

Android Enabled Mobile Robot (AEMR)

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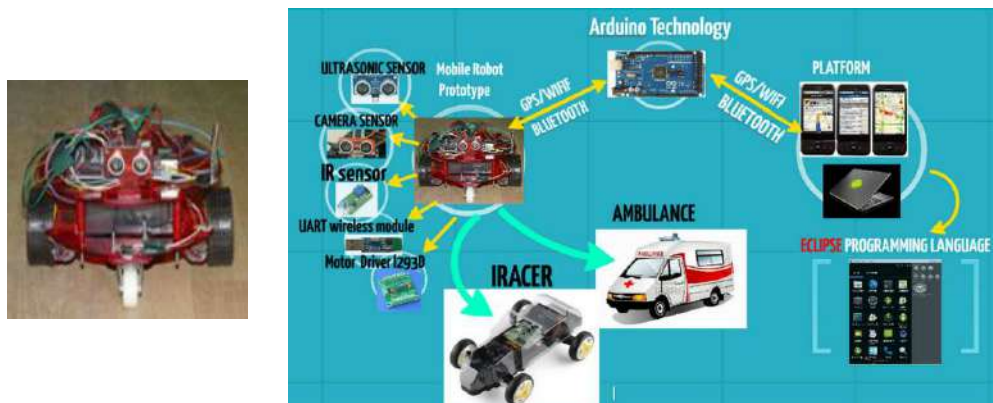
Abstract

Mobile applications are applications or services that can be pushed to smart phones, tablet computers, and other mobile devices to help users by connecting them to internet services. The objective of the project is to design and implement an Android-based mobile application to control the navigation of a robot or a Mobile vehicle for the purpose of tracking and navigation control.

The project covers the following topics:

- ✓ Study different mobile plate forms
- ✓ Using Arduino MEGA ADK microcontroller technology.
- ✓ Using Android as Robot Remote Control
- ✓ A mobile software will be developed to remotely control the robot via Wireless communication.
- ✓ The design of the navigating robot will be enhanced with GPS capabilities and sensitivity tools.

Keywords: Mobile applications; Robot Remote Control; Arduino; wireless communication.



Use of Traffic Simulation Model as Intelligent Decision Support System in City of Alexandria

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Abstract of The project

This project focuses on the development of a knowledge infrastructure, computational models, and user applications that allow access to real-time information about the state of transportation in city of Alexandria. In order to have an intelligent Decision Support Systems, we used and integrated different techniques like simulation methods, artificial intelligence, computing algorithms, and almost every possible problem that might arise during traffic movement to simulate all the possible solutions.

We chose Alexandria, Egypt since it's our hometown and that we've witnessed ourselves the tragic accidents and blockages that happen in the city. We picked this project in order to help solve all traffic issues and thus a better Alexandria. As we all know traffic flow is the lifeline of any city, so this project would create a basis on which any city could build and implement its transportation system. The project will address all issues in a generic manner

and present an optimal Solution of these problems. The City was divided into grids and all grids were connected with a command center collecting and presenting solutions to end users for that grid. In a more advanced stage individual civilian assistance could be provided.

We used SUMO as primary simulation, with some sensors to gather information and a GUI program to integrate every component of the system together, to obtain a full Simulated System of Transportation. This model will be used as Intelligent Decision Support System in Alexandria.

The project covers the following topics:

- ✓ Simulation
- ✓ Web / GUI Application
- ✓ Vehicle Detection

Keywords: Traffic ; transportation; simulation; algorithms; sensors, maps

Internet Of Things

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Abstract

The goal of the project is to analyze, design and implement an Internet of Thing IoT-based systems with an emphasis on sustainable smart city applications. Specifically we consider Smart Parking application. The idea is using multiple sensors for monitoring parking spaces availability in the garages, parking lots all over the city. The system integrates hardware sensors and microcontrollers as well as software and databases building an application that is scalable with data management capabilities applicable to heterogeneous device platforms. This application is built with emphasis about privacy and security. A combination of reliable and secure Internet of Things, based on secure architectures and technologies for connected objects and scalable, adaptive system supporting data flows from sensing devices and a high quantity of object instances. All these technologies fusion is expected to support intelligent information systems of smart cities.

Keywords:

IoT, smart cities, smart parking, smartphones applications

Mobile Application for Unmanned Underwater Vehicle

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Abstract

Unmanned Underwater Vehicles (UUV) is one of the most researched areas for underwater vehicles the recent years. UUVs not only avoid humans from being put in danger by diving long distances underwater but also it is an efficient and quick way to have the job done.

The main objective of this project is to enhance communication between ROV and its station by moving it from wired to wireless communication and there are other Subsidiary objective like Maximize the time that the ROV be underwater and Design a light weight, small size, strong body system.

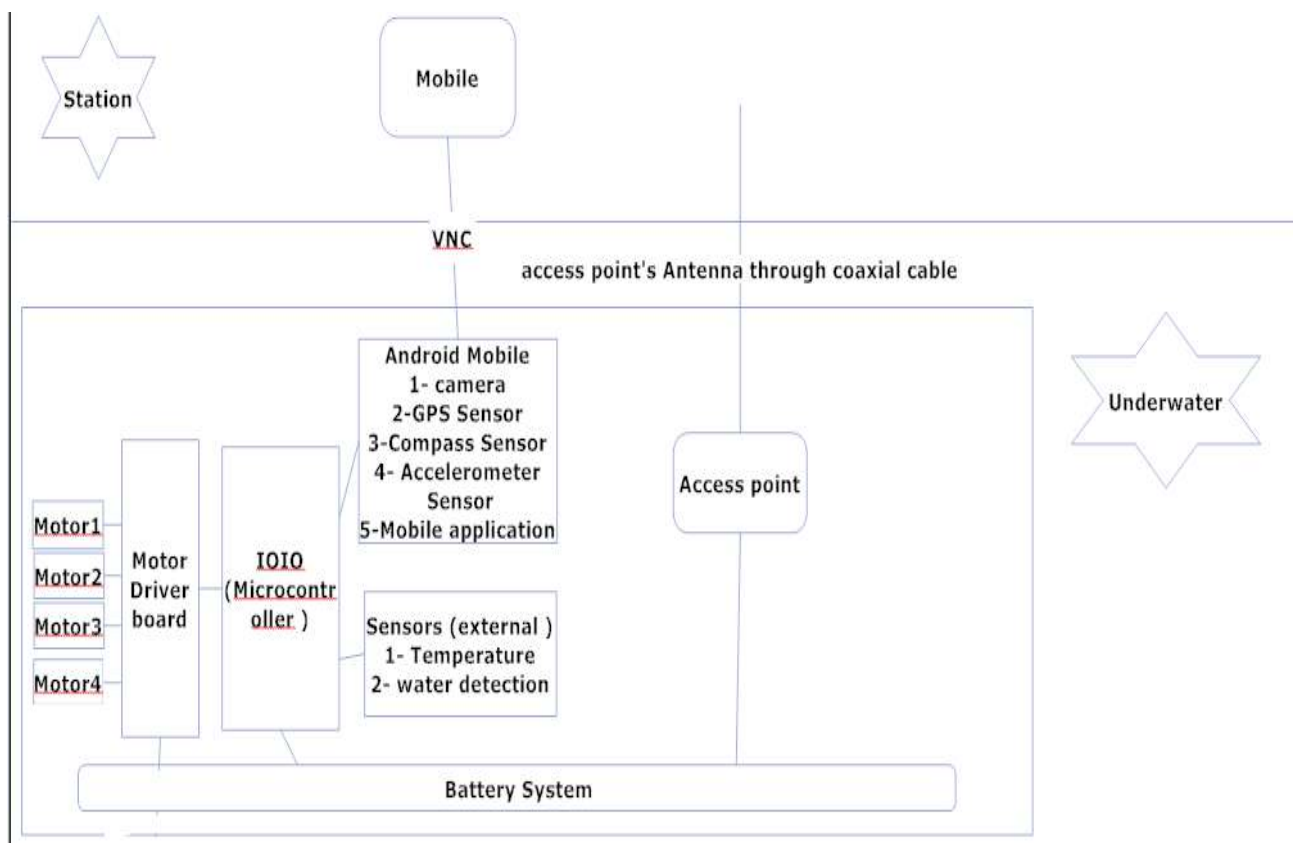
Application of ROV is Explore and Study the ocean, to measure the concentration of various elements or compounds in the water , monitor the presence of microscopic life, animals and plants. Exploration of archaeological artifacts and sunken ships, and for military purposes so Image processing proposed for object detection.

The project covers the following topics:

- ✓ Android application that contain view of underwater ROV , Control motion of ROV, and Sensor's data

- ✓ Electrical Design , Control system and Mechanical design of ROV (full design for ROV)
 - Motors
 - Batteries
 - Microcontroller
 - Vehicle body and architecture design
- ✓ Wireless Communication for ROV
- ✓ Sensors and Navigation Systems (GPS, Camera, Temperature).
- ✓ Image Processing.

Keywords: Mobile Application; UUV; ROV; Underwater communication, Sensors, Image processing



An Intelligent Road Traffic Management System Based on RFID Technologies

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Abstract

Over the last two decades, traffic congestion has been increasing dramatically worldwide as a result of increased motor vehicles and population growth. Emerging wireless technologies, such as radio frequency identification (RFID) networks can have significant impact on improving the efficiency of the road traffic management system in Alexandria city. This project reviews recent advances and developments in the fields of wireless communication technologies with regard to their applications in vehicular distributed systems. Following that, we propose an intelligent road traffic management system that is inspired by ant colonies and the principles of swarm intelligence, Unlike the traditional vehicular ad hoc network (VANET) system, which uses cellular gateways, network access points and other infrastructure entities, the proposed model is distinguished from VANET systems because of its unique characteristics – in particular mobility constraints, the ease of deployment, and the infrastructure less nature of RFID networks. Furthermore, this thesis also discusses the primary issues in reducing the randomness in the current traffic management systems and other measures, such as security protocols including data validation and authorization services. Finally, an experimental case study is provided to verify the proposed model compared to other available traffic management and operation schemes.

Keywords: Traffic management; Intelligent systems; RFID technologies; Wireless communications; Security.



Reconfigurable input/output System

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Abstract

Nowadays, most of the computer devices have USB (Universal Serial Bus) connection port but they do not have all other input/output connection ports. In this project, it is required to study the properties and requirements of the common input/output connection ports in the computer devices such as (serial port, parallel port, VGA port, HDMI Port, etc) and find the main features and usage of each one. The aim of this project is to build a unified communication device that can convert from/to USB connection to/from the other most common ports to get use of the modularity and expansion of the USB connection. It is important to study the effect of this conversion (the performance, the complexity, the usability ... etc) on the send/receive process.

The project covers the following topics:

- ✓ Computer system interface
- ✓ Input / Output communication protocols
- ✓ Input / Output connections format and conversion

Keywords: Communication protocol; USB Port; input/output Port structure.



Data Transfer System

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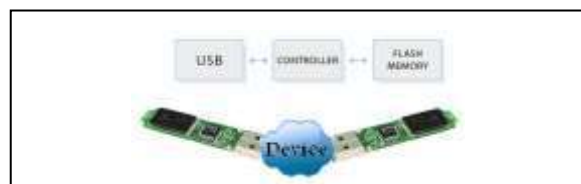
Abstract

Data movement and storage become very popular in the daily uses. Most of the computer users have a personal flash memory that is used to store or move data very frequently. The access of these files which includes copy or move them from one flash memory to another or even delete any file, requires a computer device with USB connection ports and an operating system. This environment is not always available. In this project, it is required to study the properties and structure of the flash memory device and explore how data are stored in it. The aim of this project is to build a unified device that can deal with the flash memory devices. Two flash memory devices can be connected to this device and then the files can be copied or moved from one to another. A user friendly interface will be constructed and implemented with this portable device. The performance, the complexity, and the usability are main issues in the proposed device.

The project covers the following topics:

- ✓ Flash memory types and interface.
- ✓ USB control and communication protocols.
- ✓ Format and properties of data storage units.

Keywords: Communication protocol; USB Port; Flash memory; Data storage format.



Computer Engineering Department
Graduation project, July 2014

Automated Railway Crossing System Using RFID

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Abstract

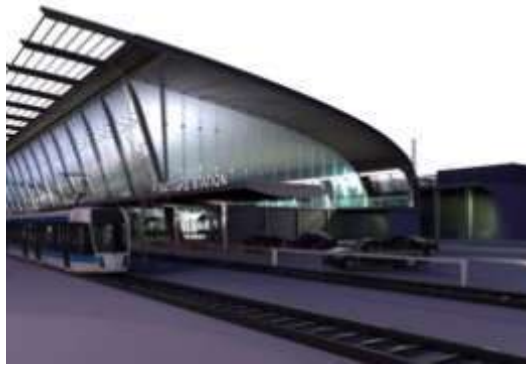
Thousands of Egyptians were killed in the past 20 years due to train accidents and all the governments failed through that period of time to provide essential safety provisions over what seemed to be an almost daily disaster. The amount of deaths has been continuously rising as a result of the chaotic arrangement of the railway system in Egypt. Due to the technological innovation, machines are continuously and effectively replacing humans at repetitive jobs that should be performed exactly the same way each time with the same efficiency such as railway crossing systems. This project aims to develop a simple but effective prototype of a railway crossing system that can be easily implemented in real life. Seeing that machines proved to work accurately and efficiently 100% of the time and unlike humans who can always get tired and produce errors that causes the loss of lives. The project will be a simple tracking system of a Radio Frequency Identification (RFID) chip attached to a train as it approaches a crossing the RFID chip will be identified by the reader using Arduino board located a few centimetres away from the train. Afterwards a signal will be sent

to the railway crossing arm to close with a certain delay using a motor. Moreover an LCD screen will be used to display countdown to slowly stop the traffic flow as the train approaches the crossing.

The project covers the following topics:

- ✓ A proposed idea to solve the main problems of repeated railway accidents
- ✓ Working with RFID
- ✓ Developing an automated system with Arduino kits

Keywords: RFID; Arduino;



Early Recognition Of Alzheimer Disease Using Brain MRI

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Abstract

Alzheimer's disease is a brain disease that causes a slow decline in memory, thinking and reasoning skills. It represents a major public health problem. The research aimed to detect automatically the early recognition of the AZ disease thereby avoiding the deterioration in the case resulting to a complete brain damage. Alzheimer's disease yields visible changes in the brain structures. The aim is to recognize if the patient belongs to Alzheimer's disease category or a normal healthy person at an early stage. Initially, image pre-processing and features extraction techniques were applied including data reduction using Discrete Cosine Transform (DCT), texture measures, histogram equalization and edge detection on the most involved region in Alzheimer's disease in MRI.

The project covers the following topics:

- ✓ Recognition and detection for Alzheimer's disease using MRI images without the need for clinical expert.
- ✓ Image pre-processing and feature extraction were used to describe brain images such as texture measures and edge detection.

- ✓ Applying Discrete Cosine transform for data reduction.
- ✓ Different classification techniques were applied to recognize the AZ disease.

Keywords: Image pre-processing; Feature extraction; Edge detection; DCT; classification.

