

# A Mobile Surveillance Robot Over The Wifi Network Using Atmega 8

M.A.S Pane<sup>1,3</sup>, P EhKan<sup>1</sup>, K. Saleh<sup>3</sup>, M. Irwanto<sup>2,3</sup>

<sup>1</sup>(School of Computer and Communication Engineering, University Malaysia Perlis, Malaysia)

<sup>2</sup>(School of Electrical Engineering, University Malaysia Perlis, Malaysia)

<sup>3</sup>(Department of Electrical Engineering Medan Institute of Technology, Indonesia )

Corresponding Author: M.A.S Pane

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**Abstract:** Technology is currently growing very rapidly, and evolved changes, both robots using media technology cable or Bluetooth robot, which is in use is limited by distance. Smart computers are growing very rapidly including Smartphones android, which uses a linux based operating system. The limitations of controlling the robot with a media cable or Bluetooth can be overcome by a robot monitor using the Android smartphone with Wi-Fi as a liaison between the robot with the smartphone, where the results of robot watches will be seen on the android phone interface.

**Keywords:** ATmega8, Robot, Surveillance, Wifi.

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## I. Introduction

In today's society, The development of life and technology needs cannot be separated. One indication that the development of the world is increasing along with the development of technology and the rapid development of automation and measurement has changed the working processes in the life [1]. Many emerging communication tools can be connected wired or wirelessly. The development of the wireless world is increasingly needed due to the very dynamic necessities that are not limited by space and time. Mobile devices have an advantage as regards to the average size of the instrument which is small, so easy to carry anywhere, and low power consumption when compared with desktop devices although it must be in standby and interface, is relatively comfortable and capable of running various types of applications on different operating systems.

By utilising the development of existing mobile technology, it is expected that the control of the tools used can be more efficient because there is no limit to the distance between controllers with tools to be controlled [2]. This can make it easier for users to monitor or operates the device automatically. Robot technology is a tool that can be used as human aids and has several advantages. One of the advantages of robots is that it can be used in places that are not possible or harmful to humans. For example, chemical research laboratories that sometimes do not let humans be in place because of the danger of poisonous gas or radioactive. Mobile robots are grouped into two distinct groups of robots controlled by humans and autonomous robots. Autonomous mobile robots can move in dynamic environments and are known without human control [3]. Various types of controls are often developed to make it easier for humans to control the robot, from the still using the cable to wireless. Wireless Fidelity (Wi-Fi) [4] is one type of wireless communication that can transmit data in the form of text, sound, and images. With streaming video techniques, images captured on the camera can be transmitted in the form of data bits and displayed on the screen in real time.

This research introduce a robot-shaped dynamic device that can be controlled using Wi-Fi as a medium of communication. Where robots can be wirelessly accessed remotely for specific uses. From the observations made that the need for dynamic devices is necessary, especially for jobs in dangerous places and other special purposes that do not allow a person to interact directly with the object being worked on or observed. So, with this Wi-Fi robot, the remote control that has been realized is a repeater which means there are two processes of data transmission. The remote control will be made using a Wi-Fi transmission medium controlled by a computer and mobile smartphone, data or instructions obtained from a computer or mobile smartphone translated by a microcontroller into a bunch of bits that will be sent to the robot which is subsequently converted into movement or action.

## II. Literature Review

### 2.1 Robot

Robots are mechanical devices that can perform physical tasks, using human control and control or using pre-defined programs. Robotics and automation have emerged on a huge scale in the early 21st century [5]. Robots are usually used for heavy duty, dangerous, repetitive and dirty. Most robots are used in industry, for example, to clean up toxic waste, exploration of water dams and space. But along with its development, robots have started to enter in the field of entertainment and education, household appliances, such as vacuum cleaners and lawn mowers.

#### 2.1.2 The disciplines of robotics

The robot is one of the fastest growing Mechatronics products today, which is a combination of several technologies, especially:

- Electronics Technology
- Software Technology
- Mechanical Technology.

Considering that most of the current robot is a robot that is intelligent, it can be said that the robot is a product of the automation technology as shown in Figure

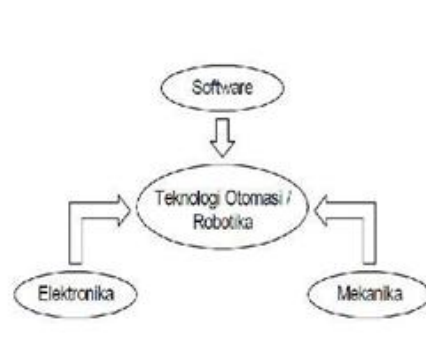


Figure 2.1 The disciplines of robotics technology.

#### 2.1.3 Mobile Robot

Mobile Robot is a robot construction that is characteristic of having an actuator to improve the overall strength of the robot so that the robot can make the transfer of positions from one point to another. This car robot is very suitable for people who start to know the robot. This is because the robot car does not require heavy physical work. To be able to make a mobile robot minimal knowledge required of microcontroller and electronic sensors.

### 2.2 Supporting Applications

In the design of the Controller Robot Monitor Software, this requires some software or application.

#### 2.2.1. CVAVR Application

CodeVisionAVR is one of the Software used to program AVR. CodeVisionAVR is very easy to use, just download into the IC that will be given the program. Why it is so easy to use because CodeVision AVR itself already has a pretty good User Interface to make it easier for its users, besides, CodeVision AVR also has a lot of features that are devoted to AVR programming. The weakness is CodeVision AVR is still using the Low-Level Language based language C.



Figure 2.2 Launcher CVAVR

CodeVisionAVR (CVAVR) also a compiler for the C programming language that will be used to program the microcontroller. The name AVR itself comes from "Alf (Egil Bogen) and Vegard (Wollan) 's Risc processor" in which Alf Egil Bogen and Vegard Wollan are two Norwegian inventors who invented the AVR microcontroller which was later produced by Atmel.

### 2.2.2 Visual Basic Versi 6.0

Basic language is a language that is easy to understand so that programming in the Basic language can be easily done even by people who are just learning to make the program. This is also easier after the presence of Microsoft Visual Basic, which builds on the idea of going simple and easy scripting languages for graphic user interfaces developed in Microsoft Windows operating systems. This is seen from the basic of making in visual basic is FORM, where the user can arrange display from then run in the script very easy. Visual Basic 6.0 is the development of the previous version with some additions to the current trending components, such as internet programming capabilities with DHTML (Dynamic HyperText Markup Language).

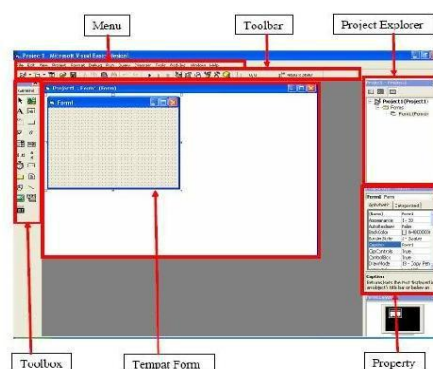


Figure 2.3 Visual Basic Interface v6.0

Making the application program using Visual Basic is done by making the application look on the form, then given the program script in component required. The structure is composed of component components located in [Toolbox], and each part used must be set to its properties via the [Property] window. The menu is mainly a standard operation within the Windows operating system, such as creating new forms, creating new projects, opening projects and saving projects. Also, there are visual basic usage facilities on the menu. For more details, Visual Basic provides a very complete and detailed help in MSDN. The toolbox contains the components that can be used by an active project, meaning that the contents of elements in the toolbox are very dependent on the type of project built.

### 2.2.3 Ultra VNC

UltraVNC is free software that is powerful enough and easy to use to display another computer screen (via internet or local network) on the pc screen. UltraVNC allows you to use the keyboard and mouse to remotely control other computers over a local network or the internet. This means you can work on a remote target computer as if you were sitting in front of a computer directly controlled from your place.



Figure 2.4 Ultra VNC.

UltraVNC (sometimes written uVNC) is an open source application for the Microsoft Windows operating system that uses the VNC protocol to control other computers remotely. VNC (Virtual Network Computing) is a model of implementation of the destination computer usage in realtime, while the work can be done depending on the features given VNC software.

### III. Methodology

#### 3.1 Diagram Robot

This chapter discusses the design of a mobile surveillance robot system using a microcontroller Atmega 8 as the brain of a surveillance robot which will be integrated with WIFI as in the example diagram below.

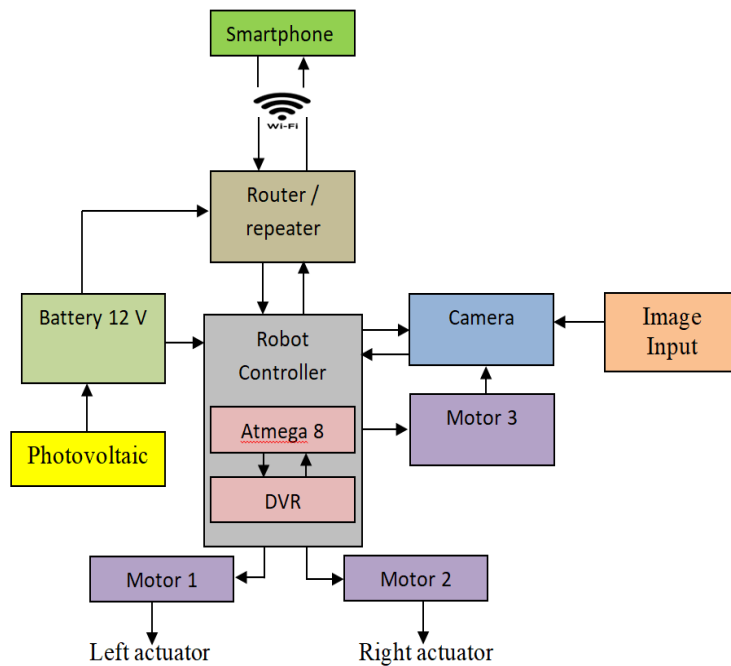


Figure 3.1 Diagram Robot

The solar panel diagram and circuit of the power plant are illustrated as shown Figures 3.1 Input system comes from the energy of sunlight. Photovoltaic receives sunlight and converts it into electrical energy to charge the battery when the battery power is reduced after the Relay is connected. The battery will forward power source to CCTV, Microcontroller ATmega8, H-Bridge Driver along with Stepper motor according to its requirement.

#### 3.2 Flowchart

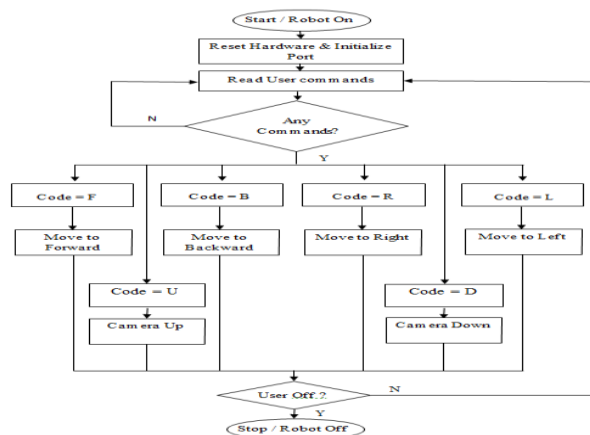


Figure 3.2 Flowchart Robot

From Figure 3.2 can be explained the process flow of the robot. First, the robot is started then the robot will reset and initialize the port after that the program will read the command from the user who came from the smartphone and received by the repeater to proceed to the serial port to verify the user command. Data command that has been verified by the program is then used to run the motor drive, if the code received in the form of code F, B, R, L, U, and D the actor will move by the command of the user. To distinguish between two commands used ASCII code. If a user command has been processed, the program will return to read the next user command.

### 3.3 Software

In making the application of robot control system based on the android smartphone using the main program that is CodeVision AVR, Visual Basic 6.0, uVNC, And the phone with android operating system.

#### 3.3.1 Input Source Code to ATmega8

Input source code into the microcontroller ATmega8535 intended that the microcontroller can understand commands given user so that the robot can execute the command provided from the user via a smartphone. Figure 3.1 shows the source code that will be input on microcontroller ATmega8535 using CodeVision AVR software.

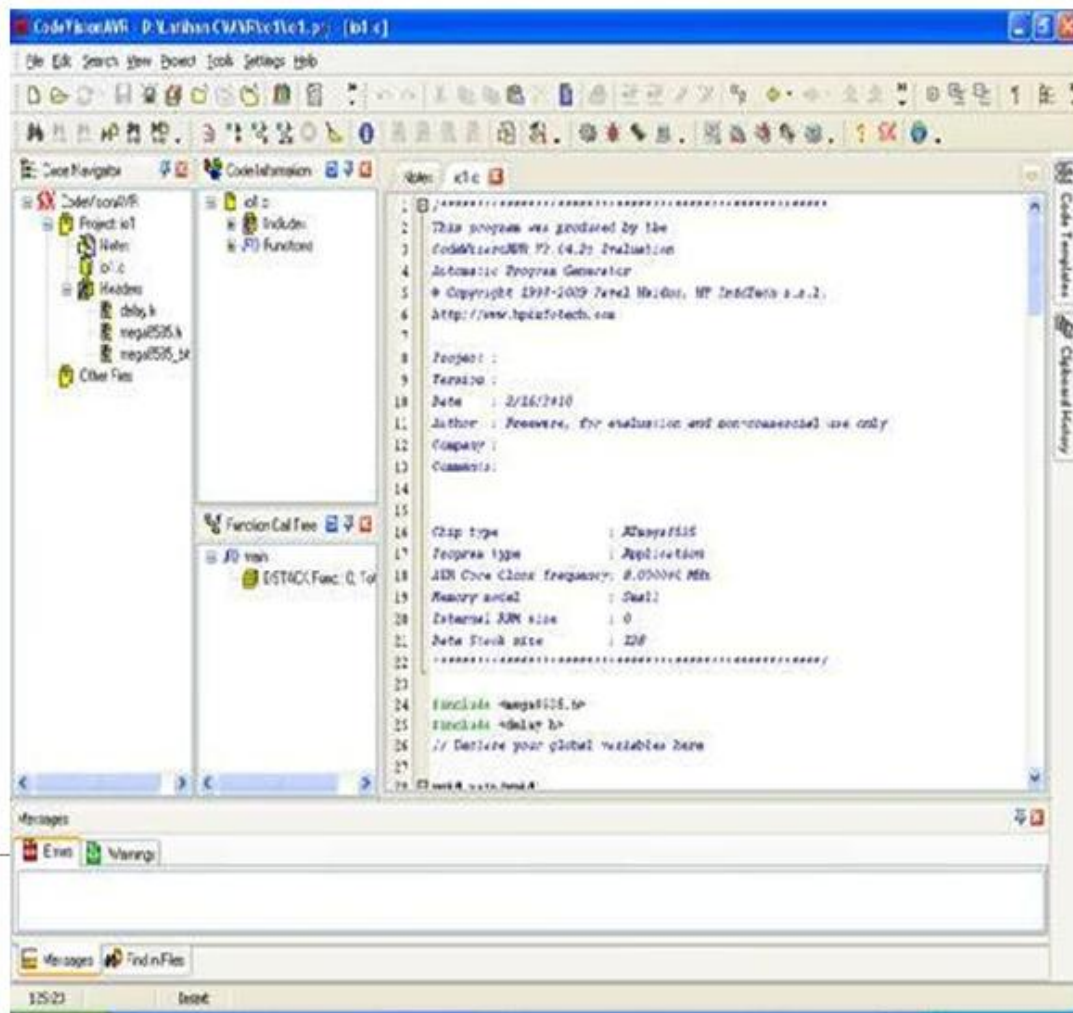


Figure 3.3 Input Source Code

### 3.4 Hardware

In addition to the software used in the manufacture of the robot, monitors are also used hardware to operate this system. The device used is a three-wheeled robot that has been designed as needed.

### 3.4.1 Configuration ATmega8535

Atmega 8535 microcontroller pin configuration has 40 pins with pin configuration specifications as in the ATmega8535 pin configuration picture below:

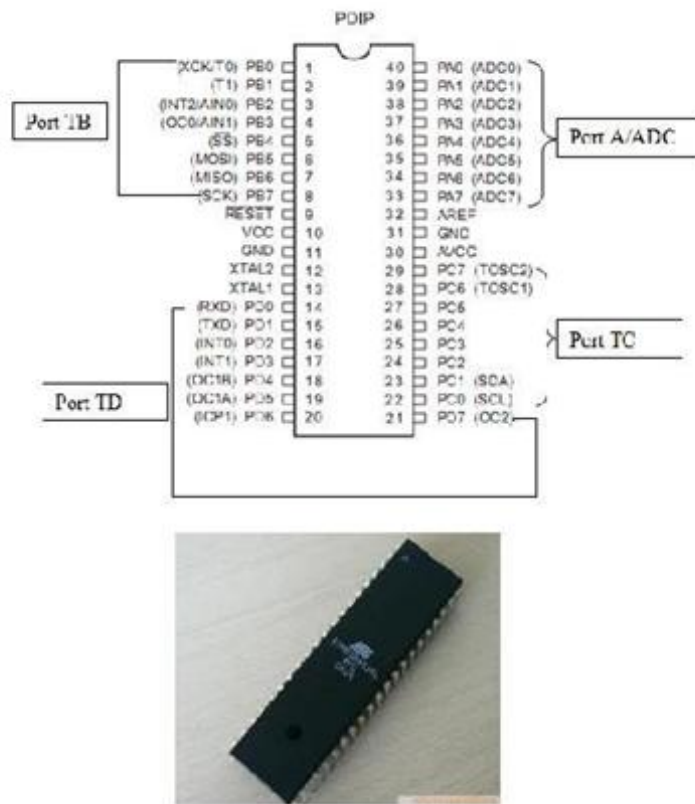


Figure 3.2 ATmega8535 Pin Configuration and Physical form

The ATmega 8535 pin configuration as follows:

1. VCC is a pin that serves as the input power supply pin.
2. GND is a ground pin.
3. Port A (PA0..PA7) is a two way I / O pin and ADC input pin.
4. Port B (PB0..PB7) is a two-way I / O pin and special function pin, ie Timer / Counter, analog comparator, and SPI.
5. Port C (PC0..PC7) is a two-way I / O pin and a special function pin, namely TWI, analog comparator and Timer Oscillator.
6. Port D (PD0..PD7) is a two-way I / O pin and special function pin, ie analog comparator, external interrupt, and serial communication.
7. RESET is a Pin used to reset the Microcontroller.
8. XTAL1 and XTAL2 are the external clock input pins.
9. AVCC is the input voltage pin for ADC.
10. AREF is the input pin of the ADC reference voltage.

## IV. Results And Discussion

### 4.1 Robot Testing

Robot testing is carried out on a flat ground surface with no obstacles or obstacles to determine whether the robot has been made by the planning.

No Obstacles			
Distance	1-30 m	31-40 m	40 m >
	Ok	Ok	X
Obstacles			
Distance	1-20 m	20-30 m	30 m >
	Ok	Ok	X

Table 4.1 Robot Testing.

Explanation  
OK : Successful  
X : Not successful

#### 4.2 Advantages

The advantages of a Robotic monitoring system is to monitor the location difficult to reach Humans. Such as chemical laboratory or area of pollution hazard, waste, location with extreme temperature, and location of conflict. The monitoring system uses a Webcam that can record video images during monitoring, so it can be on PlayBack and can capture images.

#### 4.3 Disadvantages

The robot is not equipped with a self charger like solar panel or other, so the robot needs recharging if the battery has run out. The robot is not equipped with movers that can run on extreme roads or streets, so the Robot only operates flat roads.

### V. Conclusion

The incorporation of technology from microcontrollers, cameras and wifi can be realised with a monitoring robot controlled with an Android smartphone can communicate well over a Wi-Fi network. The robot can walk by commands from the user through the application system can facilitate the control and monitoring areas that are difficult or dangerous for humans.

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