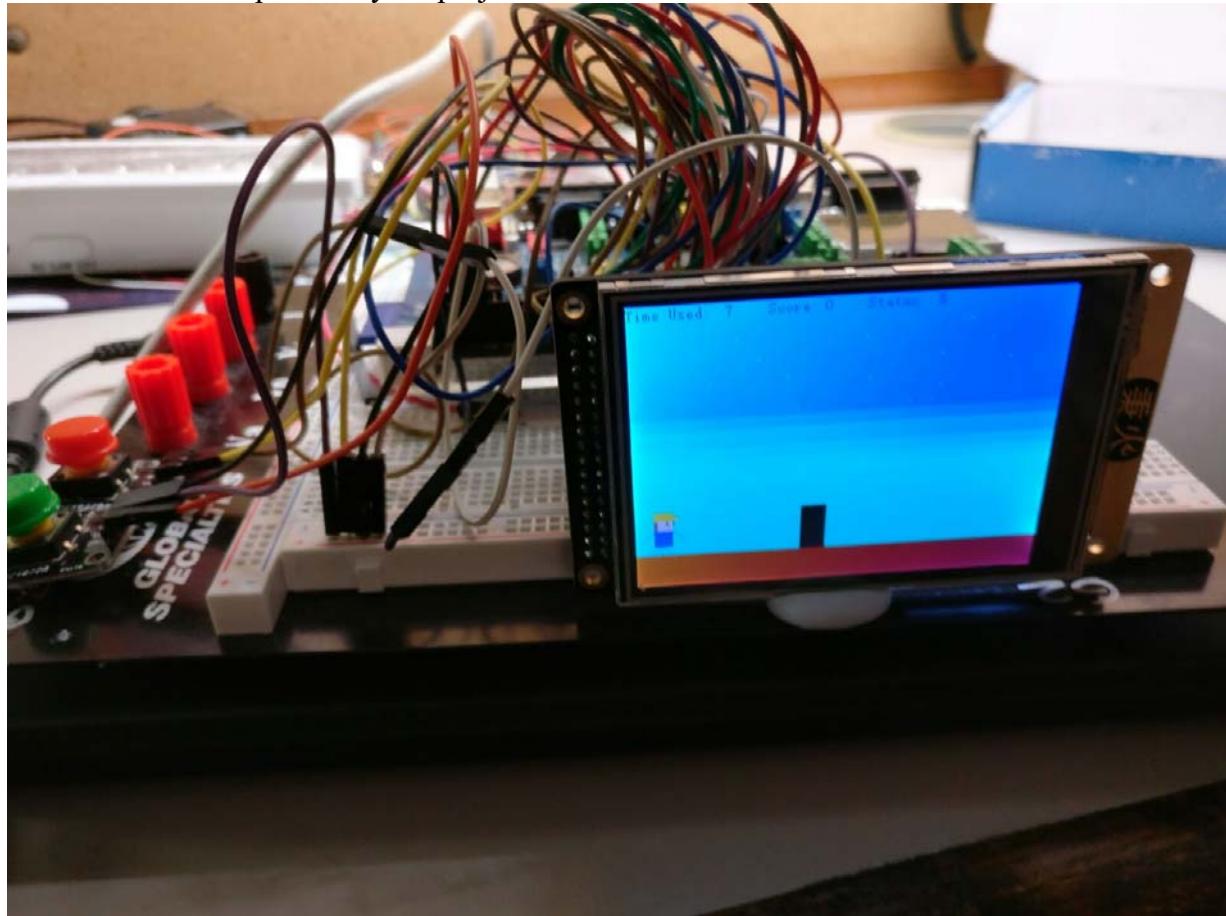
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Group Number	12
Project Title	STM32 game – Jumping Man
Name of Student 1	Chan Mau Yuen
Name of Student 2	Lau Chi Him

Please attach ONE photo of your project here



Please list the functions of your project in point form

This is a simple game which is develop for helping rehabilitation after having hand tendon surgery.

- Jump button – for helping player to control the character to jump through the blocks.
- Pause button – for helping player to pause the game
- Time counting function – for helping player to count the time used in that level.
- Scores counting function – when player jump through the block, they can get 1 mark.
- Level select function – player can select the difficulties of the game.
- Scores list – list out the top 5 scores.
- Sound effect – special sound will be played when the character fail to jump though the blocks.
- Return function – if player press the jump button and pause button at the same time, they will return to the game menu.

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Group Number	13
Project Title	Smart Car with Hand Control and Voice Control
Name of Student 1	Lau Ka Wun
Name of Student 2	Li Ho Yin

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Use a glove to control the movement of the car by using a MPU-6050 6-axis accelerometer/gyroscope
- Control the car with the functions of touch panel via Bluetooth
- Support Voice Control
- Use a TB6612-M motor driver to control 2 DC motors
- Use a LM2940-M Voltage regular to adjust voltage output

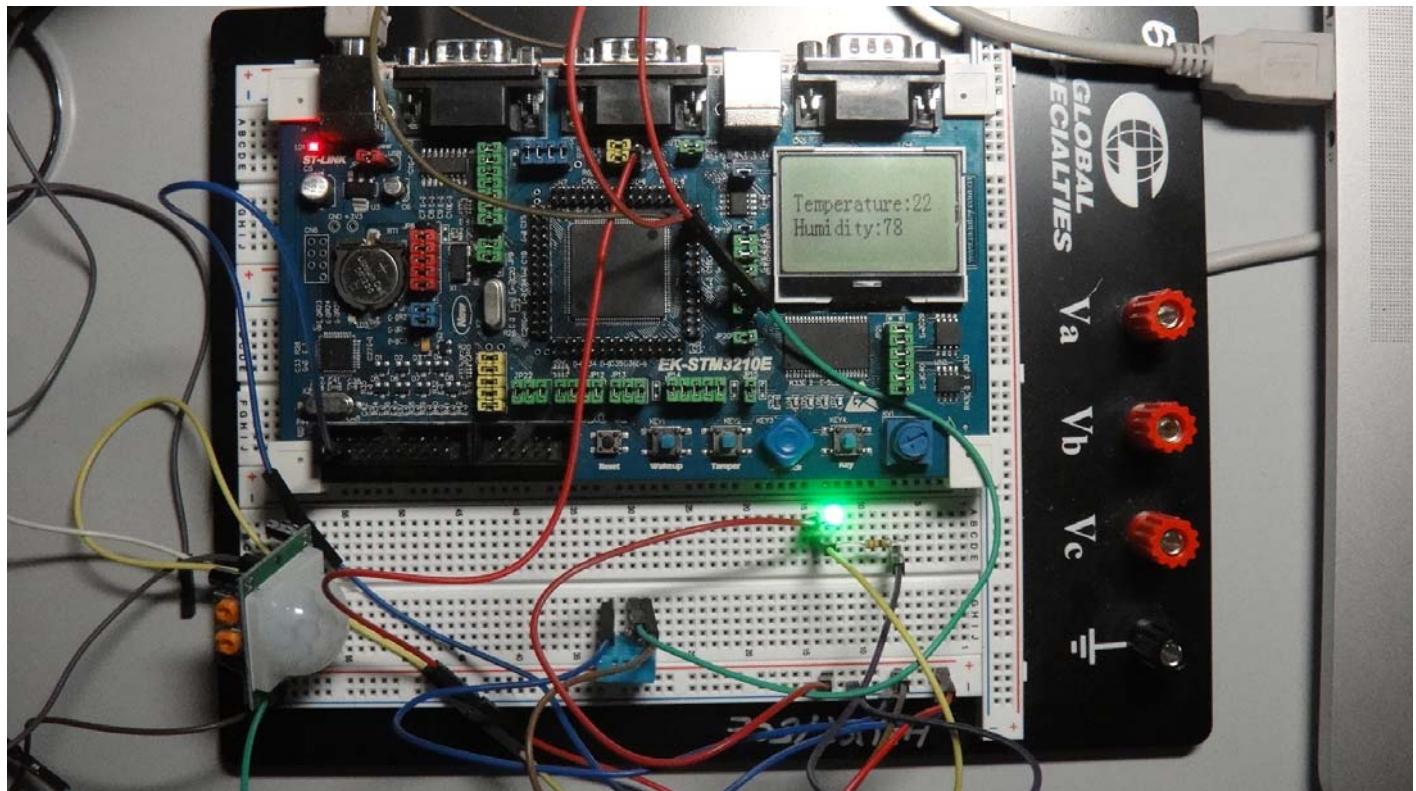
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Group Number	14
Project Title	Smart Home
Name of Student 1	Hui Hong Chuen, Ashley
Name of Student 2	Chu Siu Fing

Please attach ONE photo of your project here

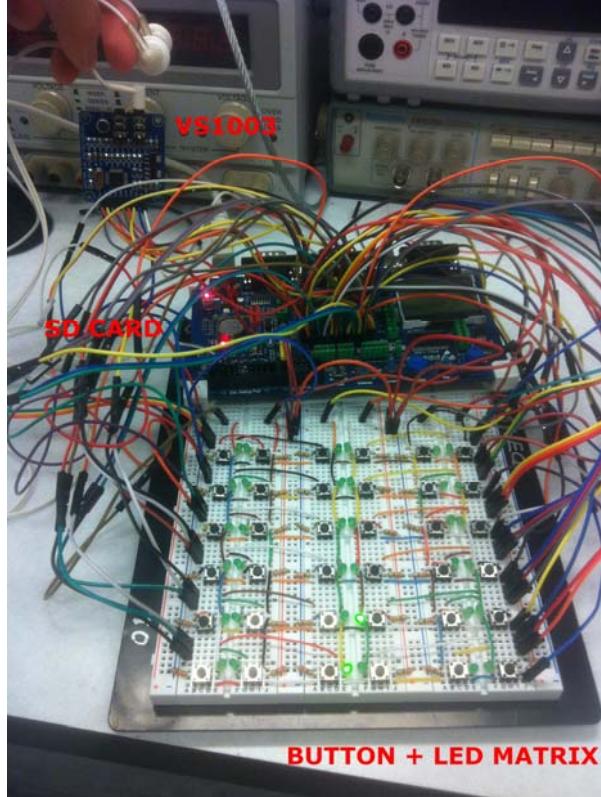


Please list the functions of your project in point form

- Using STM3210E to control all the features
- Sensors are used to detect the environment and the data will be processed by the STM3210E board
- DHT11(Temperature and Humidity sensor) is used to detect the temperature and humidity
- PIR Motion Sensor (Pyroelectric InfraRed Sensor) is used to a warm body that passes by the sensor
- When a warm body passes by the PIR Motion Sensor, the Led will turn on for a while.
- The LCD will show the temperature and the humidity.

ELEC 3300 Project Summary Sheet

Group Number	15
Project Title	Soundboard
Name of Student 1	Yap, Alistair Yun Hee
Name of Student 2	Cheung, Ling Fung



- When the user presses a button, the corresponding .wav file (set in initialization code of ‘main.c’) stored on an SD card is played via the 3.5mm TRS jack of a VS1003.
 - Pressing different buttons in sequence plays the corresponding sounds WITHOUT stopping other files currently playing.
 - Sounds are mixed together by sample-wise amplitude sum.
 - Clipping is handled by normalization of a constant factor.
 - Buttons can be set (at initialization stage) to have different play modes:
 [Single + Restart] [Single + Kill] [Loop + Kill]
 - Single: Sound file plays from start to finish, then stops.
 - Loop: Sound file plays from start to finish, then restarts on its own.
 - Restart: Pressing the button again before the sound has finished RESTARTS the sound.
 - Kill: Pressing the button again before the sound has finished STOPS the sound.
 - The KEY button on the EK-STM3210E board is set to stop ALL currently playing sounds.
 - State of buttons (up/down) is checked using scanning method to save pins.
- While a sound is playing, the LED next to the corresponding button is lit to represent the sound’s status.
 - LED is on while the sound is playing.
 - LED turns off if the sound is killed, or it ends and is not in loop mode.
 - LED will not turn off in loop mode, unless the sound is killed.
- The potentiometer (variable resistor knob) on the EK-STM3210E board can be used to change volume if ADCMODE in ‘main.c’ is set to ‘1’ at initialization stage.

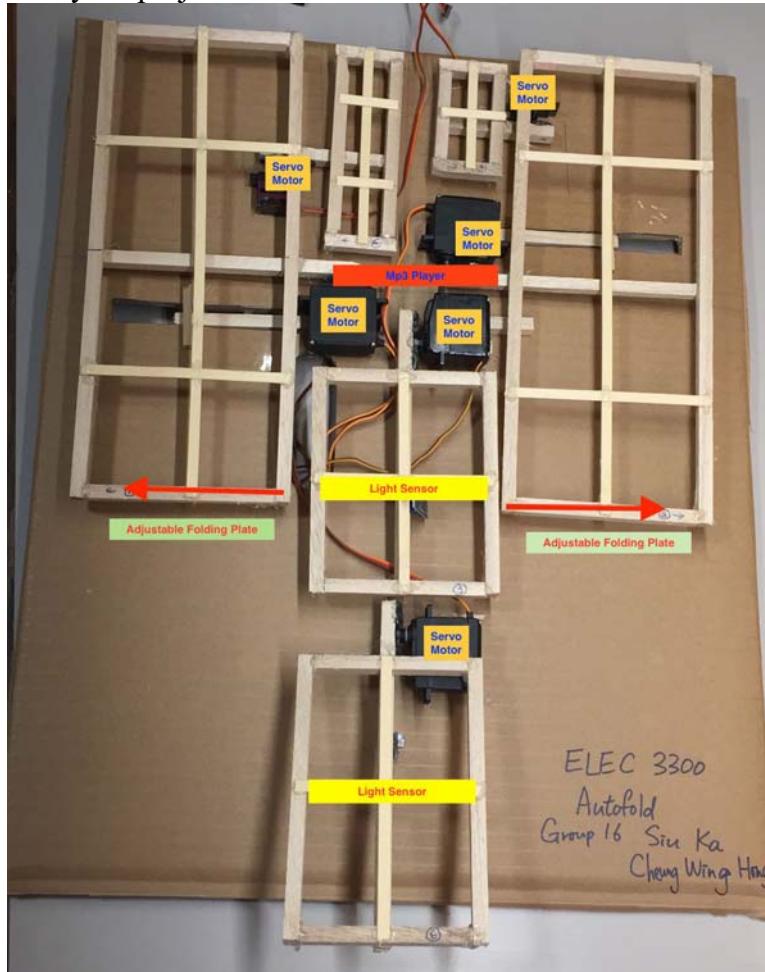
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Group Number	16
Project Title	Autofold – Laundry Folding Machine
Name of Student 1	Cheung Wing Hong
Name of Student 2	Siu Ka

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Provide two mode of laundry folding (T-shirt and Trousers)
- Equipped with two light sensors to detect light intensity to distinguish between T-shirt and Trousers
- Servo motors (MG995, SG-5010) are designed for turning 180 degrees with different orders
- Adjustable width of folding plates through servo motors
- Helpful for patients who suffer from Parkinson's disease or any other kinds of disabilities that makes them unable to do the laundry folding
- Included MP3 player to play audio reminder for the visually impaired
- With a LCD display

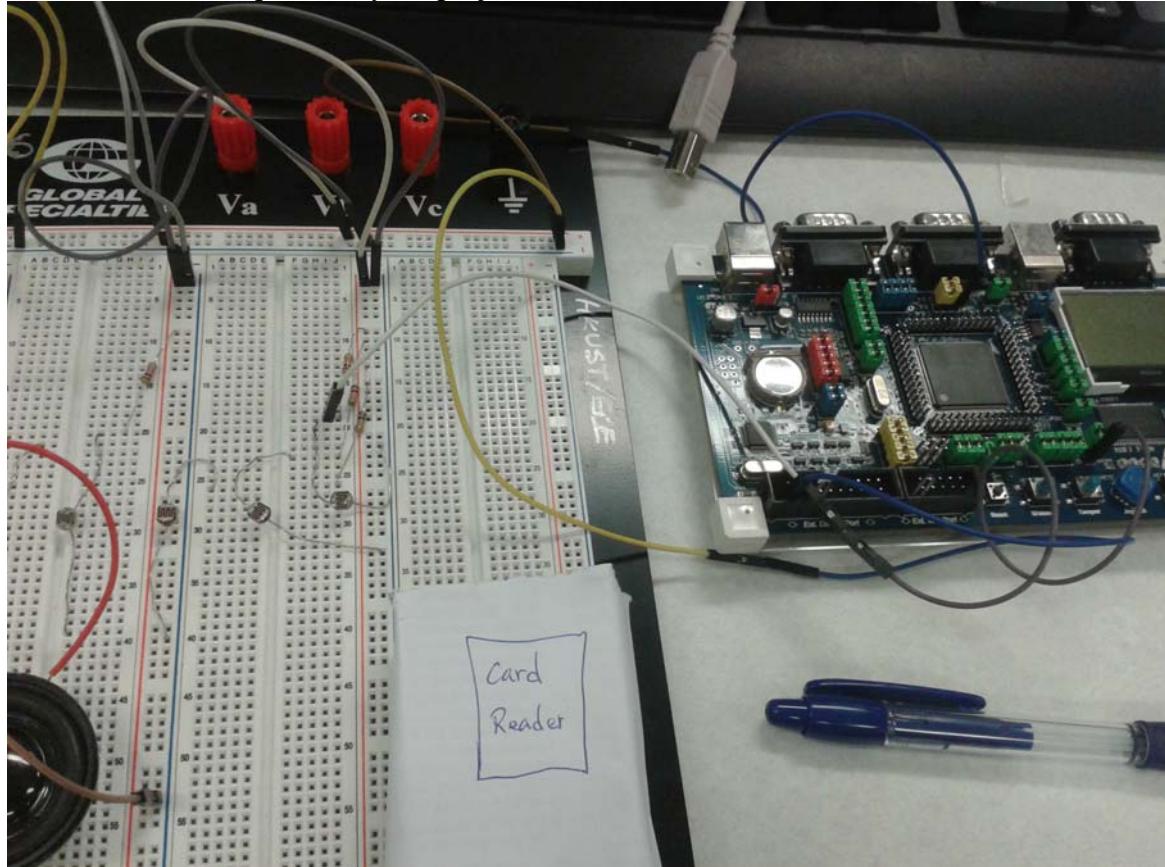
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Group Number	17
Project Title	Music Gamebox
Name of Student 1	FOK Ming Kit
Name of Student 2	/

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Game displays on the LCD screen.
- Pentatonic scale electronic musical instrument.
- Reading cards that store information.

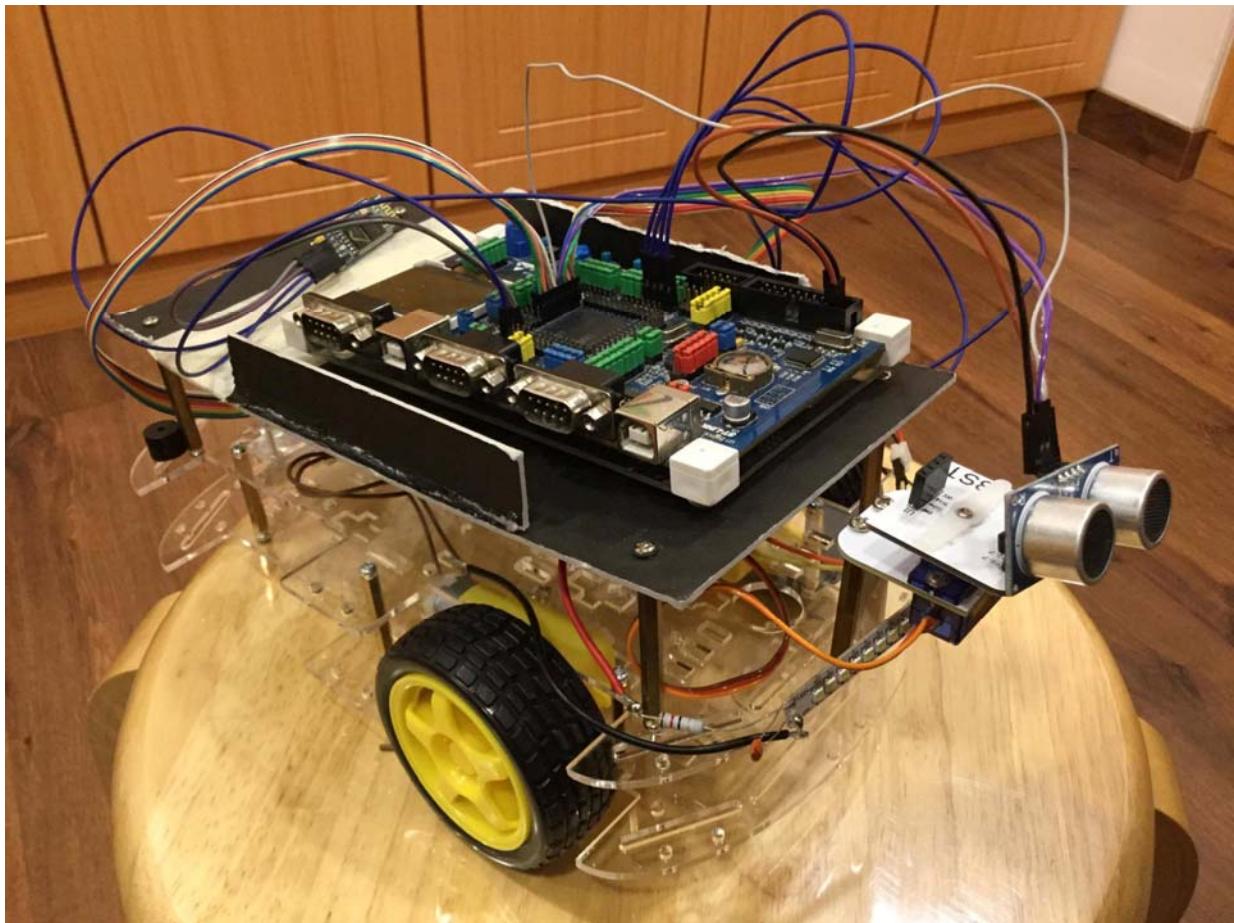
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Group Number	18
Project Title	Bluetooth smart car
Name of Student 1	Chan Tat Kei
Name of Student 2	Leung Sze Long

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The car can be controlled by Bluetooth through the app
- The power supply of the STM32 and the wheels are separated. The STM32 is supported by a portal battery and the wheels are supported by 3 1.5V battery
- There is an ultrasound sound sensor in the front of the car. The sensor will detect if there is an obstacle in front of the car. If there is the obstacle in front of the car within 15cm, it will stop the car going forward to prevent the collision
- There is several LEDs in the front of the car. The LED can be switched on/off via the app
- There is a buzzer in the back of the car. When the car is moving backward, the buzzer will turn on. Besides, the buzzer can be turned on via the app.

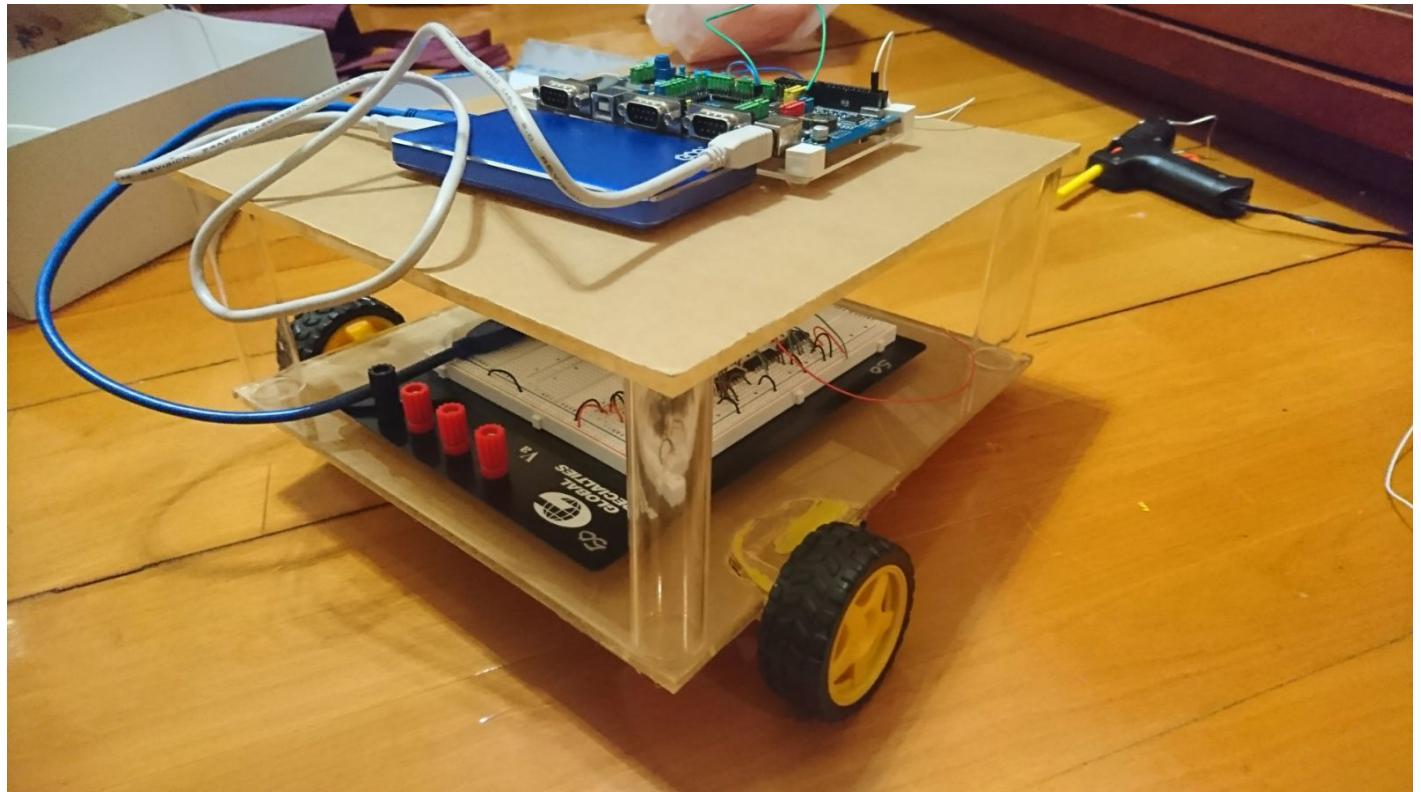
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Group Number	19
Project Title	Smart Auto-cleaner
Name of Student 1	Poon Chun Ho Henry
Name of Student 2	Chong Ka Lok

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Set a S-form route which cover all area of a rectangular room
- Move on the route automatically
- Stop and change to a destined direction when a wall is detected by proximity sensor
- Calculate the speed of the car by using rotary encoder
- A duster is stick on the bottom of the car
- Stop automatically when it finishes to move on the route and give a notice by LED and LCD display

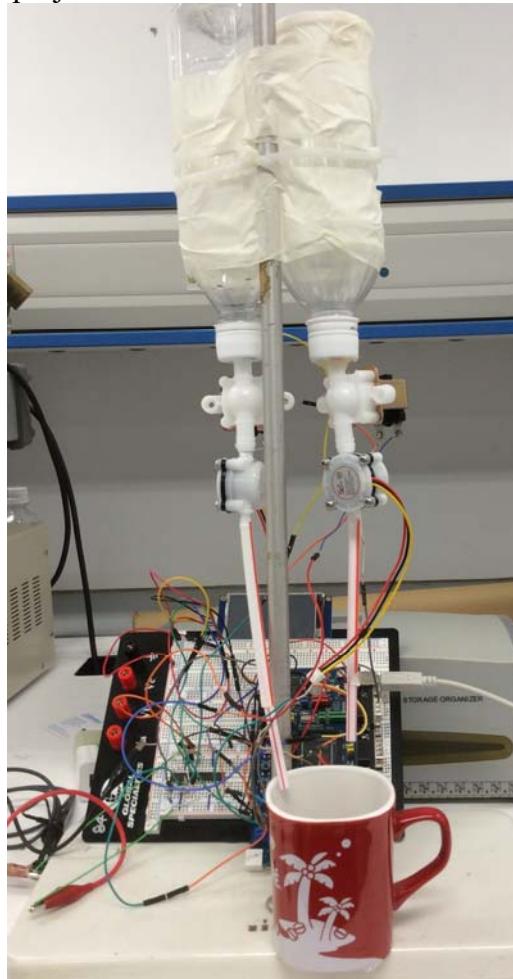
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Group Number	20
Project Title	Potion Mixture Control Module
Name of Student 1	CHAN CHI KIT
Name of Student 2	CHOY SIU LUNG

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Potion Control
Flow of fluid amount will be controlled by the cooperation of fluid flow sensor and electric valve with respect to the specific formula.
- Human Machine Interface
3.2'' LCD display with touch sensor would be use for specific formula creation and selection.
- SD Card Read Write
SD card use for store the formula created by user and load when the specific formula is called.
- Application
Automatics drinks mixer e.g. Coffee Machine.

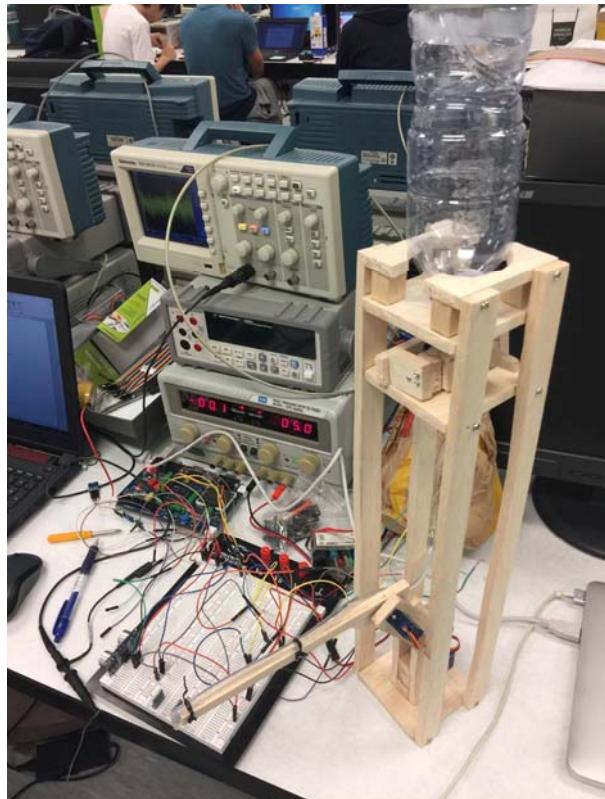
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Group Number	21
Project Title	Dynamic Watering System
Name of Student 1	Sze Cheong Shing
Name of Student 2	Lam Tsz Lok

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Measure the moisture of soil of plant to determine if the plant needs to be watered
- Able to identify the location of the plant and rotate to face the direction of the plant
- Able to identify the distance between the robotic arm and the plant by distance sensor
- Robot arm will reach out to that distance by adjusting the PWM provided for two servo motors on the robotic arm
- An additional motor controls the switch for the water-tap to water the plant

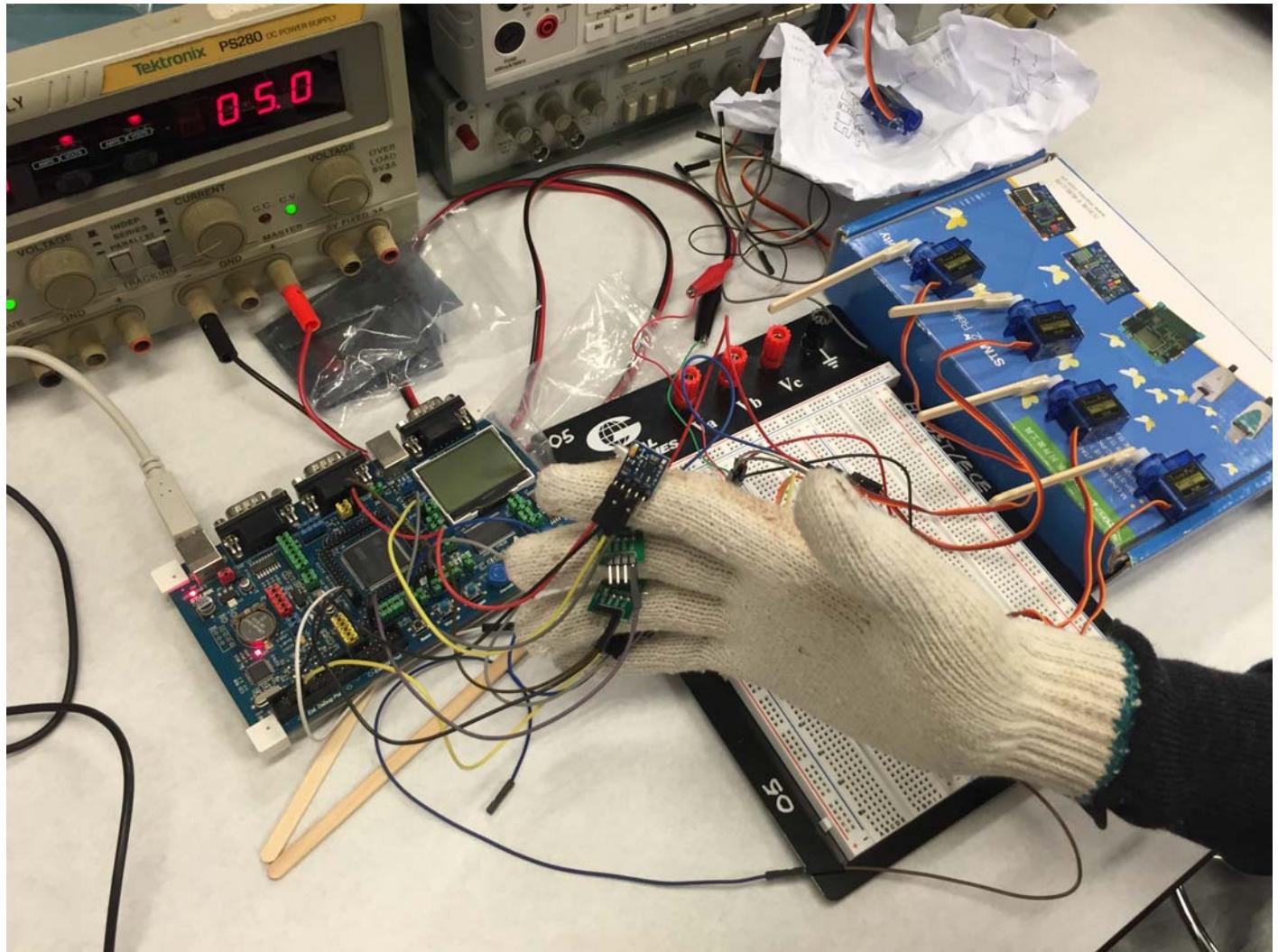
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Group Number	22
Project Title	Gaming Robot
Name of Student 1	Cheung Chi Kei
Name of Student 2	Wong Lok Kei

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Two games in series: first “Rock Paper Scissors”, then “Frog Frog Jump”
- Use the result of “Rock Paper Scissors” to decide who call first in “Frog Frog Jump”
- Randomly generate rock, paper or scissors signal, and finger-like signal for 2 games.
- Receives the signal comes from the sensor which connected to the player
- Use 4 compass sensors to sense the fingers movement of user.
- Analyses the signal, and distinguish the choice of user
- Use 4 servo-motors to perform the choice of microcontroller
- Use LCD to display the result

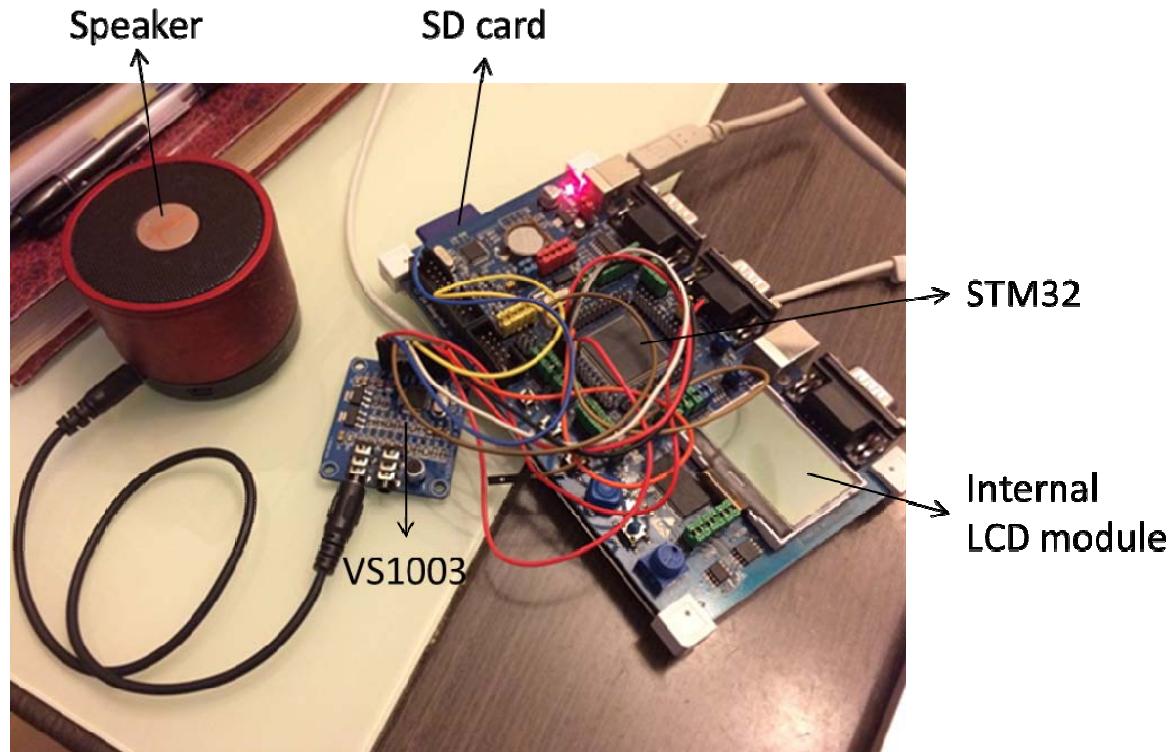
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Group Number	23
Project Title	MP3 Player
Name of Student 1	Law Kai Chun 20313489
Name of Student 2	Leung Ho Fung 20307052

Please attach ONE photo of your project here



Please list the functions of your project in point form

- SD card: The songs are stored in SD card. After implementing FatFs in the program, STM32 can read MP3 files from SD card which is in Fat16/32 format.
- VS1003: It is a MP3 decoder which can communicate with STM32 through SPI. When VS1003 receives a MP3 data, it can decode the data and then convert it into analog signal. Eventually, the analog signal will be transferred to a speaker so that the song can be played.
- Internal LCD module: The internal LCD module has been used to display the name of the song which is currently played.
- Play/Stop button: On the STM32 development board, a button is used as play/stop function.

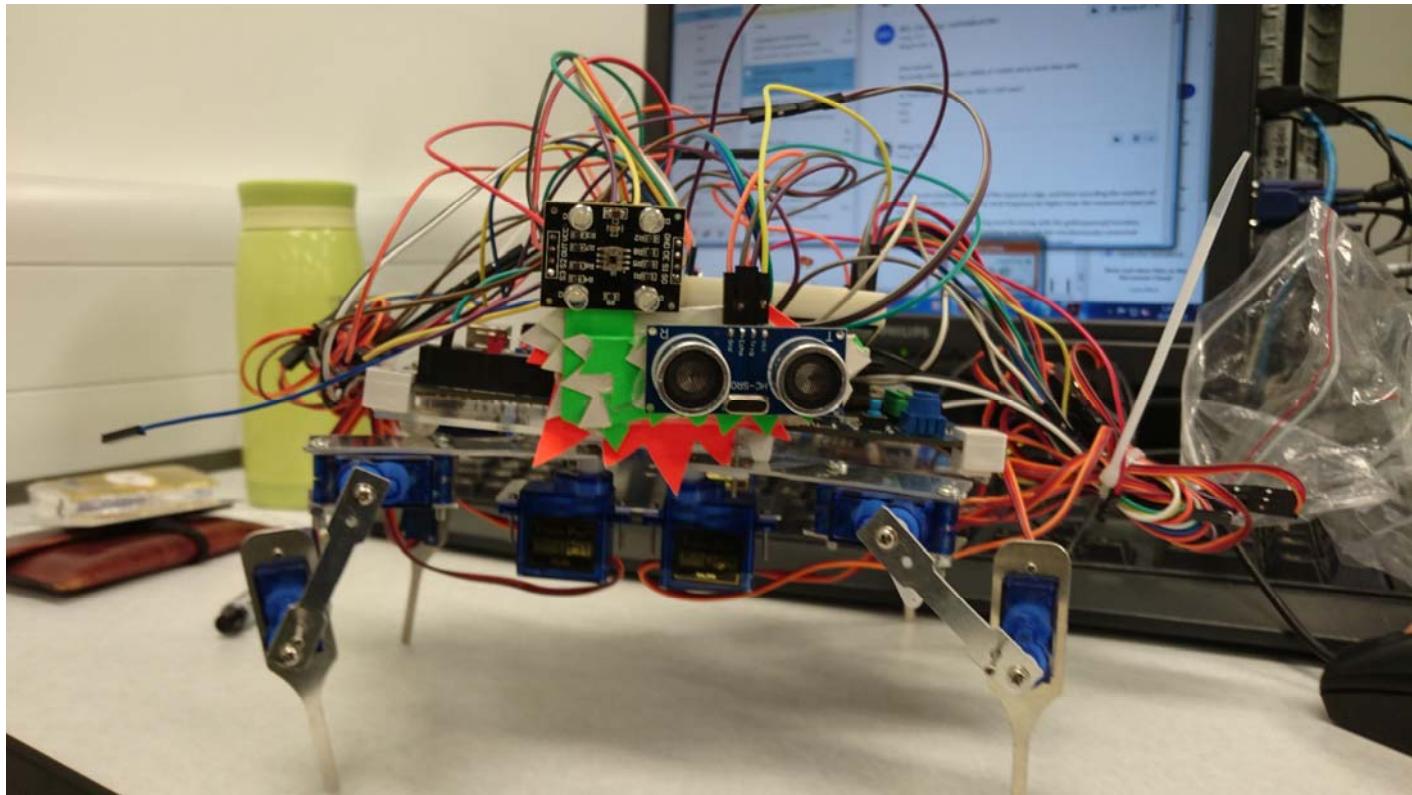
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Group Number	24
Project Title	Color Walker
Name of Student 1	Lee Wing Yu, Michelle
Name of Student 2	Zang Jiayuan Billy

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Walk by coordinating the 3 servos on each of the 4 legs
- Move towards condition of sufficient light for color sensor to function
- Ultraviolet sensor to prevent collision with obstacles
- Color sensor to sense the color being presented
- Map the input color to the one of ten primary colors
- Alter course of movement according to the color being shown
- Allow user to set preference of color

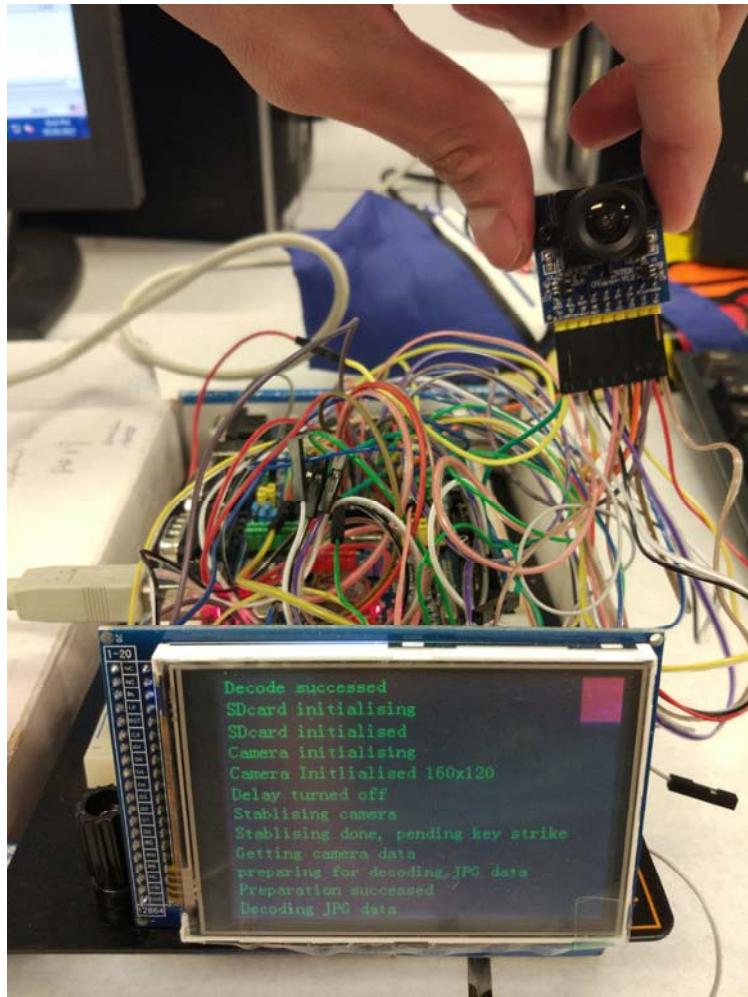
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Group Number	25
Project Title	Camera
Name of Student 1	Suen Chun Tung
Name of Student 2	Lee Ka Kui

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Key input to start capture photo
- Capture 40x40 photo
- Display on screen
- Save Jpg data to SDCard

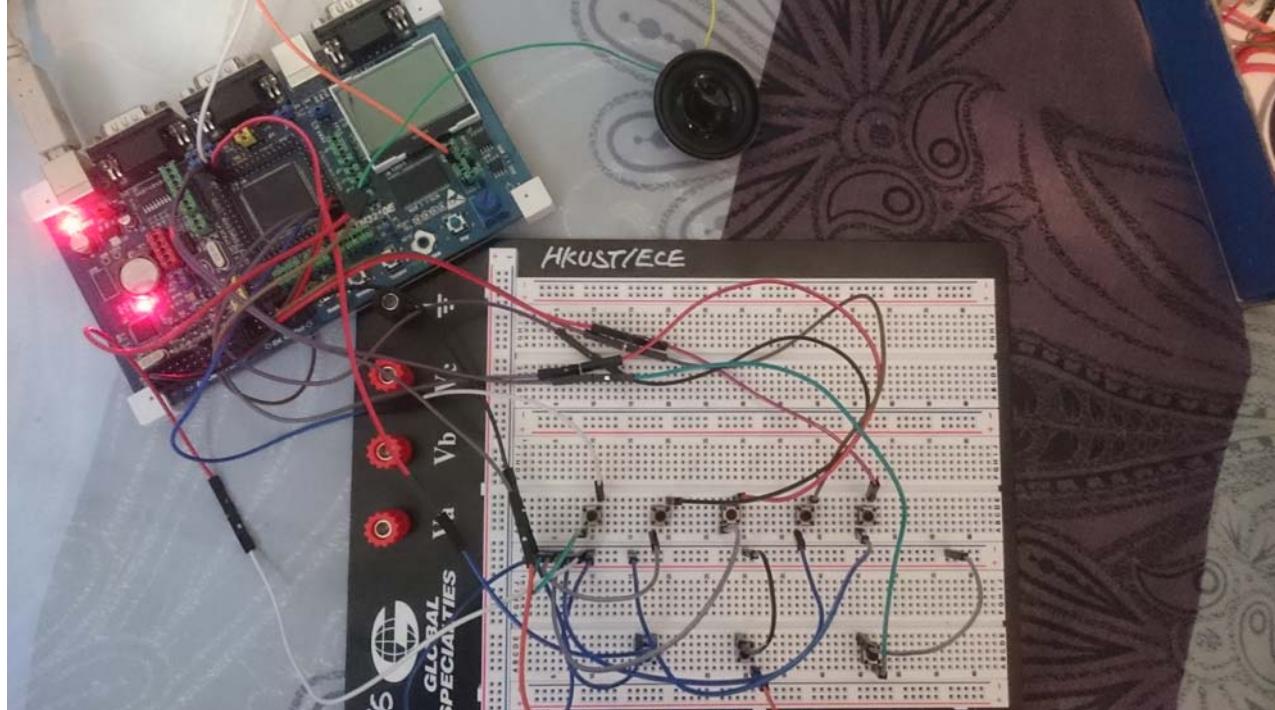
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Group Number	26
Project Title	Electronic Piano
Name of Student 1	Lai Hau Yin
Name of Student 2	Tam Sui Yan

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Can play with eight notes between middle C with eight buttons
- Can display the note that playing on the screen
- Can increase one octave by pressing the key

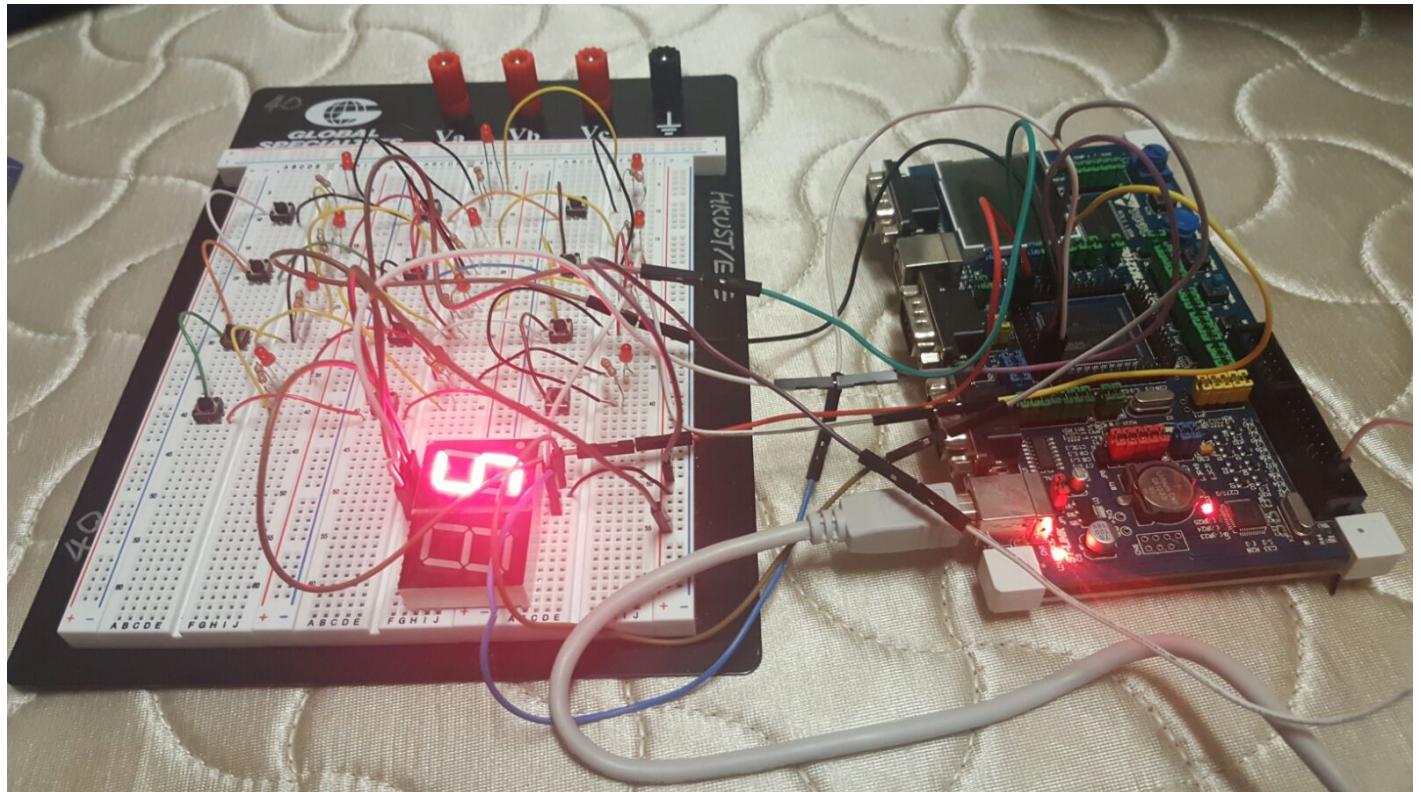
ELEC 3300 Project Summary Sheet

This is a ONE Page Summary Sheet, Content more than 1 page will be deleted.

All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	27
Project Title	Mole Buster game
Name of Student 1	Lau Ka Chun
Name of Student 2	Chan Tsz Him

Please attach ONE photo of your project here



Please list the functions of your project in point form

- User need to press Key1 to start the game.
- When the game is started, the LED will light up randomly.
- The 7 segment display is used to count down the time.
- The highest score and the current score will be displayed on the screen.
- There are two mode of the game (Level1:1 LED light up at a time; Level2: 2 LED light up at a time).
- There are totally 12 LED and 12 buttons.
- If the LED light up, users need to press the button next to it.
- If user press correctly, the score will be increased.
- If user press incorrectly, the score will be decreased.
- The highest score will be saved in the stm32.
- The game is ended when the time run up and display "Game Over" on the screen.

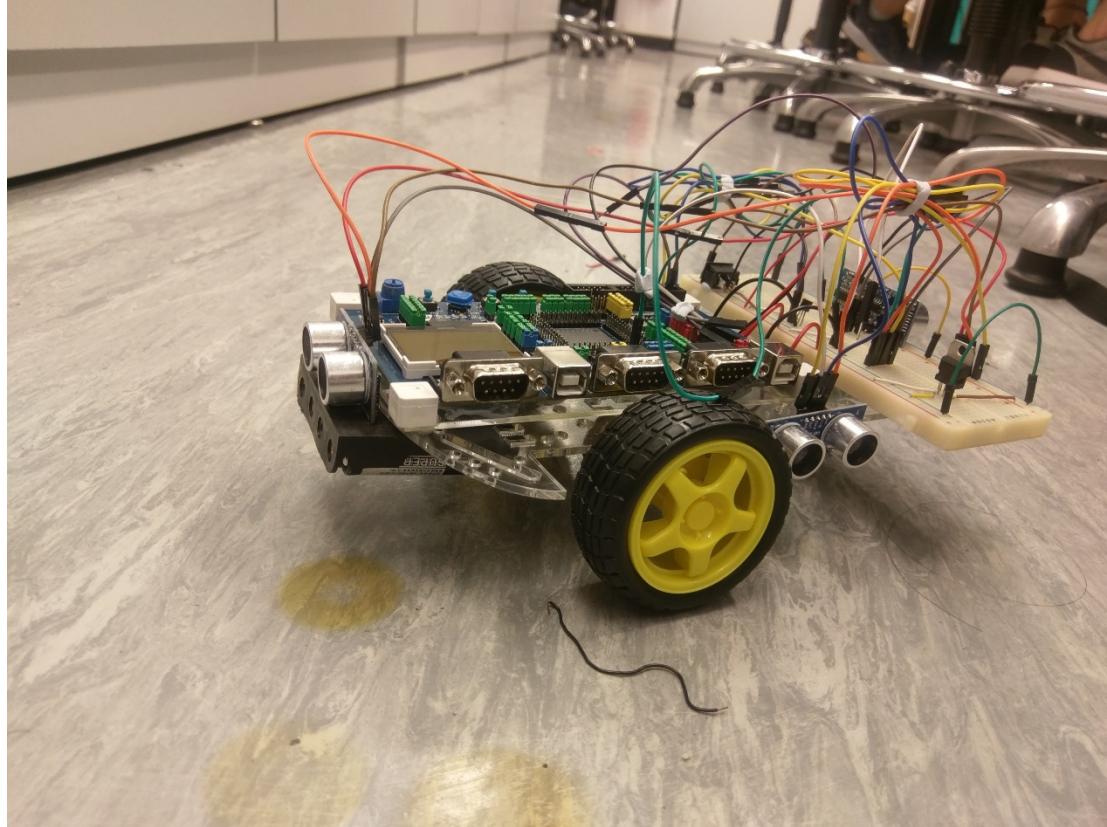
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	28
Project Title	SMART Transportation Car
Name of Student 1	Fong Chi Heng
Name of Student 2	Yeung Tung Hong

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Automatically find a route to the destination
- Can be controlled remotely
- Find its location in the map
- Find the distances of obstacles from the surrounding
- Avoid crashing with obstacles

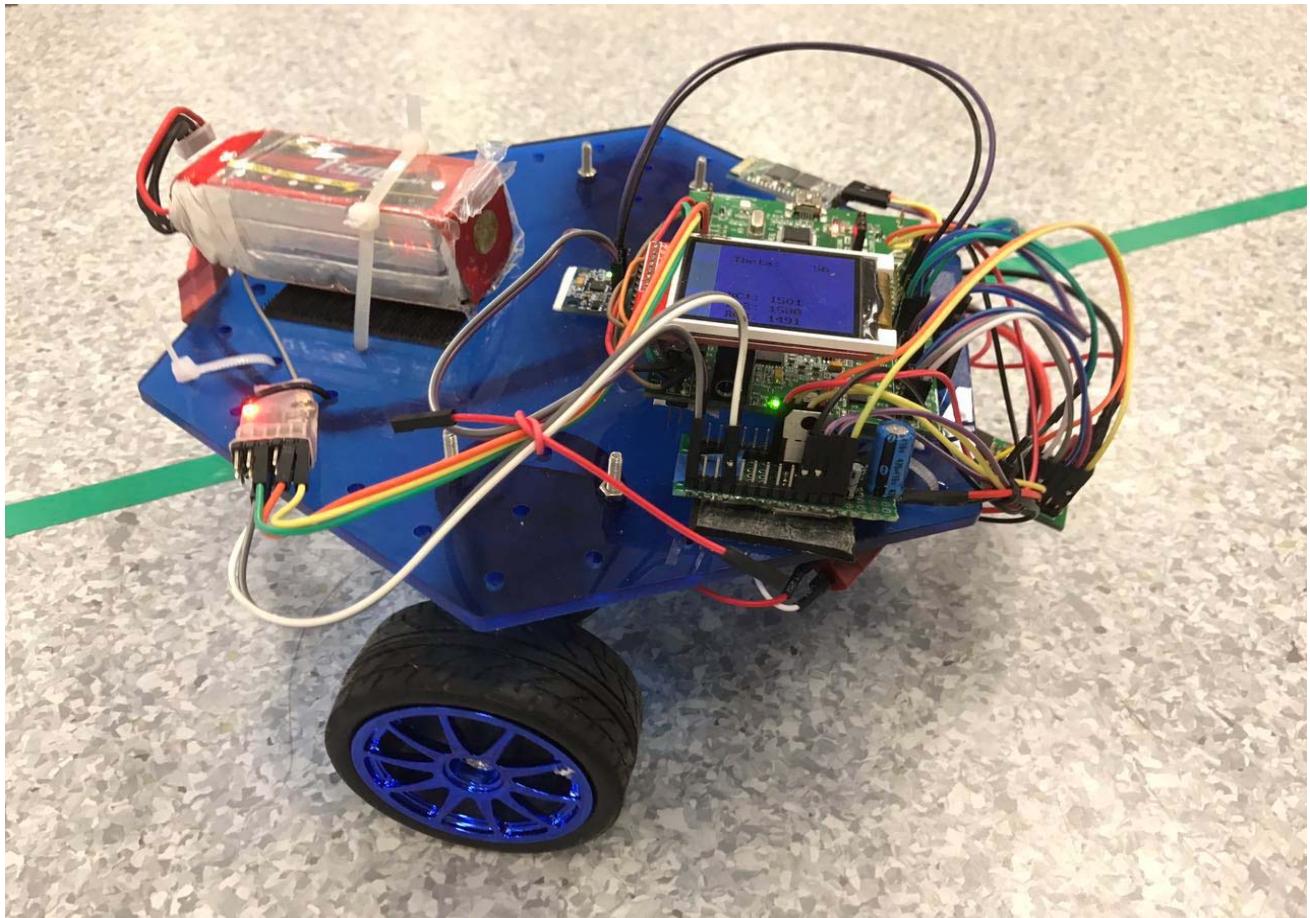
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	29
Project Title	Self-balancing Robot
Name of Student 1	ZHANG, Yitong
Name of Student 2	ZHANG, Zizheng

Please attach ONE photo of your project here



Please list the functions of your project in point form

- **Keeping balanced** automatically using motors, sensors and a microprocessor.
- **Realizing movements** (moving forward, moving backward, turning left, turning right and rotating) with a wireless controller.
- **Collecting data** (like speed, attitude) and **showing them on the LCE screen** in real time
- **Collecting data** (like speed, attitude) and **sending them to the computer via the Bluetooth serial port** for further analysis.
- **Recording the environment information** and keeping itself away from colliding with other objects.

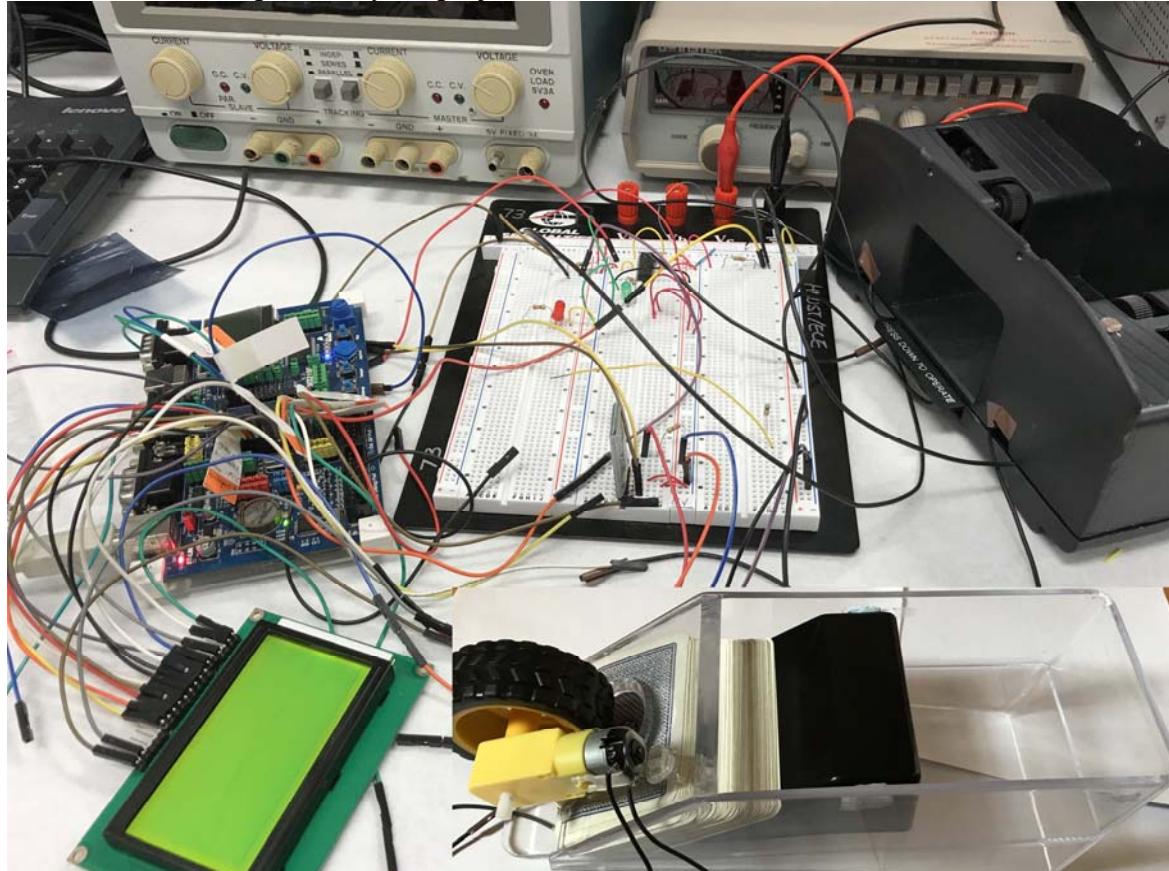
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	30
Project Title	Automatic shuffle and deal cards machine
Name of Student 1	CHAN King Hei
Name of Student 2	MUI Ka Yin

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Bluetooth
 - Use Bluetooth to connect the machine and the user's mobile
 - Start the machine
- Shuffling machine
 - Use LDR to detect if there are any cards
 - It will stop until all the cards were shuffled
- Dealing cards
 - Use wheel to deal the cards
 - Control the duration time of the spinning motor, in order to control the numbers of cards are going to deal

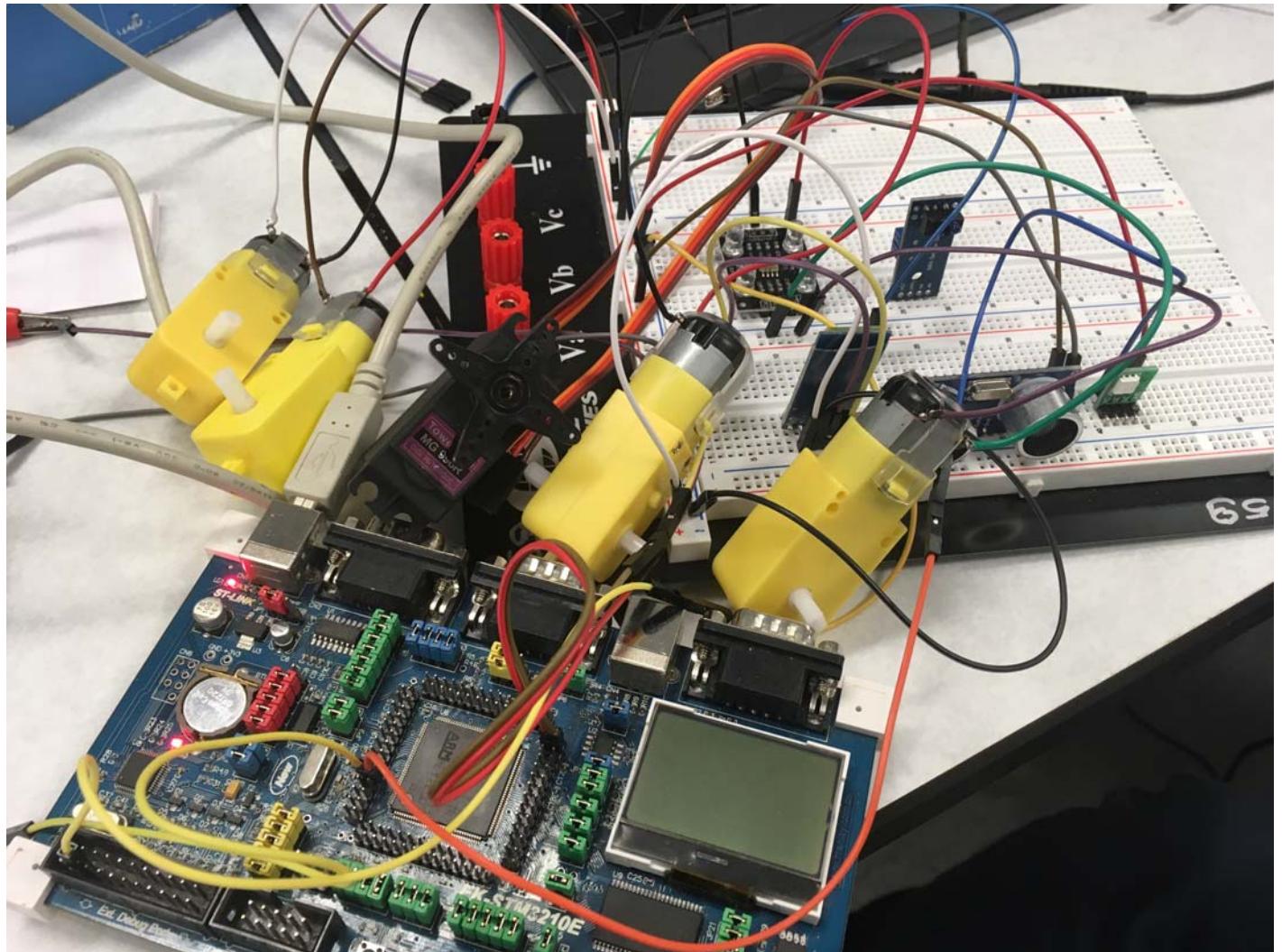
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	31
Project Title	Poke Killer
Name of Student 1	SHEK Tsz Kin
Name of Student 2	Wong Yeung Hoi

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Use mobile app to communicate with STM32 with Bluetooth in order to turn on/off “Cheat mode” and which player is the cheater.
- Selectively separate good cards and bad cards by Color Sensor.
- Store these two types of cards by two slots.
- Deal out the cards one by one by Motor when detecting there is a hand in front of the machine by around 4-6 cm with Ultra Sonic Sensor.
- Turn to the next player after one player is done by Servo Motor.

ELEC 3300 Project Summary Sheet

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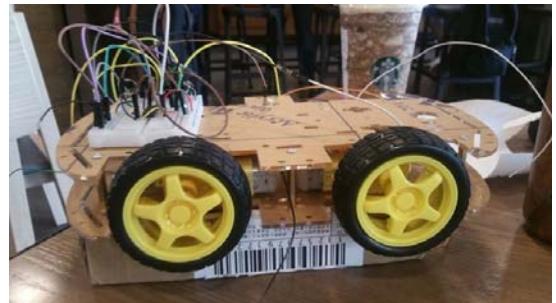
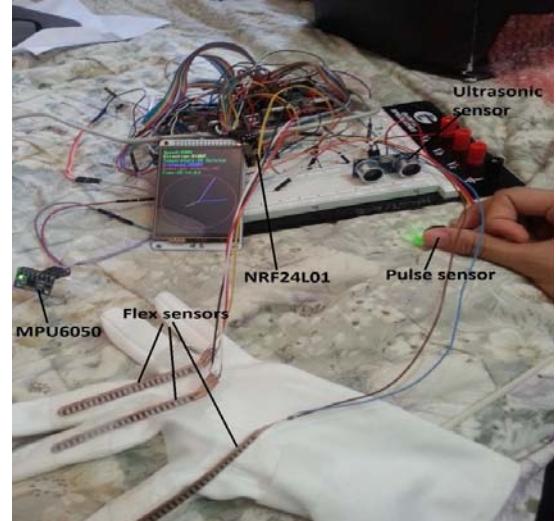
All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	32
Project Title	Smart wheelchair
Name of Student 1	Ko Wing Fung
Name of Student 2	Hui Kiu Chun

Please attach ONE photo of your project here

Please list the functions of your project in point form

- The design is to provide opportunity for paralyzed or even seriously paralyzed patients to move away from their ward beds on their own. There are 2 modes for the wheelchair: Security Access Mode and Control Mode
- In Security Access Mode, users have to make use of the **accelerometer (MPU6050)** to input a password, so as to start the function of wheelchair. After passing the data from accelerometer to the filter, MCU will make decision whether the motion is along X or along Y by setting certain thresholds. The preset password code is “X,Y,X,Y”. If the password is defaulted, users need to input it again
- After getting the access of wheelchair, it comes to the Control Mode:
- Users can simply slightly move their fingers and hands to determine the motion and speed of wheelchair. 2 **Flex sensors** (in total of 3) are utilized to provide the changeable speed function by using the degree of resistance in collaborating with the bending angle of flex sensors. The samples are passed to the ADC of stm32 and takes the samples. To remove the noise and obtain a desirable result, a filter is passed to filter out noises. (Taking 100 samples and get the average). Then, the filtered signal will be processed by a mathematical formula and generate a number for CCR register (A number to control the duty cycle of PWM)
- The **Accelerometer (MPU6050)** is to control 4 directional motions of wheelchair, including forward, left, right and stop. By rotating the accelerometer to the left, right, horizontal level and upside down provides a left, right, forward and stop motion respectively
- The CCR number generated by flex sensors and direction of motions by accelerometer are packaged and transmit to the car-motor structure, connecting to the hardware components (**motors and IC: L293D**), via the **NRF** wirelessly. **BJT** is used to amplify the signal from 3.3V to 5V
- Ultrasonic sensor** is applied and attached to the car module. It determines the distance of car and obstacles ahead. It transmits wave regularly using the interrupt. Once wave is received, stm32 stores the distance in a buffer. When the time comes (while loop), distance will be shown on the LCD monitor
- Heart Beat Pulse Sensor** is also used to keep checking the heart beat rate of user and values are displayed on the **LCD monitor** (Taking sample in interrupt procedure and pass through a filter). Not only that, temperature (by MPU6050) is also measured and display on the LCD monitor.
- RTC Clock** is used to demonstrate the time function. It counts every second. When the battery is connected to the stm32(Vbat has voltage), even if stm32 resets, RTC configuration still persists(readjustment of time is unrequired) and clock is still counting. A clock picture is displayed on LCD monitor using mathematical formulas.



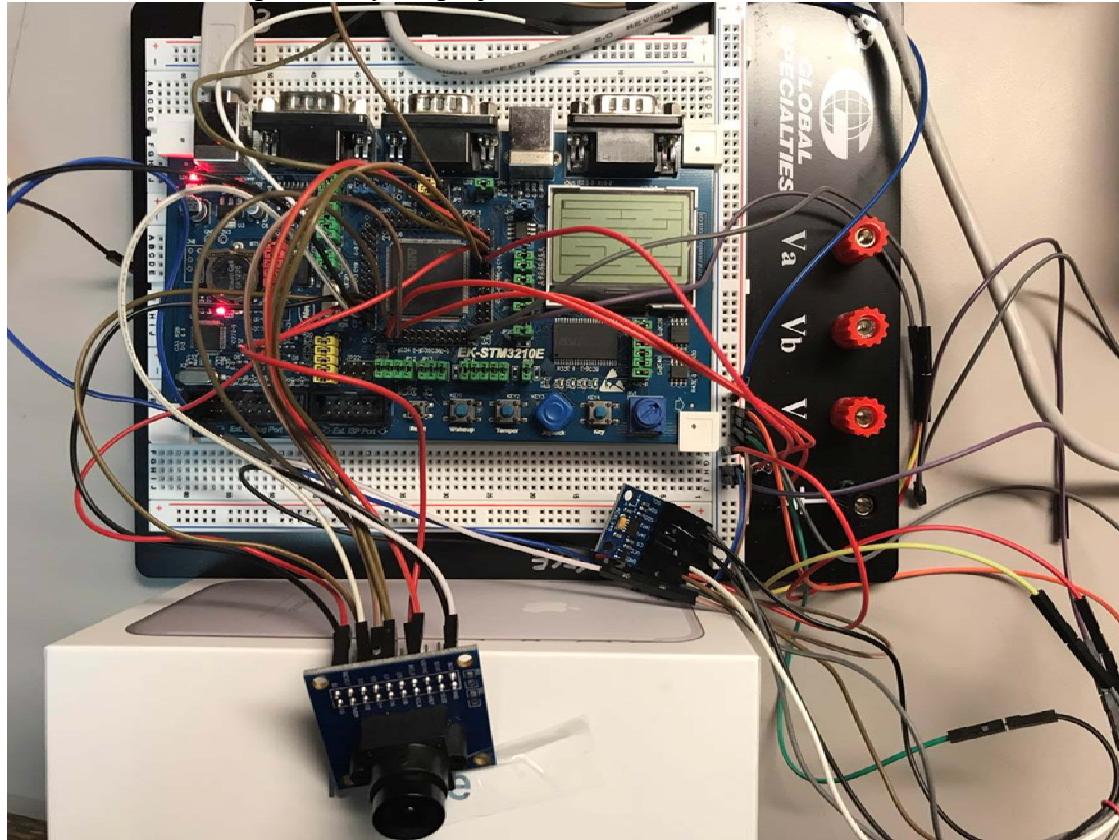
ELEC 3300 Project Summary Sheet

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Group Number	33
Project Title	Rush Maze
Name of Student 1	CHEN, Ziqi
Name of Student 2	

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The player needs to exit a maze in one minute
- LCD screen will display the maze and a block indicating the player's position
- The accelerometer sensor is used to control the left/right/upward/downward movement
- The camera is used to take photos and allow the player to select a maze

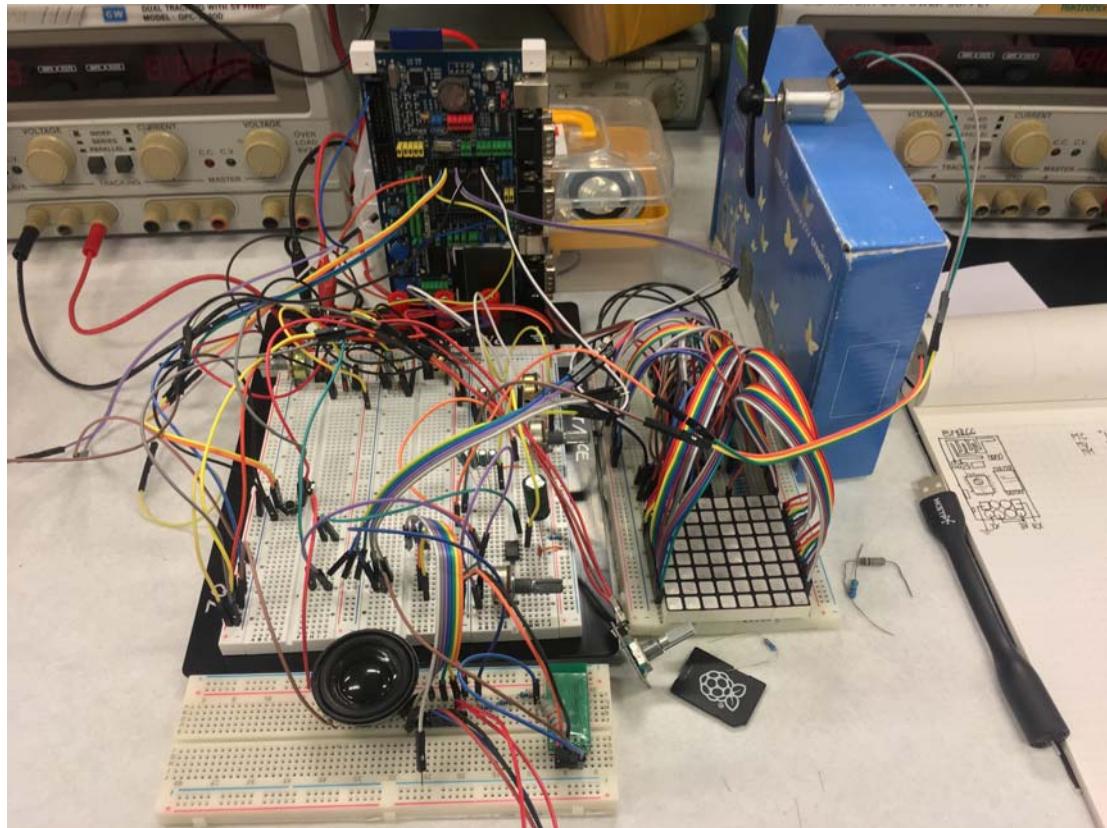
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	34
Project Title	Smart LED Speaker
Name of Student 1	LEE, Eun Shang
Name of Student 2	NG, Chung Ki

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Play music from the SD card
- Clock and alarm
- Display the time and music visualization on the LED matrix
- Temperature-controlled cooler fan
- Control locally by button, turning knob and LCD display
- Remote control achieved by Bluetooth via an Android app
- Single voltage power supply

ELEC 3300 Project Summary Sheet

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Group Number	35
Project Title	Remote Control Rescue Car
Name of Student 1	Lui Chun Ngai
Name of Student 2	Ng Tszi Hong

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The Rescue Car can move in different direction
- The camera can rotate by a turret
- The camera can capture live video and display on the controller
- The car is controlled by another MCU board and the data are transferred by Bluetooth modules.
- A buzzer alert the users to locate the object being searched.

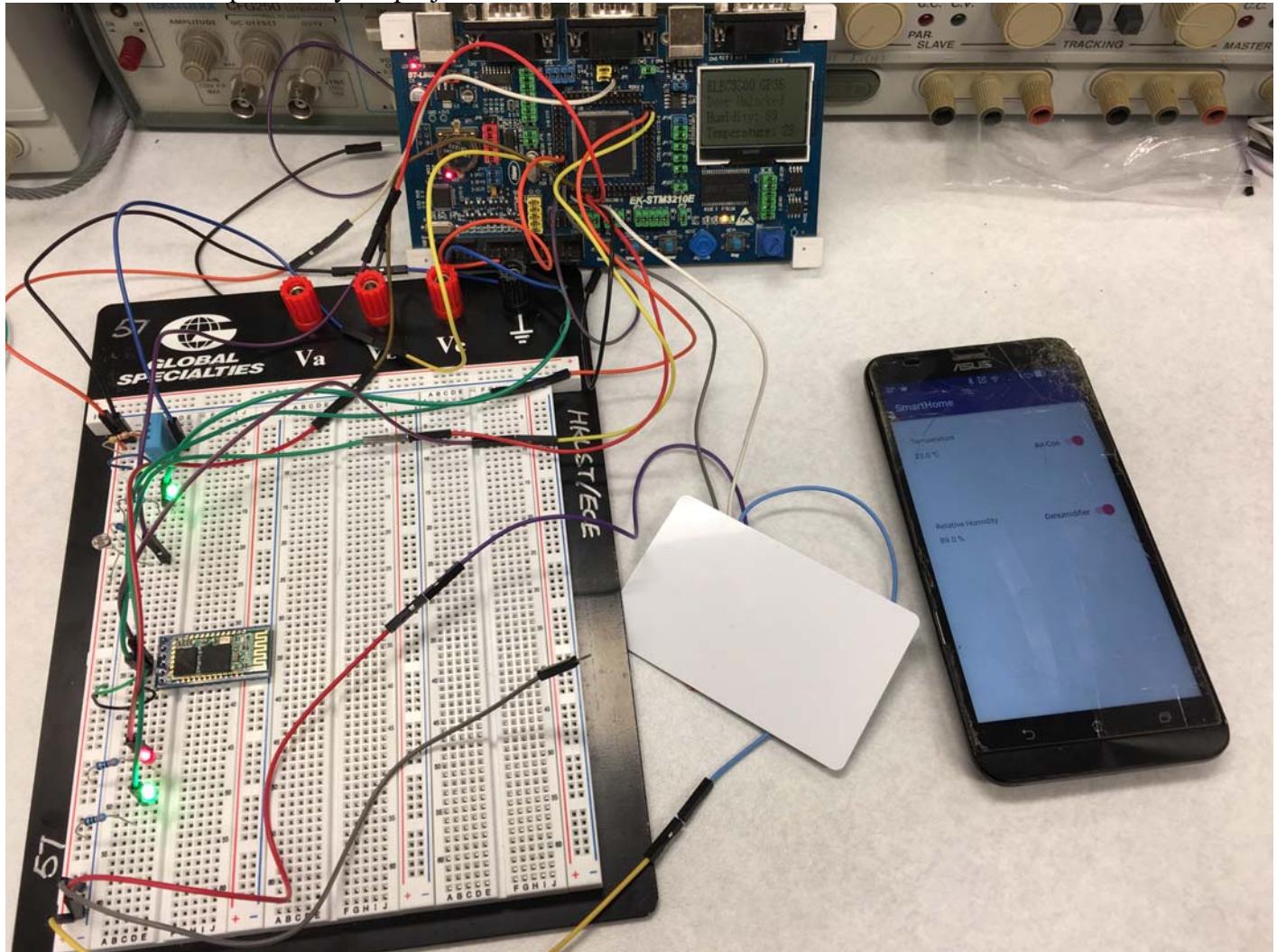
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	36
Project Title	Smart Home System
Name of Student 1	Cheung Wing Lun
Name of Student 2	Wong Kai Dik

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Use DHT11 to detect the temperature and relative humidity of the room.
- Use Light Dependent Sensor to detect the darkness. Turn on the light if the room is too dark.
- Use PN532 NFC module as door lock system
- Use HC05 bluetooth module to send the DHT11 data to mobile app and to receive the command from mobile app

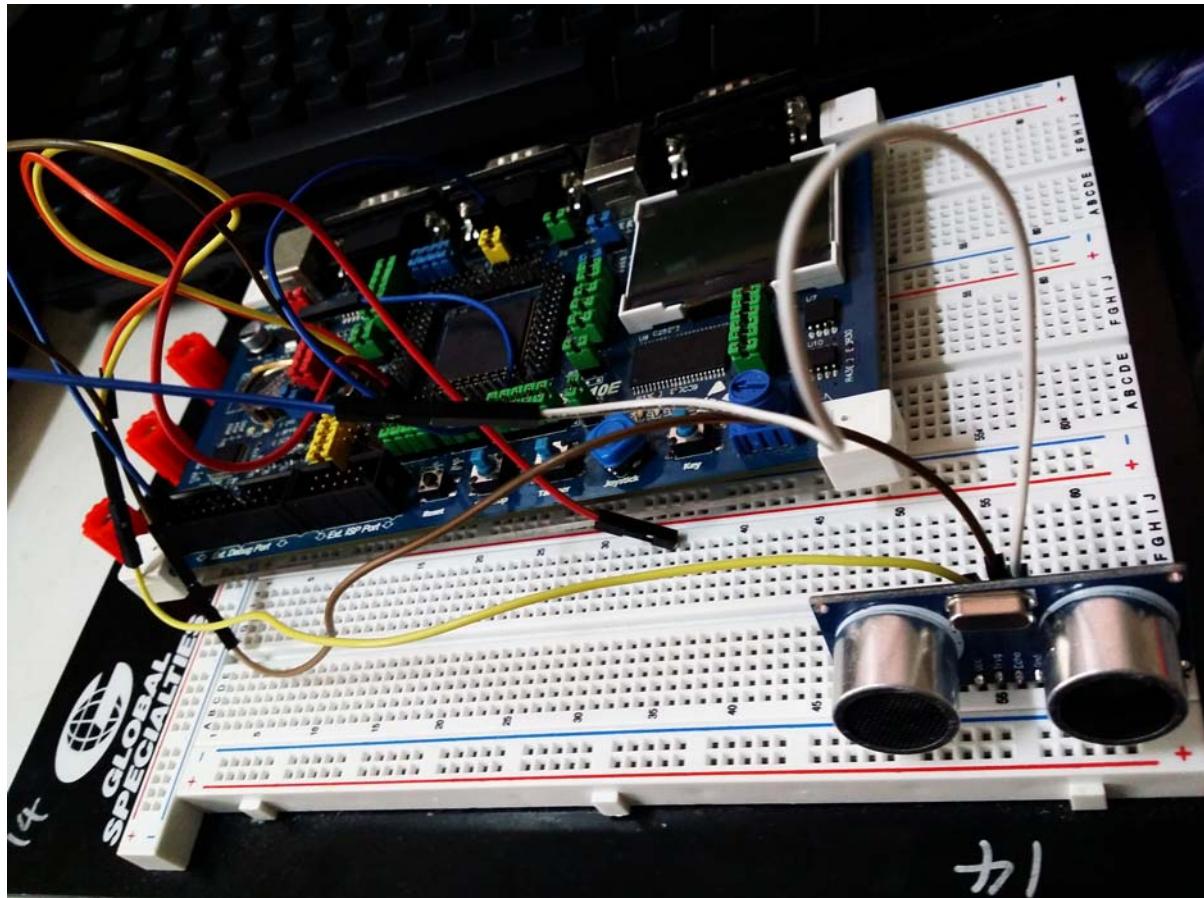
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	37
Project Title	Ultrasound detector
Name of Student 1	CHAN, Yun King
Name of Student 2	WU, Wang Hin

Please attach ONE photo of your project here



Please list the functions of your project in point form

- When detecting obstacle, LED will turn on.
- Show the distance between the detector and the obstacle on LCD.
-

ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	38
Project Title	Engineering Quadrotor
Name of Student 1	WANG Luqi
Name of Student 2	HUANG Shan

Please attach ONE photo of your project here



Please list the functions of your project in point form

- A Quadrotor which can perform basic flying gestures, including the adjustments of raw pitch and yaw.
- Controlled by a remote controller RX701, control signals are further sent to STM32 board for processing.
- A STM32F407 board installed on the Quadrotor, which are responsible for receiving the control signal and generate corresponding PWM signal to the ESC after complicated analysis. Build in MPU6050 provides gyroscope, accelerometer and magnetometer(I2C), which get the useful information of the flying gestures.
- Ultrasonic(USART) and barometer(I2C) aided height control. Enabling the quadrotor to be roughly stabilized in a desired height.
- 360 degree Lidar(USART) installed on the quadrotor, which constantly scan the environments and send the data to the ground control center via a blue tooth.
- A ground control center connected to the quadrotor via a Bluetooth(USART).
- The ground center can display the sensor information sent back from the STM32F407 board as well as the control signal send by the remote controller, making it easy to compare and analyze.
- The ground center can draw a simple 2-D diagram to display the surroundings of the quadrotor.

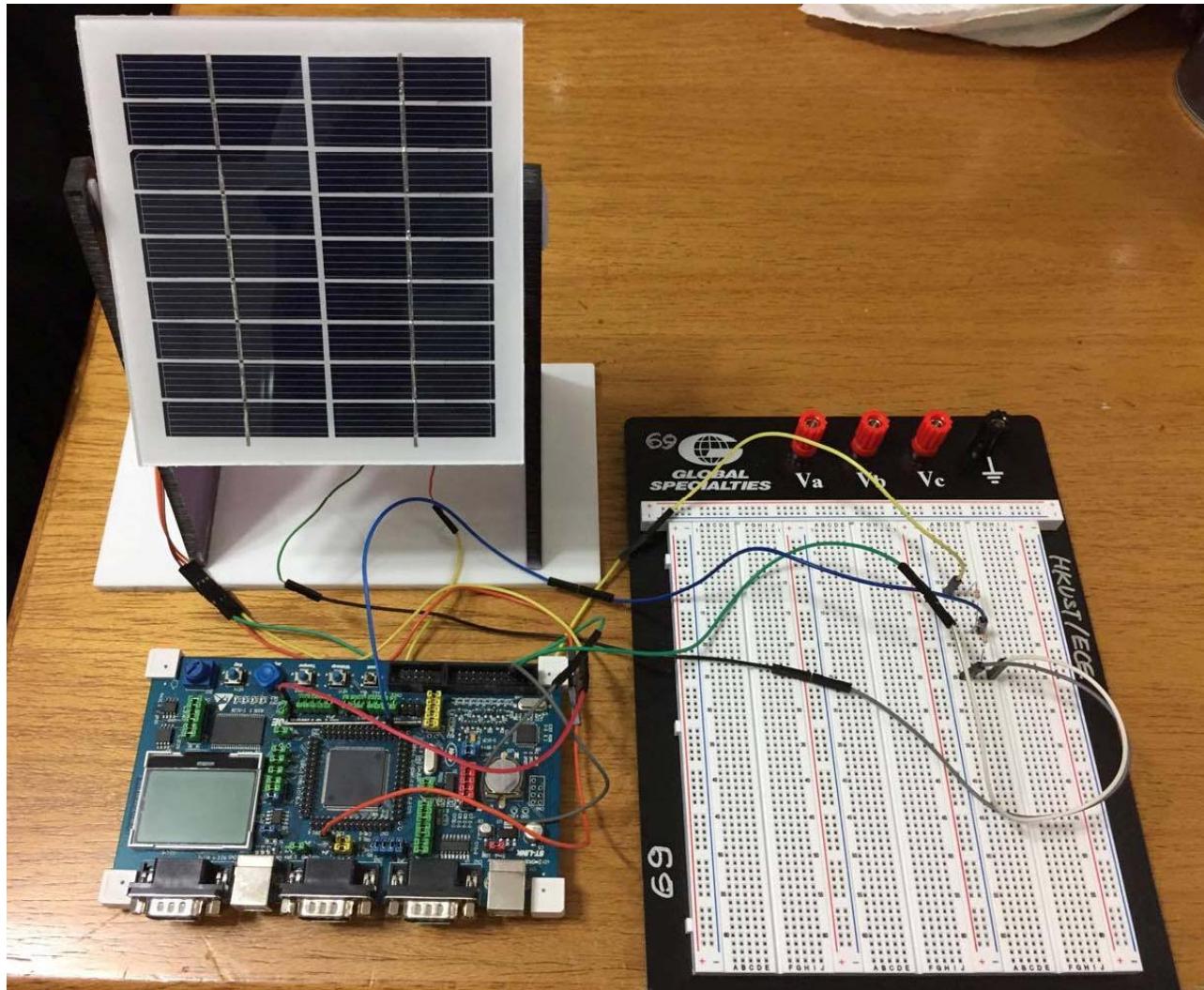
ELEC 3300 Project Summary Sheet

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Group Number	39
Project Title	Sun Tracking Solar Panel
Name of Student 1	Lai Man Hoi
Name of Student 2	Wan Hiu Lam

Please attach ONE photo of your project here



Please list the functions of your project in point form

- optimize the usage of solar panels
- automatically search for the best position for the solar panels to generate largest voltage
- sweep through 160 degree and record the voltage generated by the panels at each 20 degree
- panels go to and stay at the position that largest voltage is generated
- conduct sweeping process again if the voltage dropped by 70%

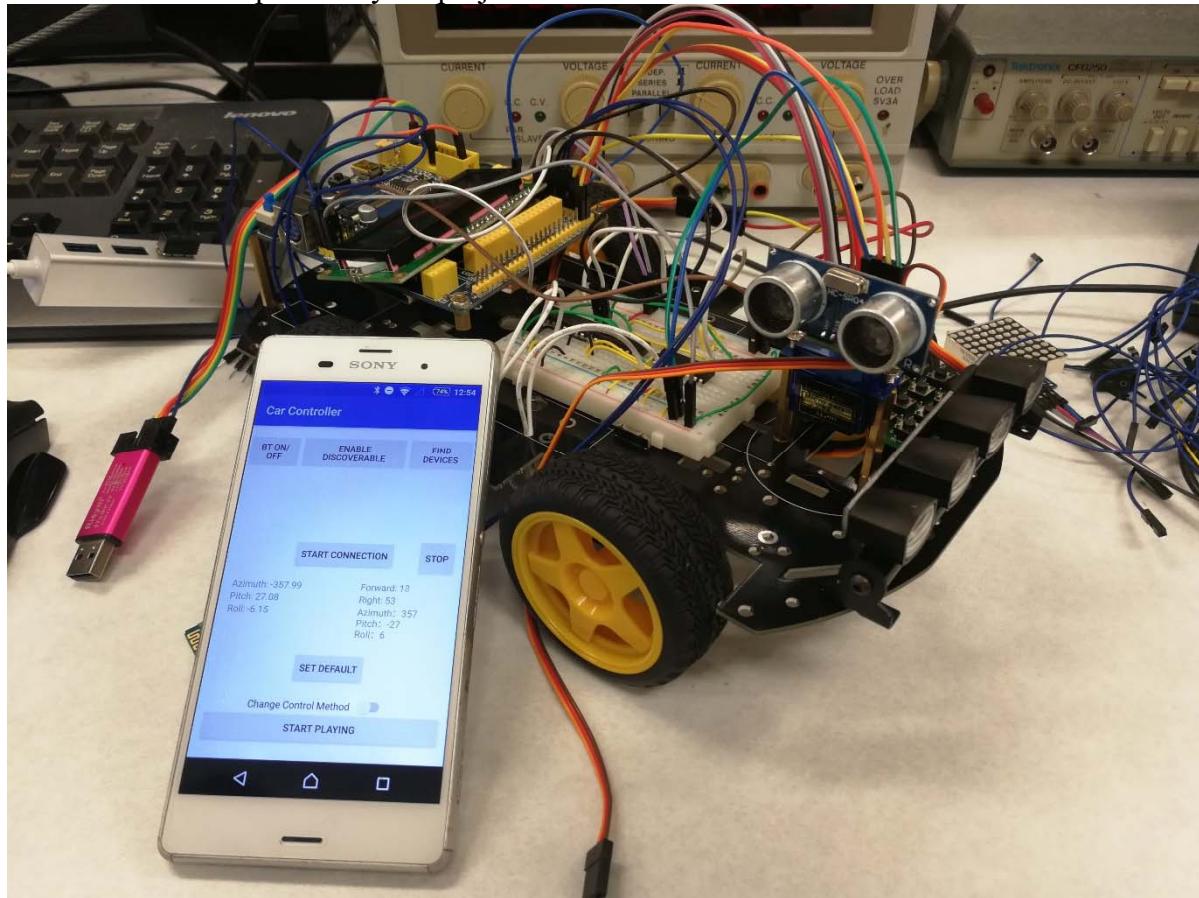
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	40
Project Title	Electronic Shopping Cart
Name of Student 1	JI, TONY WAI SUM
Name of Student 2	Liao, Kunjian

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Dual-mode Bluetooth control on Android Smart Phone, including using virtual buttons or gravity.
- Four wheels controlled by PWM signals generated by the MCU.
- Ultrasonic sensor installed on an SG-90 servo, enabling the car to detect obstacles by rotating to three directions, and turn according to the scanned results.
- Car headlights controlled by infrared sensor. If human approaches, headlights will turn on.
- Car can be unlocked and controlled only after entering a correct password by pressing buttons.
- Relevant information will be printed onto the LCD screen.

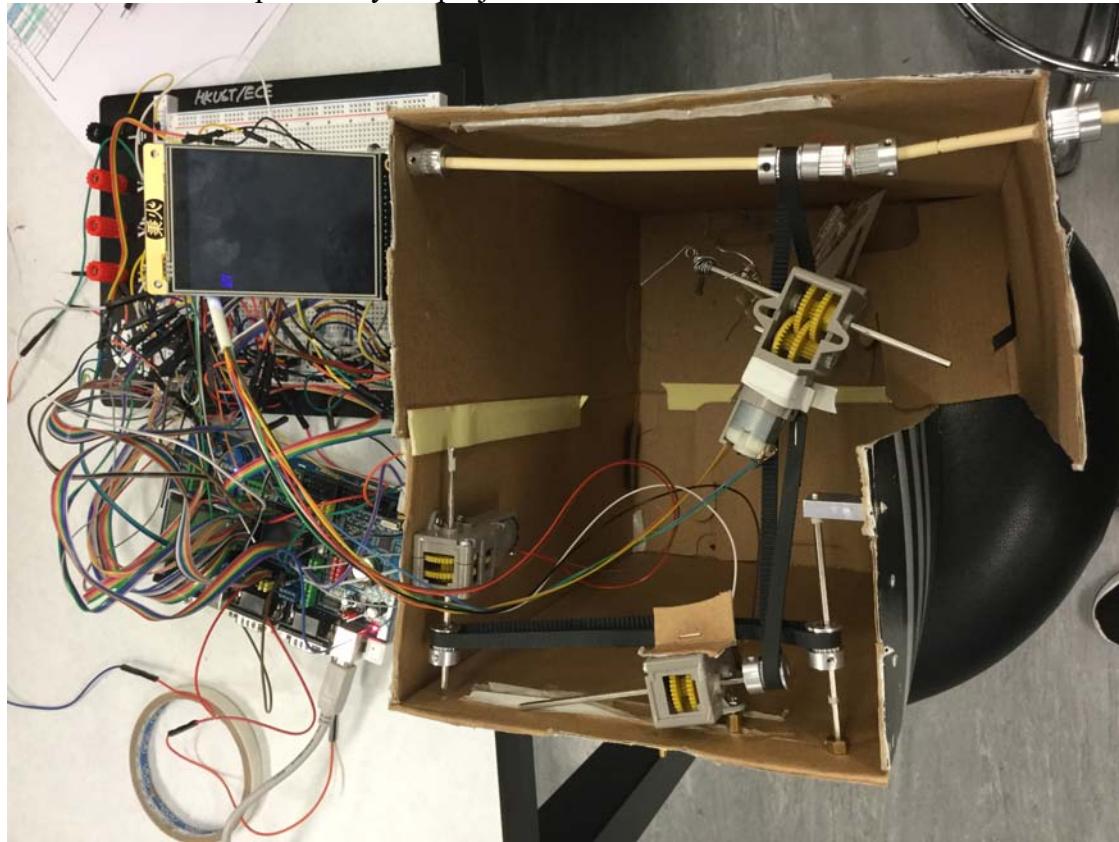
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	41
Project Title	Bluetooth Controlling Claw Crane
Name of Student 1	Hui Pak Hong
Name of Student 2	So Tit Kwan

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Control the claw movement by Bluetooth via phone.
 - The process is done by the USART communication between stm32 and the Bluetooth module.
 - When movement signal (directions and grab) is transmitted, stm32 will send the Enable signal (1) to corresponding transistors connected to motors, which will turn on the motors.
- The lcd will display some information about the claw crane, such as current mode (test or game) and the remaining time for a gaming session.
- Four interrupt signals are implemented to signal the stm32 that the claw part has reached the limited position, x and y direction. There are total 4 trigger switches for these four interrupt.
- A 1-Hz Signal is generated by Tim4 which has a master and slave relationship with Tim3.
- One interrupt signal is implemented as the global timer, which is rising edge triggered by the Tim4 signals. The interrupt will update the global time counter by one for every second.

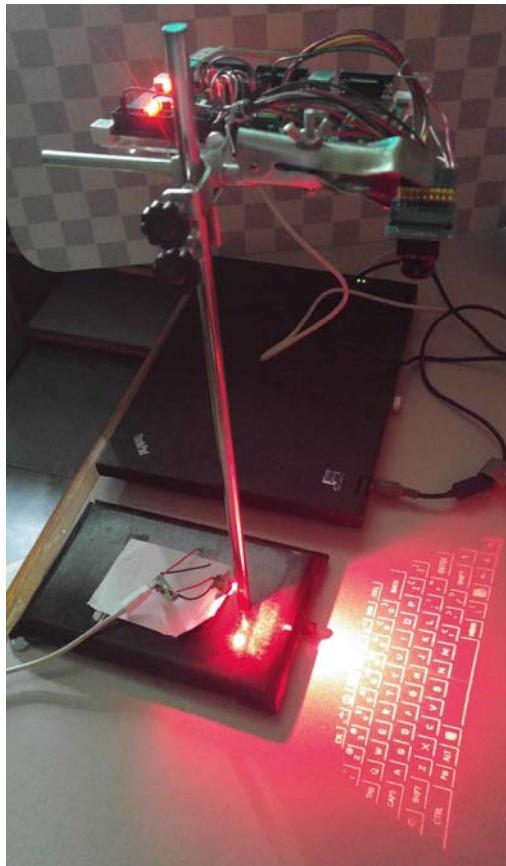
ELEC 3300 Project Summary Sheet

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Group Number	42
Project Title	Laser Projection Keyboard
Name of Student 1	Lee Sin Yee (20308202)
Name of Student 2	Lam Yip Long (20313415)

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Keyboard projector: Display the image of keyboard on the table
- OV7670: Use to captures images
- The camera is programmed to continuously record frames
- STM32 calculate pixels and detect the black pixels which are the color of the finger
- Use the black pixels to locate the coordinate and determine the value of the keyboard
- The value will display in the LCD.

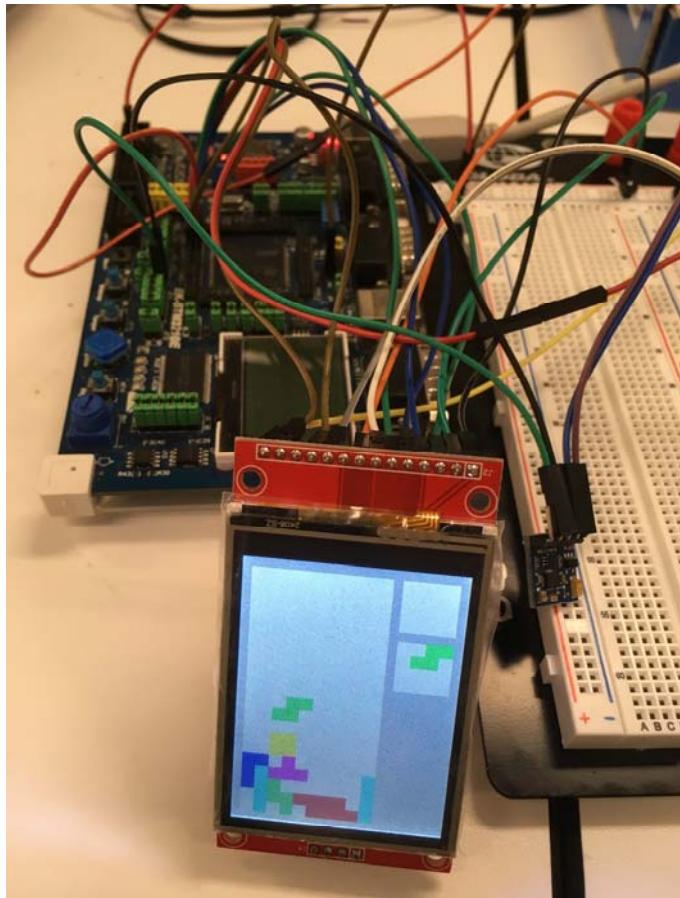
ELEC 3300 Project Summary Sheet

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Group Number	43
Project Title	Tetris Game with color LCD using accelerometer
Name of Student 1	KAM Ho Ming
Name of Student 2	LEONG Pak Ki

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Tetris Game shown by color LCD
- Accelerometer as a control(eg. Rotate left -> block move left)
- Show score on upper right corner
- Pause and restart game

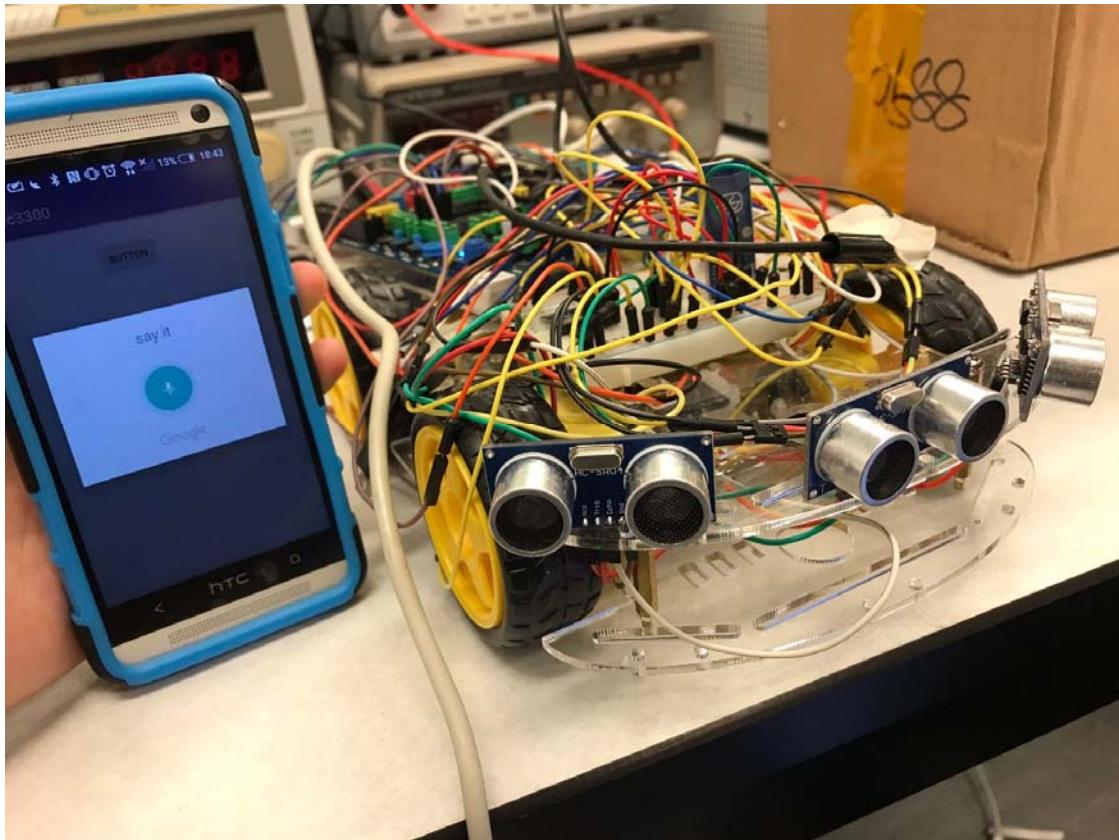
ELEC 3300 Project Summary Sheet

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Group Number	44
Project Title	Electric Car in Guiding the Visually Impaired
Name of Student 1	TSANG Pak Kin
Name of Student 2	LOW Jin Hui

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Obstacle detection with the use of ultrasonic sensors
- Voice detection through the implementation of Android app and phone's microphone
- Voice command by integrating Bluetooth module with the Android app
- Mode switching between Guiding mode and Explore mode
- In Guiding mode, the car could load the saved route from the SD card and guide the visually impaired to the desired destination
- In Explore mode, the car could save the corresponding route into the SD card while following the individual leading the car
- Guiding mode and Explore mode are aided by the reception of GPS coordinates generated from the user's phone through Bluetooth module
- Compass module (GY-282) is used to determine the car's direction
- Adjustment of car's sensitivity in terms of obstacle detection through manipulation of variable resistor on the STM32 board

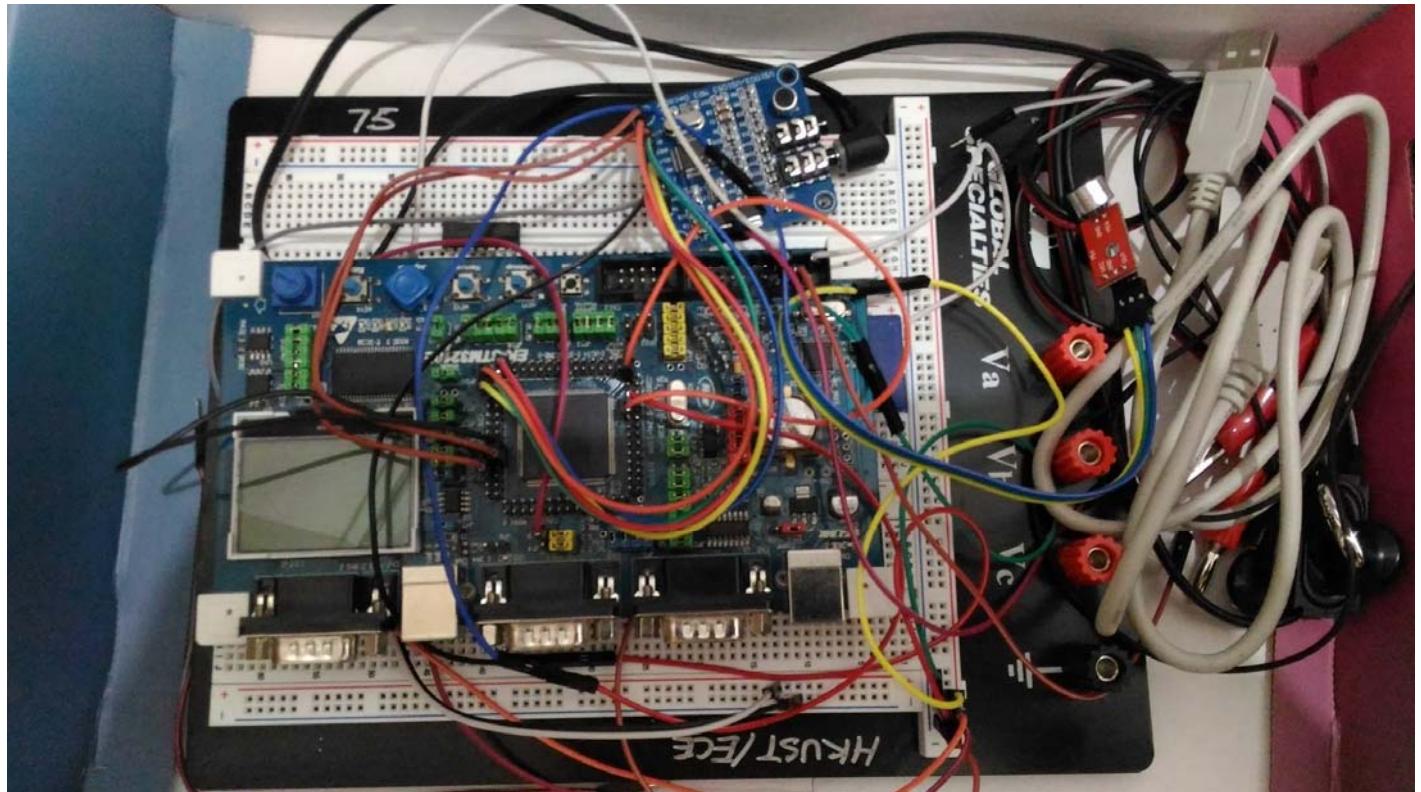
ELEC 3300 Project Summary Sheet

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Group Number	45
Project Title	Audio analyzer/Mp3 player
Name of Student 1	Tsang Chiu Sing
Name of Student 2	Chan Chun

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Input audio signal through ADC at 17.5kHz, process with 16 point fourier transform
- Display result with 4-band frequency spectrum on LCD: 1.05kHz 3.25kHz 5.45kHz 7.65kHz
- LCD refresh at 10Hz
- Read mp3 files from SDCard, extract ID3 tag info, play in-order using VS1003(SPI write byte to slave).

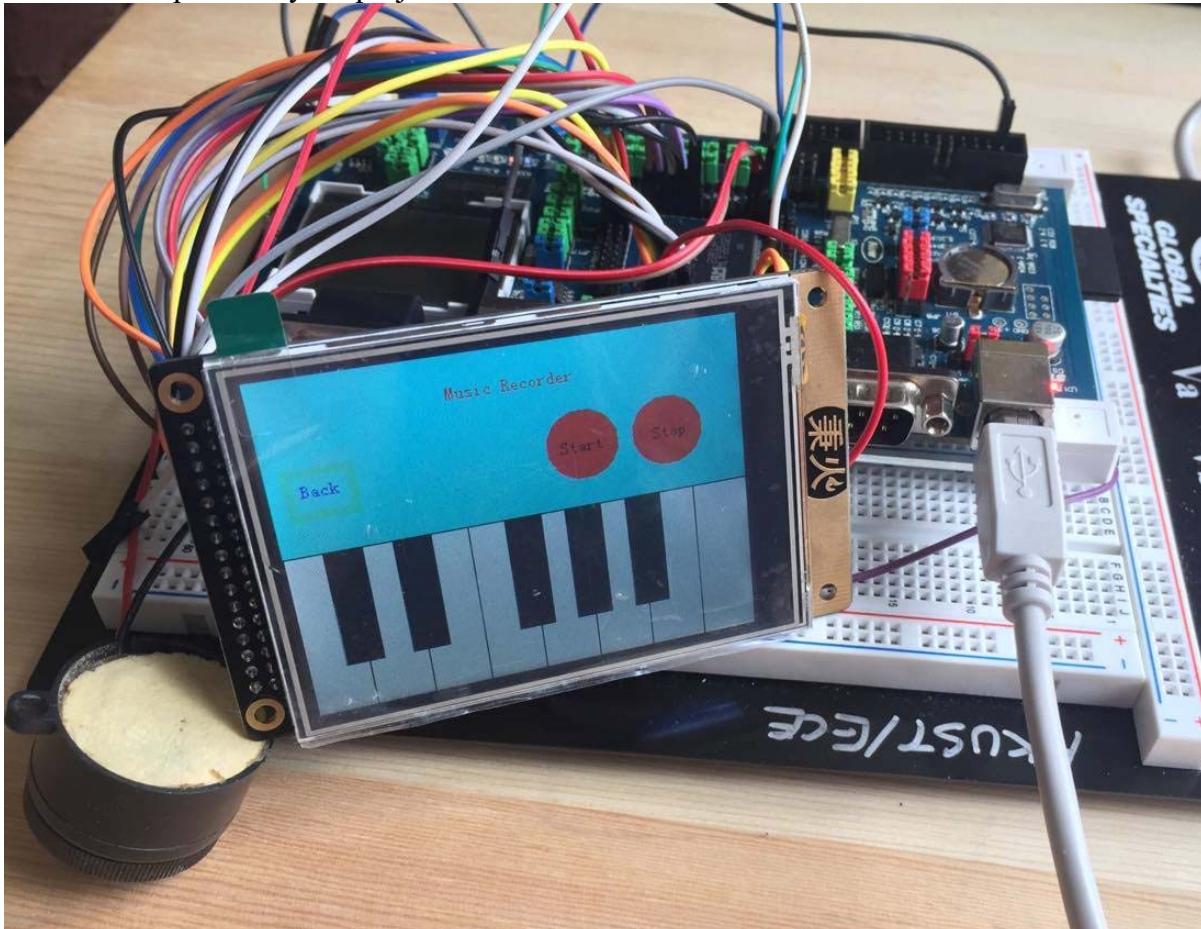
ELEC 3300 Project Summary Sheet

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Group Number	46
Project Title	Portable Piano
Name of Student 1	LEE Nga Wai
Name of Student 2	SZE Ming Tak

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Display a virtual piano on the touch screen
- Generate different pitches of sound via buzzer when pressing different piano keys
- Store the sequence and duration of piano keys pressed into SD card
- Play the stored sound pattern via buzzer

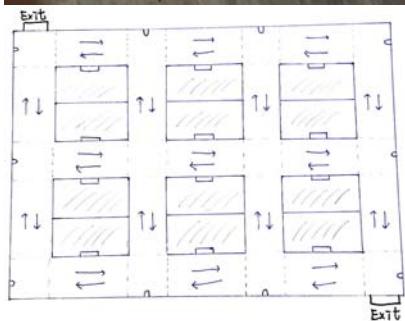
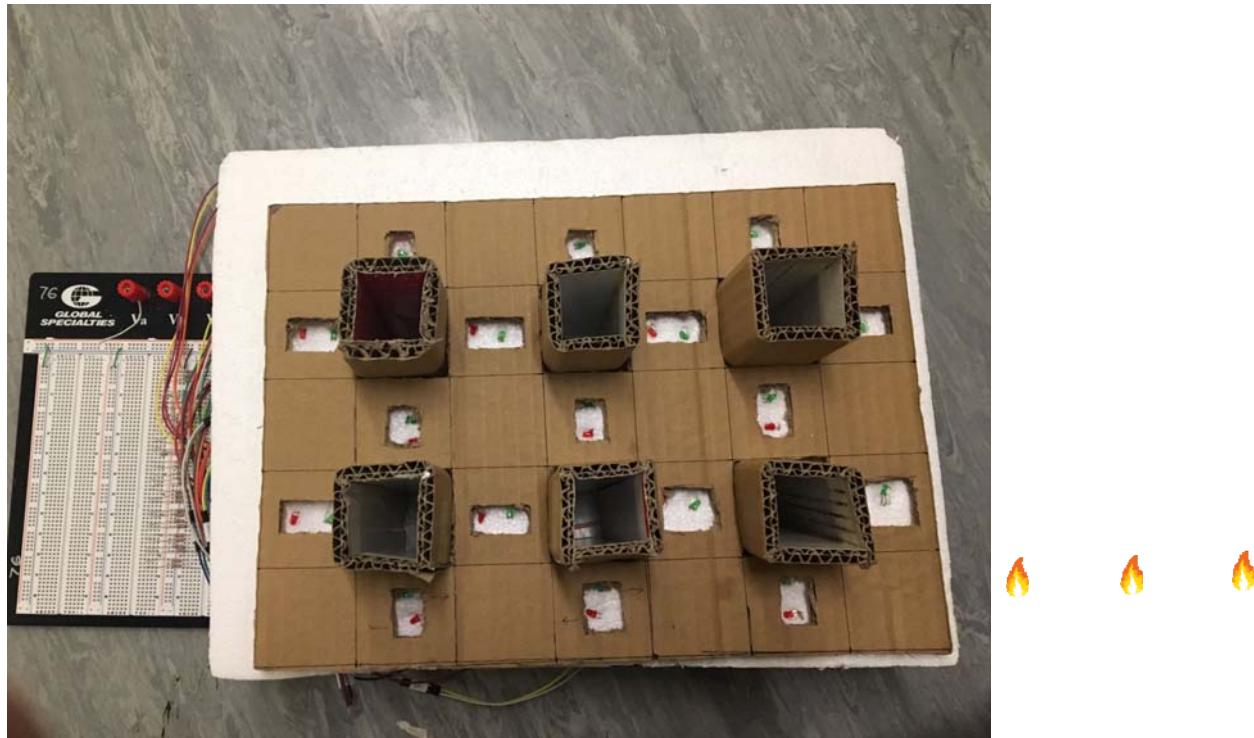
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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	47
Project Title	Fire Emergency Exit Design
Name of Student 1	Li Tsz Yin (20275417)
Name of Student 2	Lo Yan Kit (20274827)

Please attach ONE photo of your project here



The wires are under the plane

Please list the functions of your project in point form

- Detecting the location of the fire by Flame Fire Detection Sensors (Analogic and digital signal)
- The Emergency Path for the residents on LCD
- The Emergency Path also shown by LED
- Showing the actually location of the fire on LCD
- Using Timer to generate the Emergency Instructions

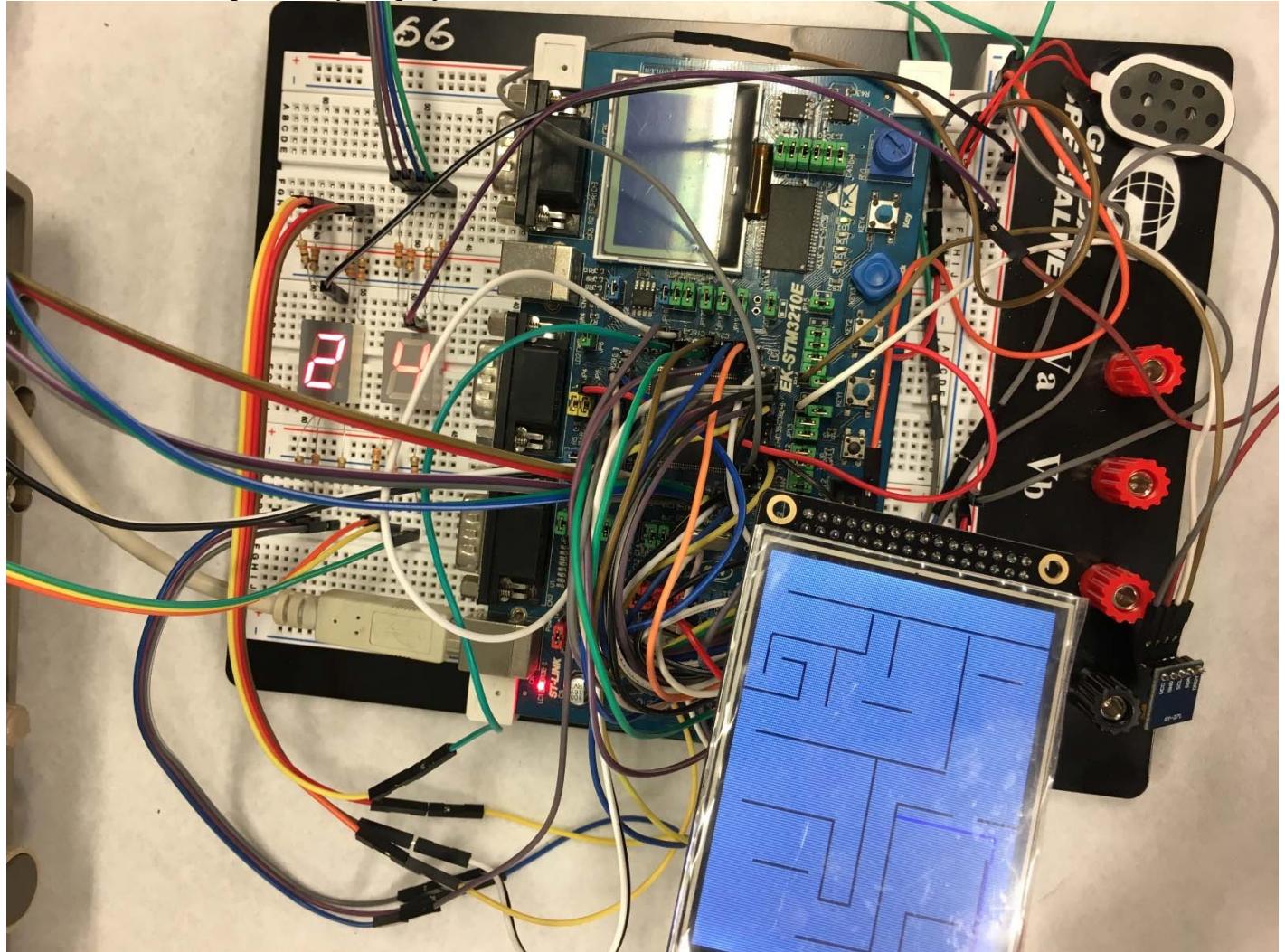
ELEC 3300 Project Summary Sheet

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Group Number	48
Project Title	Maze game
Name of Student 1	Chan Chi Chiu
Name of Student 2	Chan Kam Yiu

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Display maze with a hidden vocab in each maze
- Use 3-Axis Digital Compass IC to play
- Produce sound when hitting the wall
- Save image displayed on LCD into SD card
- Display time limited with 2 7-segment

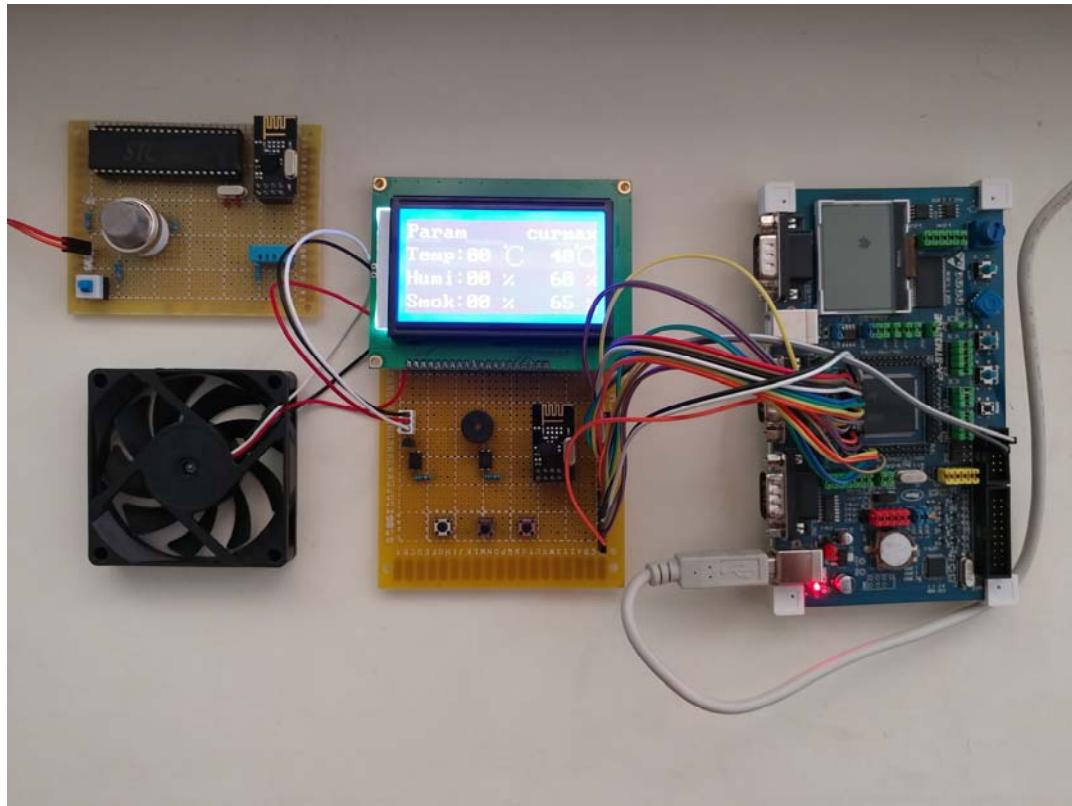
ELEC 3300 Project Summary Sheet

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Group Number	49
Project Title	Intelligent Home
Name of Student 1	CHAN, Chun Hin
Name of Student 2	CHONG, Kwan Lok

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Using STM32 as the central controlling unit with LCD12864 as display, only 8 data lines and 3 control lines are needed, and words could be displayed on LCD12864
- Measuring the humidity and smog level with DHT11 and MQ2
- Data from DHT11 and MQ2 is sent to STC12C5A60S2 and then NRF2401
- NRF2401 is used to collect data and transmit the data.
- There are three different data shown on LCD12864, which are humidity, smog level and also temperature
- Users are available to change the maximum level of humidity, smog level and temperature by three separate buttons.
- Once the current humidity of the room is higher than the preset value, the fan will turn on automatically and the alarm will buzz.
- When the current smog level in the room is higher than the preset value, the alarm will buzz.
- If the current temperature is higher than the preset value in the room, the alarm will buzz.

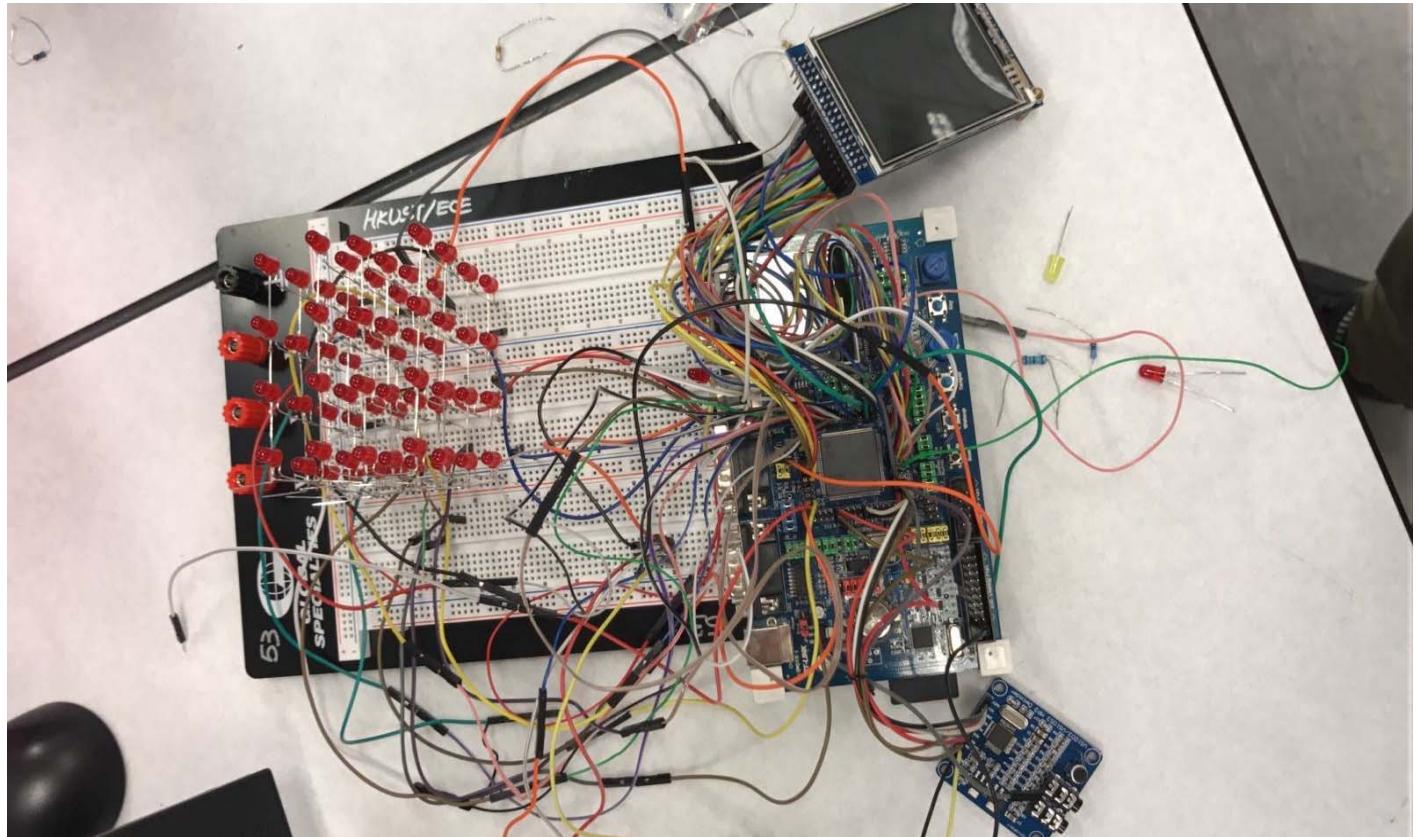
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	50
Project Title	Dancing Music Cube
Name of Student 1	MAK Kai Lap
Name of Student 2	YUEN Kai Cheung

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The Joystick is used to play music like a MP3, which can play, stop the music and change the songs.
- Read the music file from the SD card port.
- A screen is used to be a user-friendly interface, which can display words that makes control more understandable and easier.
- A LED cube displays a range of pattern effects while music is playing.

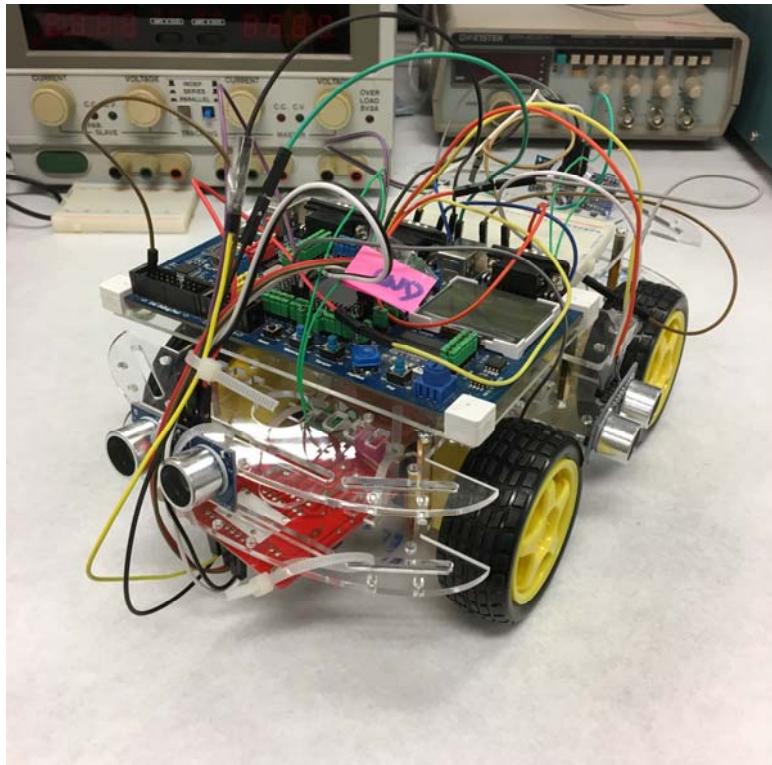
ELEC 3300 Project Summary Sheet

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All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	51
Project Title	Self-driving Robot
Name of Student 1	Betsy Weber
Name of Student 2	Jasmine Wong

Please attach ONE photo of your project here

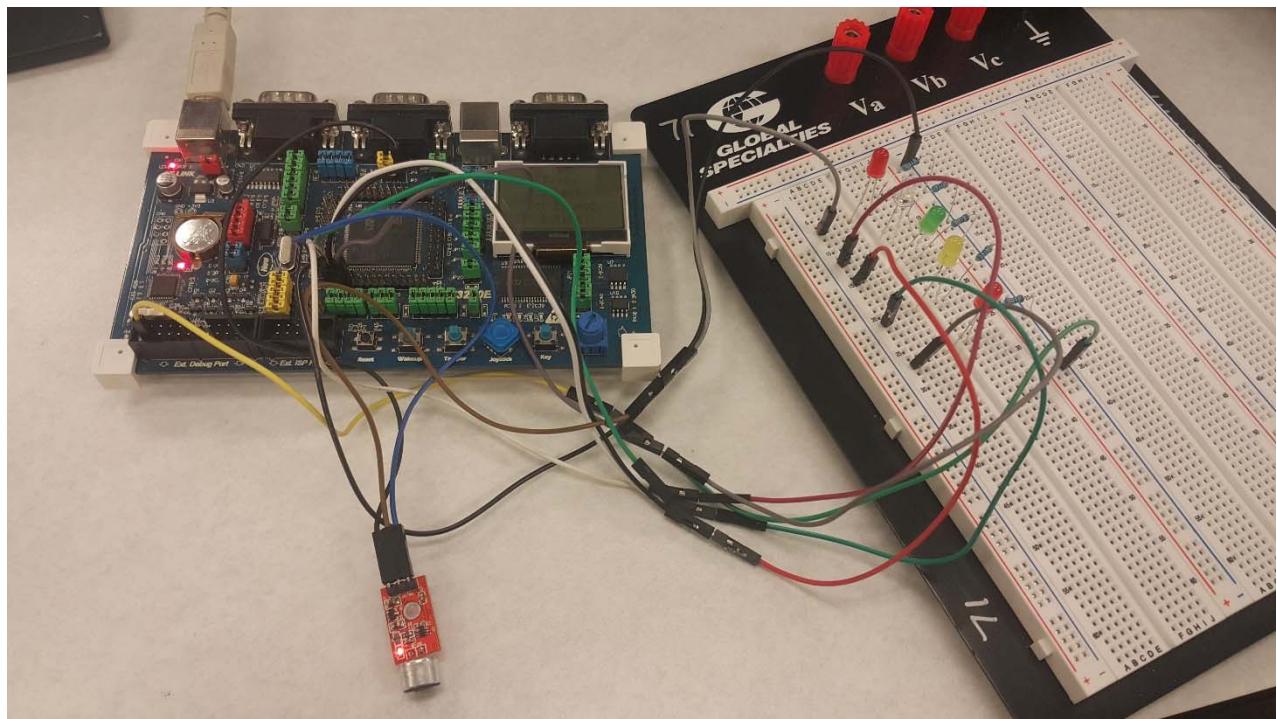


Please list the functions of your project in point form

- Robot can move backwards and forwards with the L298n Dual H-Bridge
- Robot can detect the distance from walls on all four sides using Ultrasonic sensors
- Using a compass sensor, the robot can detect what direction it is going and make 90 degree turns
- Robot can display the distance it has travelled using the LCD screen and a magnetic RPM sensor

ELEC 3300 Project Summary Sheet

Group Number	52
Project Title	Speech Controller
Name of Student 1	Chan Wing Wai
Name of Student 2	Koon Ka Ho



- Embedded LCD display the menu for the controller
- Record speech segment and store into flash memory of STM32 board
- Compare speech segment and calculate the similarity by DTW algorithm
- Invoke the corresponding command when the speech segment is matched
- STM32 board controls the LED light and function as switches
- Sound data is collected from MAX9812 chip and send to STM32 board

How to use:

Press Joystick Left or Right to select the mode, Left is Mode 1 and Right is Mode 0.

Follow the instruction showed on the LCD screen, and press joystick select for recording sample.

Mode 1:

It will record 5 different audio samples and compare with the sixth sample. After that it will find out the most similar result and display the distance (vary inversely with similarity) on the LCD screen. The corresponding LED will light on.

Mode 0:

It will record two audio samples for comparison. After that it will display the distance on LCD screen and the level of similarity will show by the LED. The level of similarity is vary directly when more LEDs light on. No LEDs light on means recognition failure.

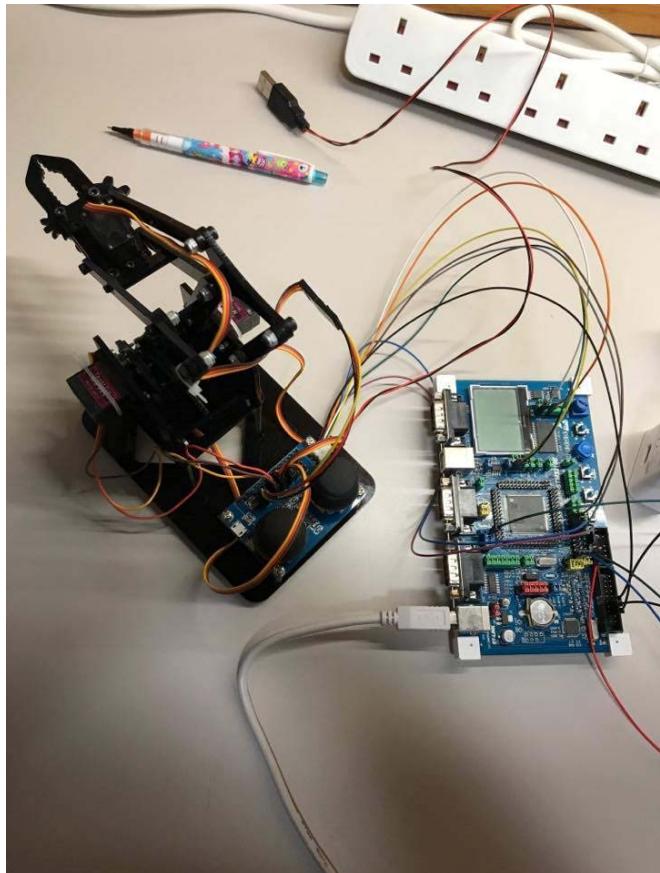
ELEC 3300 Project Summary Sheet

This is a ONE Page Summary Sheet, Content more than 1 page will be deleted.

All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	53
Project Title	Robotic Arm
Name of Student 1	Cheung Ka Tim
Name of Student 2	Chan Ting Lai

Please attach ONE photo of your project here



Please list the functions of your project in point form

- There are four steering gears in the arm and this can allow the movement of the arm
- The clip on the top of the hand do have two functions, help taking things, stirring drinks
- In order to let the steering gear move, we need to generate pwm signal(50 Hz) and there is a potentiometer inside a gear to detect the change of angle.
- We use two joy stickers to control the robotic arm.
- The lcd monitor can detect the four potentiometers which have 4 ways adc channels that pass through joy stickers and check the error.

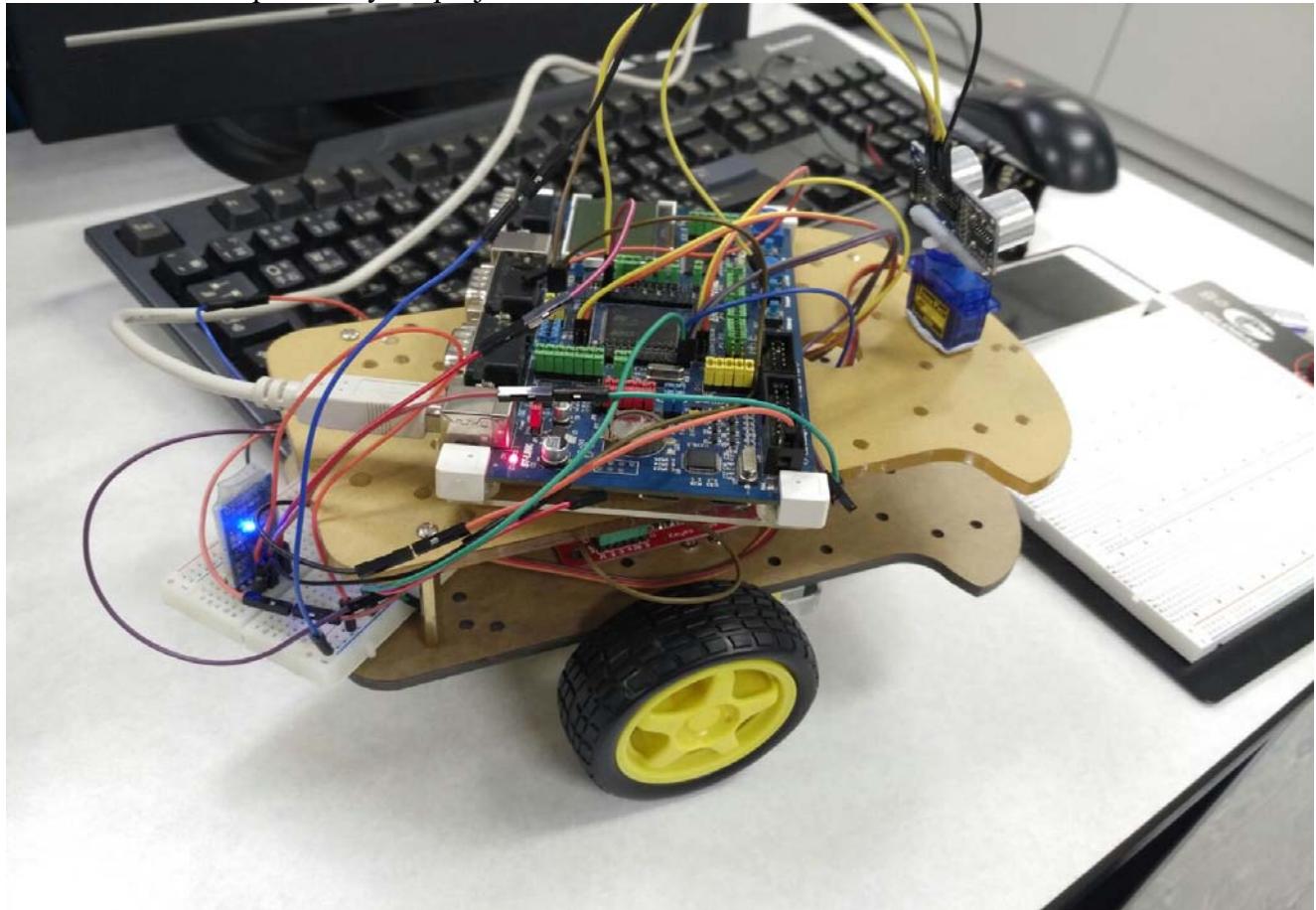
ELEC 3300 Project Summary Sheet

This is a ONE Page Summary Sheet, Content more than 1 page will be deleted.

All the fonts used in this Sheet should be in Times New Roman at 12 points

Group Number	54
Project Title	Robotic Rover
Name of Student 1	Chan, Hei Yin
Name of Student 2	SIN, Kwan Nok

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Two control modes to select: Remote control and Automatic control by using an app to the select control modes and Bluetooth for connection.
- Remote Control: Giving command the movement of the rover for remote control by using the Bluetooth module (HC-05).
- Automatic control: the rover will move automatically. Ultrasonic sensor (SR-04) is used for distance measurement and barriers detection. Servo motor with Ultrasonic sensor for changing the detect angle. Whenever encounter barriers in the front, it checks whether right or left has barriers and turn direction (always check right first).
- The role of STM32 is to control the motor drive (L298N package) for movement, Bluetooth module for connection as well as communication, ultrasonic sensor for measurement and servo motor for controlling the angle.

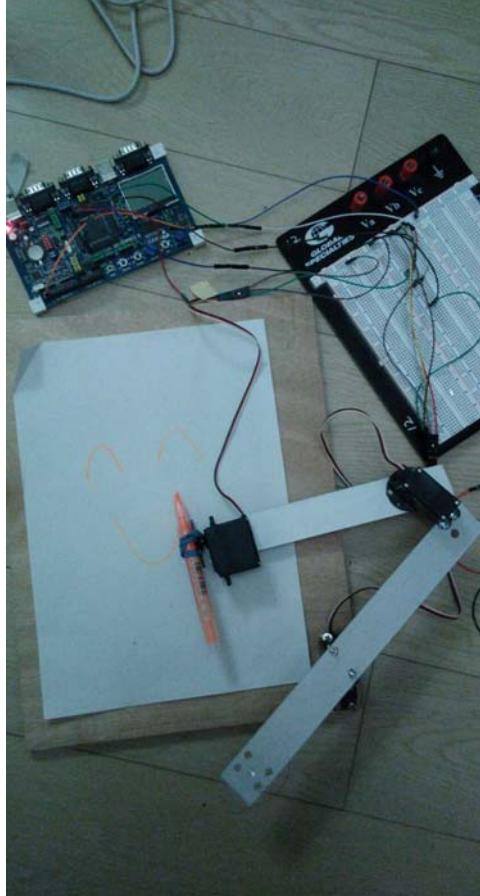
ELEC 3300 Project Summary Sheet

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Group Number	55
Project Title	Robotic Drawing Arm
Name of Student 1	LO TSZ FUNG
Name of Student 2	TSUI WING KEUNG

Please attach ONE photo of your project here



Please list the functions of your project in point form

- The robotic arm composite of two motor and able to perform movement on a horizontal plane
- The pen was control by the third motor which only perform up and down movement
- Sketechs straight lines and degree 2 Bezier curves
- The data structure to operate the drawing function

```
enum DrawType { I,D,N,C,L};
```

```
// Determine the action
```

```
//I = Initializing the robot arm position
```

```
//D = Draw that generate signal to the motor which move down the pen
```

```
//N =Not Draw that generate signal to the motor which move up the pen
```

```
// C= Curve that call a function which specfiy to draw curve
```

```
// L= Line that call a function which specfiy to draw straight line
```

ELEC 3300 Project Summary Sheet

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Group Number	56
Project Title	
Name of Student 1	YANG, Jun
Name of Student 2	YIP, Chun Hin Jeffery

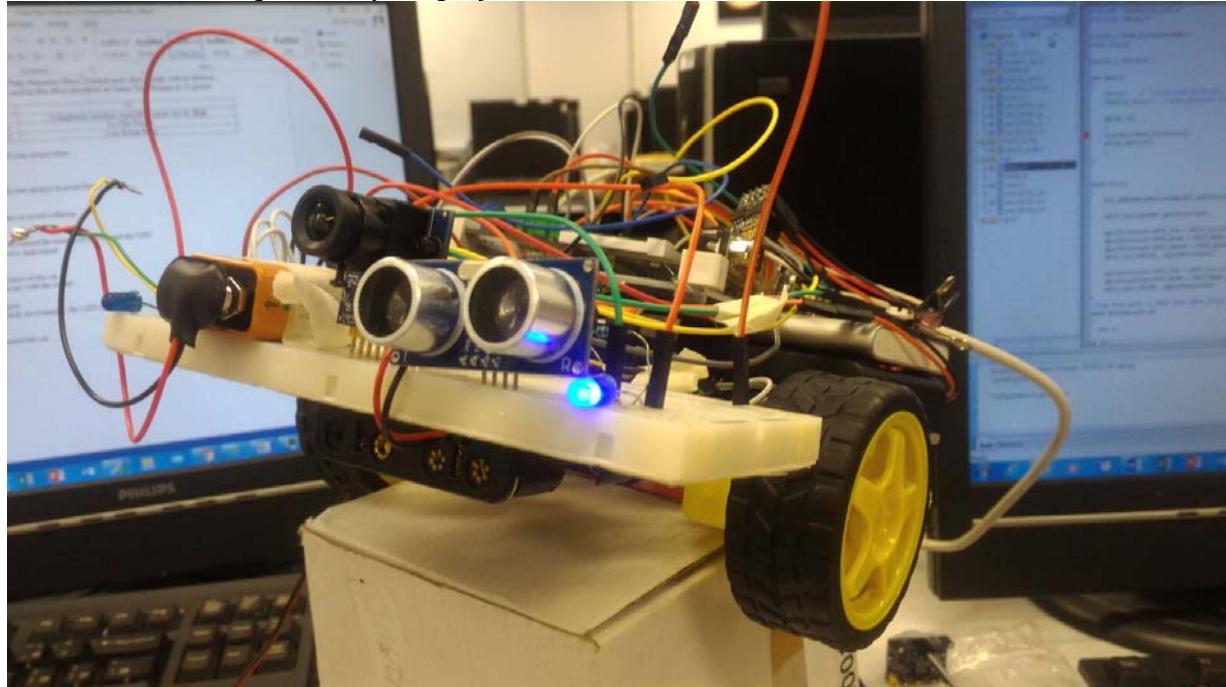
ELEC 3300 Project Summary Sheet

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Group Number	57
Project Title	Completely wireless controlled smart car by Wifi
Name of Student 1	Lo Chi Yeung
Name of Student 2	Law Kwan Ping

Please attach ONE photo of your project here



Please list the functions of your project in point form

- Avoid crash
Using ultrasonic sensor to avoid collision
- Wifi controlling
Provide wifi signal to control the motion of the car and the LED
Use USART to receive wifi signal
- Compass
Can know the direction of the car
Use I2C communicate with the signal
- Detect light intensity
When the car in dark environment, the LED can be light up
- Car movement
Use PWM to control the car