

Electrical Engineering Department
[Power Section]



Green Hybrid

Supervised

Prof. Dr. Ahmed Khairy Aboul Seoud.

Dr. Mohamed Mohamed Sedqy El Habrouk

Graduation Project

Moataz Muhammad Ibrahim Muhammad

Project's Abstract

Renewable Energy is the future of humanity, there is no denying. And nature as generous as it is, it gave us many forms of energy that we can utilize to generate the power we need to develop. Wind, Solar, tidal, geothermal, tidal and many other forms of energies are some forms of clean energy. Apparently, there are restrictions on utilizing these energies depending on the geographical position, topographical nature, geological nature and many other factors. Geothermal Energy, for example, is tied to places where there is a "leak" in the earth beds where water can be heated to steam by the heat of the core of the Earth. And Tidal Energy depends on costal position and high currents.

For a geographical and geological nature like Egypt's, Solar Energy and Wind Energy are the easiest forms of energy to be utilized. That's the main reason why we chose to shed more light upon the whole matter. Each renewable energy source plays a role in electricity generation. In the foreseen future, renewable energy will not be a choice but a must. Our role in this project is to gather these sources together, and make a hybrid system that elevates each of the utilized sources to optimum performance, to reach the needed energy demand and avoid the fatal drawbacks of conventional fossil fuel.

Green Hybrid reflects the world's need to increase the amount of electricity generated from renewable sources, gathering the most promising renewable energies which can raise the total contribution of clean energy in the electricity grid and decrease dependency on fossil fuels which will lead us to a more healthy and productive world. That is our goal, and that is what we will seek to achieve.

Electronics and Communications Engineering

Supervised

Prof. Dr. Ahmed Khairy About Seoud.

Dr. Mohamed Mohamed Sedqy El Habrouk

Graduation Project

Aya Mohamed Fouad

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Project's Abstract

HABCI is a brain-computer interface application that mainly targets paralyzed users, HABCI provides control over home appliances, the project contains **software and hardware** implementation of an automation system, this framework makes use of Emotiv EEG neuroheadset for data acquisition and arduino kits for device control

Project description:

Home automation (or Domotics) is a field of building automation aimed at the development of specific technical solutions for private homes and dedicated to the application of technologies for the comfort and security of its residents.

Many technological fields are involved in the realization of a home automation system ranging from electronics and computer science, to communication networks and the internet.

From the technological research point of view, the focus is on the creation of a smart system able to efficiently control and integrate all the typical home installations, such as:

- Heating, ventilating, and air conditioning (HVAC)
- Lighting
- Water delivery
- Access control
- Audio and video switching and distribution
- Intercommunication
- Remote process monitoring and control

Thus optimizing power consumption, comfort and safety.

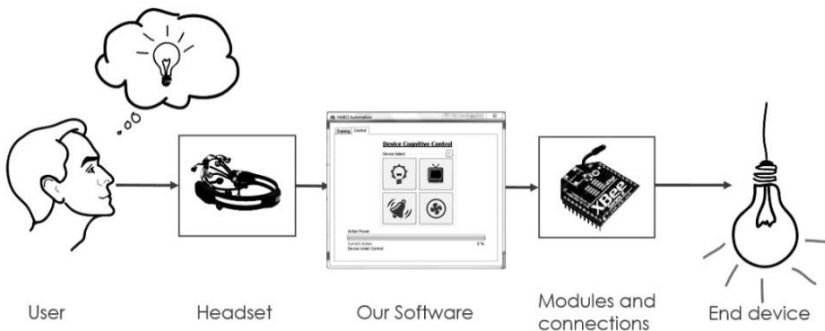
While generally conceived as a commercial technology for comfort and luxury in high-end buildings, this technology adds alternative and flexible pathways to the typical interaction paradigm of the user with his domestic environment, thus representing an accessible and efficient solution aimed at providing **disabled and old people** with a direct environmental interaction and significantly increasing the quality of life.

Why BCI?

People could use their brain activity to control devices directly. This is the definition of a brain-computer interface (BCI), as a communication system that monitors brain activity and translates certain characteristics, corresponding to users' intentions, into commands that operate a device. Defined this way, BCI systems could be very useful for people who are **dependent** on others, because of either advanced age or a severe disability, as it would open up a new channel of communication for them.

Technical view:

Our system



Application description

Our project 'HABCI' consists of 2 parts:

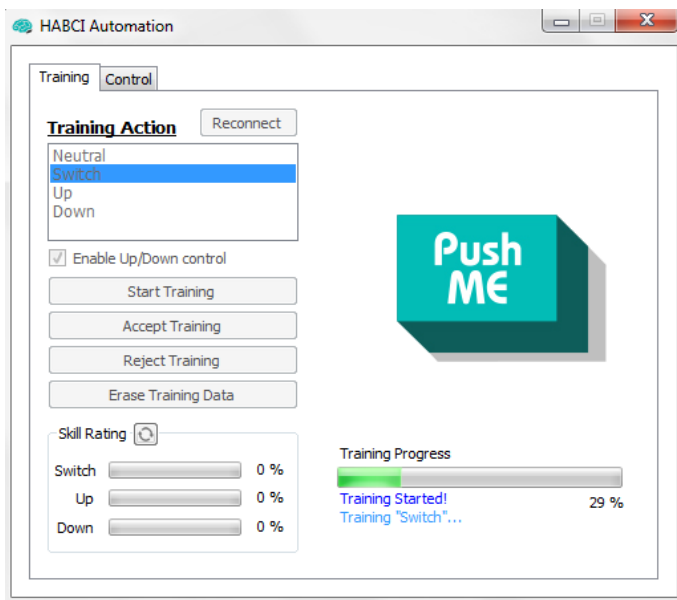
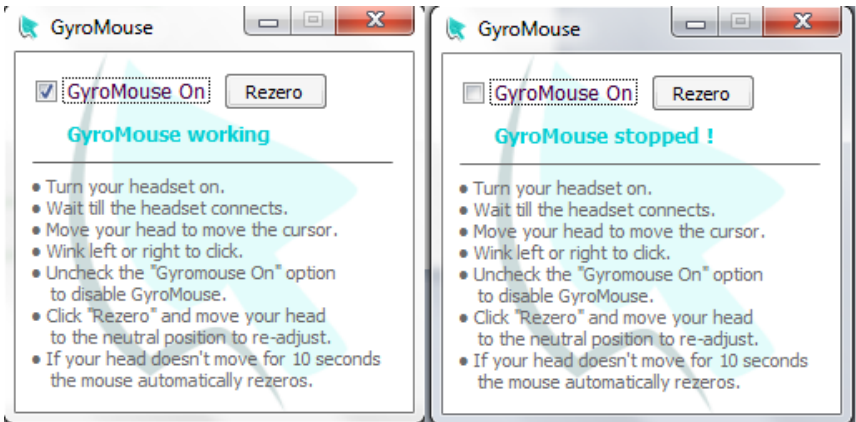
1. Software: application by C++
2. Hardware: implemented using Arduino and wireless communication technology

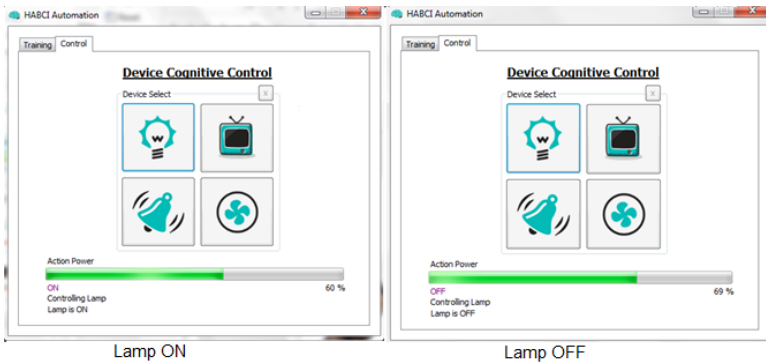
Now we will briefly describe each part of the project

1. The Application

It's easy to use, consists of 2 separate programs, the first is a gyroscope mouse enables the user to move the cursor only by using his head movement and the second application is used for training the user and controlling the devices, therefore it consists of 2 tabs as shown in figures

PS: find attached a short video demonstrates the use of our application





2. The Hardware part

Using Arduino to control Lamp, TV, alarm and fan and Xbee for the wireless communication and connecting devices to build a solid system for our product

PS: The implementation of the devices is shown in the attached video

Green Power 3Generation and Distribution

Graduation Project

Ahmed Mohamed Elsayed

Project's Abstract

Our project has two phases. one of them is about green power generation, and the other is about power distribution.

Green power generation includes:

- ✓ Solar energy:
 - ❖ Dual axis fully automated tracking mechanism.
 - ❖ Maximum Power Point Tracking (MPPT) charge controller.
- ✓ Wind energy:
 - ❖ Constructing Vertical Axis Wind Turbine (VAWT).
 - ❖ Wind lens experiment to concentrate wind.
- ✓ Biomass:
 - ❖ Theoretical review.

Power distribution includes:

- ✓ Low voltage & medium voltage distribution.
- ✓ Smart digital circuits such as: fire alarm, smart illumination, smart card access, HVAC system, etc...

Li-Fi Technology for Indoor Access

Graduation Project

Hazem Ashraf Abd El-Monaam

Project's Abstract

Li-Fi (light fidelity) can be thought of as a light-based Wi-Fi. That is, it uses light instead of radio waves to transmit information. And instead of Wi-Fi modems, Li-Fi would use transceiver-fitted light emitting diode (LED) lamps that can illuminate a room as well as transmit data. Moreover, data rate up to 1 Gb/s with high security, reliability and low Cost.

Hardware implementation: yes we propose a prototype of real-time audio broadcast system using inexpensive commercially available light emitting diode (LED) lamps
Estimated area: 3m*1m

Smart street Lighting

Graduation Project

Ahmed Mohamed Elsayed
Amany Mohammed Ghitany Mohammed
Amira Allam Ismail Allam
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Project's Abstract

Project background:

One of our ways to have Smart city is improving our lighting system our project is Smart Street light.

Smart street lighting depends on Monitoring the street lighting and control the luminance of the street lamps according to the reading of light sensors. This system will be helpful to reduce the consumption of the electricity by 40%. the link of the

Reference:

https://www.google.com.eg/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CEMQFjAA&url=http://www.ijesi.org/papers/Vol%28%29%2520%28Ver sion-3%29/J236069.pdf&ei=8YkLU-PSOMaNOAWs4YCgDQ&usg=AFQjCNEwx66dAGYsekaq6kqH_7ix1eQEuw&bvm=bv.61725948%2cd.Yms

For more reduction of the consumption of electricity we depend of solar energy . By using solar panels we will convert solar energy to electrical energy and store it at batteries and at nights we will use these batteries to lighting the streets . By this way we will have 0% of the consumption of the electricity on the streets.

For the communication system between the lighting pole and the control room we use Ethernet technology. This system also includes fault detection to indicate the present state of the control system. The intact information regarding these various aspects is transferred to web site by using Ethernet and router to visualize the state of the system by programming using php.

Project objective and importance :

- 1- Reduce the consumption of the electricity to 0%.
- 2- Improve our system to have a smart city.
- 3- Monitoring the behavior of the lighting poles.
- 4- This application is a friend of the environment.
- 5-



Quad Copter and its Applications

Graduation Project

Nader Nohad Saleh

Momen Ibrahim

Project's Abstract

The development of the copter was completed through the use of the ArduPilot Mega (APM 2.6) flight controller that is based on Arduino Mega 2560.

The basic parts of the copter include the Arduino controller board, u-blox GPS-Compass module, barometer, accelerometer and gyroscope sensors, electronic speed controllers, motors, propellers, and a lithium-ion polymer battery.

The applications parts of the copter include a dc motor and 2.4 GHz Turnigy 9x RC transmitter-receiver and a 3DR 915 MHz telemetry module, and temperature, humidity sensors and a FPV AV transmitter-receiver.

The Copter has 3 main applications, the 1st one is a real time tracking of an object with the ability of streaming a live video during the flight of the copter, the 2nd app is lifting a metallic object using a dc motor implemented on the copter, the 3rd app is using the copter as a portable weather station to measure temperature and humidity and send back measurements to a ground station.

Smart street Lighting

Supervised

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Graduation Project

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Mayada Fahim Mohamed Ghanem

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Mohamed Seif

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Samer Amgad Ahmed

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Mohab Sabry El-Mahdy

Project's Abstract

With the exponential growth in the ways and means by which people need to communicate - data communication, voice communication, video communication, broadcast messaging, command and control communication, emergency response communications, etc. - modifying radio devices easily and cost-effectively has become business critical. Software defined radio (SDR) technology brings the flexibility, cost efficiency and power to drive communication forward, with wide-reaching benefits realized by service providers and product developers through to end users.

Project background:

Traditional hardware based radio devices limit cross-functionality and can only be modified through physical intervention. This results in higher production costs and minimal flexibility in supporting multiple communication standards. By contrast, software defined radio technology provides an efficient and comparatively inexpensive solution to this problem, allowing multi-mode, multi-band and/or multi-functional wireless devices that can be enhanced using software upgrades.

Simply put, SDR is defined as **Radio in which some or all of the physical layer functions are software defined.**

Problem Statement

Element	Description
The problem of	Having multiple platform each implementing only one communication standard
Affects	The power, space, cost and coexistence of these platforms together.
Which results in	Reducing the flexibility of introducing new communication standards to the current generation of communication devices, which increases the cost of designing new ones.
Solution	Using SDR, i.e. using only one general purpose hardware based on digital signal processing capable of implementing different communication standards.
Benefits of the solution	Allowing the introduction of upcoming communication standard easily that results in reducing the cost, the design and the time used in implementing the next generation devices and the problem becomes only software-oriented.

Project Flow

1. We chose two communication standard, Wi-Fi 802.11ac and LTE advanced CAT5.
2. Testing the two standards using MATLAB in a noisy channel.
3. For each standard the simulation was driven and we generated BER curves to make sure that each one exceeded the minimum requirements set by their corresponding standard with efficient results.
4. Using a multicore Digital Signal Processor, the two standards were implemented and worked simultaneously.
5. Data was sent and received between two stations using the DSPs.