



# **Design and Build a System for Turning on an IoT-Based Motorcycle Starter Using Voice**

**Muhammad Alfanny<sup>1</sup>, Achmad Fauzi<sup>2</sup>, Hermansyah Sembiring<sup>3</sup>**

<sup>1,2,3</sup> *STMIK kaputama, Binjai, Indonesia*

[fani316464@gmail.com](mailto:fani316464@gmail.com)<sup>1</sup>, [fauzie.kaputama@gmail.com](mailto:fauzie.kaputama@gmail.com)<sup>2</sup>, [hermansyahsembiring2@gmail.com](mailto:hermansyahsembiring2@gmail.com)<sup>3</sup>

---

## **Abstract**

Motorcycles require maintenance, especially on the engine, by always heating the motorcycle before use or when not in use. However, sometimes someone is lazy to warm up the motorcycle engine. The aim is to make it easier for users to warm up the motorcycle engine to avoid damage to the engine and make it easier for motorcycle users if the electric starter on the motorbike is damaged. Research using the IoT-based google assistant uses NodeMCU 8266 connected to an Android smartphone to start motorbikes automatically. Based on the research results this tool can function properly. The conclusion of the study is that the motorcycle starter system with a smartphone control system can avoid damage to the motorcycle engine, and makes it easier for users to start the motorcycle if the electric starter is damaged.

**Keywords:** *Motorcycle, Google Assistant, IoT, NodeMCU8266.*

---

## **1. Introduction**

Technological developments and increasing human needs are two things that mutually influence each other. There are many competitions in the computerized world, causing humans to change manual equipment into computer program-based digital equipment systems, this is because by utilizing IoT (Internet of Things) in the vehicle starter system it can save time without having to wait for the vehicle to warm up by doing an internet-based starter first. first for 5 minutes before using the vehicle, this is very helpful for people who have high mobility. Increased human needs will trigger technological developments. One form of technological expansion in the Internet field is the Internet of Things. The term Internet of Things is a technology that is able to connect several objects in terms of sensors, chip devices and also electronics in various places via the internet network (TCP-IP). Technology that is currently developing rapidly should be utilized, studied and applied in everyday life to solve problems that exist around society. Like the vehicle starter that uses IoT which can start the vehicle automatically without having to enter the vehicle to do a manual starter. The formulation of the problem in this research in general is how to design an IoT-based remote control system for motor vehicle activation (starter) within the scope of the car case study. The global goal of this research is to design and build a starter system using a microcontroller for vehicle activation (starter) with a motorcycle case study [1].

## **2. Theoretical basic**

### **2.1. Audio**

One of the elements in multimedia is sound or audio. According to Lu (1999), a multimedia expert defines that sound is something that arises as a result of changing air pressure that reaches up to the human eardrum. Meanwhile, according to other experts, if the air vibrations are in the frequency range of 20 Hz to 20 kHz, the human ear will identify the air pressure as sound, Andleigh (1995). In humans, the organ for hearing is the ear, the ear also functions to maintain body balance. The ear consists of the outer ear, middle ear and inner ear. The three parts of the ear are interrelated to convert signals or sound waves that enter the ear. In the auricle there are several cartilages, namely helices, antihelical folds, antihelix, lobules, preauricular, preauricular skin tags, tragus, and antitragus. Cartilage which is layered with skin functions to collect sound waves which will be channeled through the ear canal. In the ear canal there is wax, which functions to increase the sensitivity of sound frequencies (3000 Hz – 4000 Hz) to the middle ear [2].

## 2.2. Motorcycle

A motorcycle is a machine made of thousands of components. In general, motorbike owners and users hope that there will be no damage to their motorbikes, but problems with motorbikes often occur. To overcome problems that may occur, motorbike owners and users are at least able to find out more damage to the motorbike engine so that early treatment can be carried out. In the world of motorbikes, it is known that there are 3 (three) types of engines used, namely 2 stroke, 4 stroke and battery engines. Literally, actually what is called TAK is a step or in English it is called STROKE. In other words, a 2 stroke is a 2 stroke engine, while a 4 stroke engine is a 4 stroke engine. Back to that step, the step here is a process. To facilitate understanding of this matter, it can be explained that the process that occurs in a 4 stroke engine is as follows: INTAKE – COMPRESSION – POWER – EXHAUST Meanwhile, this process is shortened on a 2 stroke engine which has a space under the piston which is used for air compression and compression[3].

## 2.3. NodeMCU ESP8266

NodeMCU is basically a development of ESP 8266 with e-Lua based firmware. The NodeMcu is equipped with a micro USB port which functions for programming and power supply. Apart from that, NodeMCU is also equipped with push buttons, namely reset and flash buttons. NodeMCU uses the Lua programming language which is a package from esp8266. The Lua language has the same logic and programming structure as C, but the syntax is different. If you use the Lua language, you can use the Lua loader and Lua uploader tools. Apart from the Lua language, NodeMCU also supports the Arduino IDE software by making a few changes to the board manager on the Arduino IDE. Before being used, this board must be flashed first so that it supports the tools to be used. If you use the Arduino IDE, use the appropriate firmware, namely the firmware output from Ai-Thinker which supports AT Command. To use the loader tool, the firmware used is the NodeMCU firmware [4].

## 2.4. Internet of Things

The internet of things basically connects all devices that have an on and off button to the internet. The devices in question can be cell phones, coffee grinders, washing machines, lamps, smart watches, and almost anything imaginable. Parts of a system can also be controlled, such as doors on housings, drills on oil rigs. The term Internet of Things is often referred to as today's technology, namely technology that utilizes mini-sized computer devices and can be connected to local networks or the internet. The device used is designed to use little power, so the device can only carry out simple commands. The Internet of Things has been widely applied to Smart Homes today [5].

## 2.5. Google Assistant

Google Assistant is a virtual assistant that uses artificial intelligence and was developed by Google. Initially, this assistant was only available on mobile devices and smart home devices. Unlike Google Now, Google Assistant has the ability to engage in two-way conversations. Its rollout began in May 2016 via the Google Allo messaging app and Google Home voice-enabled devices. After a period of exclusivity on Pixel and Pixel XL devices, it was expanded to other Android devices in February 2017, including third-party devices and Android Wear. In May, this app was also released as a separate entity on the iOS operating system [6].

## 2.6. Relay

Relay is a switch that is operated electrically and is an Electromechanical (Electromechanical) component which consists of 2 main parts namely Electromagnet (Coil) and Mechanical (a set of Switch Contacts). Relays use Electromagnetic Principles to drive Switch Contacts so that with a small electric current (low power) they can conduct electricity with a higher voltage. The most basic difference between a relay and a switch is when it moves from the ON to OFF position. Relays move automatically using electric current, while switches are done manually [7].

## 2.7. Android

Android is a Linux-based operating system for mobile phones such as smartphones and tablet computers. Android provides an open platform for developers to create their own applications for use by a variety of mobile devices. Initially, Google Inc. bought Android Inc., a newcomer that makes software for cell phones. Then to develop Android, the Open Handset Alliance was formed, a consortium of 34 hardware, software, and telecommunications companies, including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Nvidia [8].

## 3. Results and Discussion

The implementation method in this study is generally divided into 5 stages as shown in the following diagram:

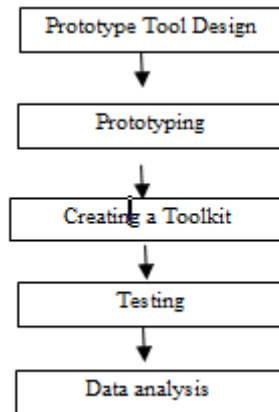


Fig. 1: Research Workflow

### 3.1. Tools and materials used

The tools and materials used for the Design and Build a System for Turning on an IoT-Based Motorcycle Starter Using Voice are as follows:

1. The hardware used in this study is as follows:

- 1) Kabel data USB dan kabel pelangi
- 2) NodeMCU ESP8266
- 3) Jaringan Wi-Fi
- 4) Smartphone
- 5) Module Relay
- 6) Baterai
- 7) Lem
- 8) Solder
- 9) Timah
- 10) Papan PCB
- 11) Beberapa baut dan mur

2. The software used in this study is as follows:

- 1) Arduino IDE
- 2) Fritzing
- 3) Microsoft Word

### 3.2. Block Diagram Circuit

The block diagram of the designed system, as shown in Figure 2

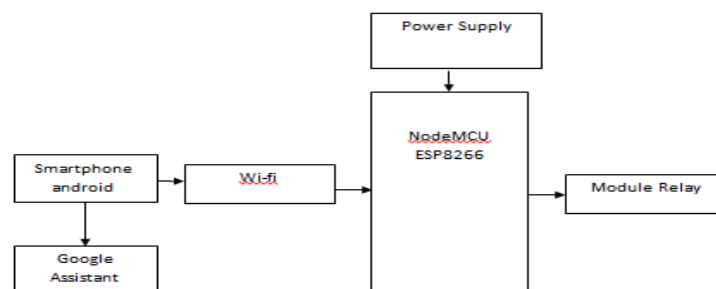


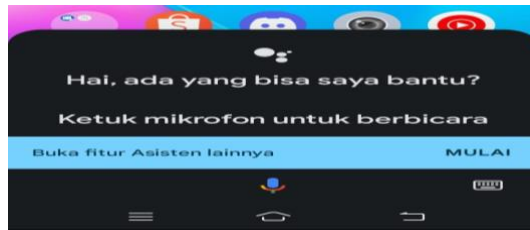
Fig. 2: Block Diagram Circuit

The description of the flowchart above is as follows:

- 1) Power supply berfungsi sebagai sumber daya listrik untuk menghidupkan sistem alat.
- 2) NodeMCU ESP8266 berfungsi sebagai pemroses, penerima dan pengirim data pada sistem alat.
- 3) Aplikasi Google Assisten berfungsi sebagai aplikasi media komunikasi pada smartphone.
- 4) Smartphone Android berfungsi sebagai input pemberi sinyal untuk menghidupkan stater sepeda motor
- 5) Jaringan Wi-fi berfungsi sebagai media komunikasi antara sistem alat dengan smartphone android
- 6) Module Relay berfungsi sebagai output saklar elektrik untuk menghidupkan sepeda motor

### 3.3. Display of the Google Assistant on a Smartphone

This circuit is composed of the components needed to design the tool so that the data tool works as desired, which can be seen in the image below:



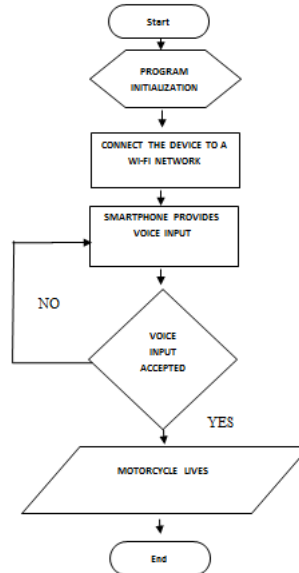
**Fig. 3:** Display of the Google Assistant on a Smartphone

The explanation of Figure III.3 is as follows:

- 1) Nodemcu Esp8266 functions as the brain and controller function of the electronic system.
- 2) The infrared sensor functions as a detector for objects in front of the device. If an object is in front of the sensor, the water pump will turn on.
- 3) The HC-SR04 sensor sends a message via Nodemcu Esp8266 to blynk. The HC-SR04 sensor functions to measure the water level in the container.
- 4) The 2Chan 5v relay functions as a switch for the water pump valve.
- 5) Electric current functions as a device's power supply
- 6) The water pump functions as a water faucet
- 7) Tap water container

### 3.4. Flowchart

The flowchart system of the designed system, as shown in Figure 4



**Fig. 4:** Flowchart

Algorithm flowchart in Figure 4 flowchart

1. Start
2. Running the Program
3. Connect the device to the WiFi network
4. Provides voice input to the smartphone
5. If sound is received then the motorbike is on, if not then repeat the voice command on the smartphone.
6. Done

## 4. Implementastion and Testing

### 4.1. Hardware Set

In the following stage, a test is carried out on the relay connected to the microcontroller, then from the results of this test it is seen whether the device can turn on the motorbike starter.



Fig 5: Motorcycle Shutdown Testing

Testing the motorbike shutdown device, this test was carried out to see whether the relay connected to the ignition key and starter could turn off the motorbike with a voice command from Google Assistant.



Fig. 6: Testing start the Motorcycle

## 5. Conclusion

After doing this research completed successfully. And after doing it testing, Android Smartphone can be used as a control system for motorbikes with Google Assistant

## References

- [1] M. Afiq *et al.*, "Perancangan Sistem Start & Pengaman Sepeda Motor Via Smartphone ( Android ) Berbasis Arduino Nano," vol. XX, no. 3, pp. 1–13, 2018.
- [2] Y. A. Tuwaidan, E. V. C. Poekoel, D. J. Mamahit, and M. Eng, "Rancang Bangun Alat Ukur Desibel ( dB ) Meter Berbasis Mikrokontroler Arduino Uno R3," *E-journal Tek. Elektro dan Komput.* (2018), pp. 37–43, 2018.

- [3] S. Pakar *et al.*, “Sistem Pakar Untuk Mendiagnosis Kerusakan Sepeda Motor Non Injeksi Pada Bengkel Gemilang Jaya Motor Kabupaten Pacitan,” vol. 6, no. 4, pp. 27–30, 2018.
- [4] “Mobile Application , arduino NodeMCU ESP8266.,” vol. 16, no. 1, 2020.
- [5] Y. Efendi, “Internet Of Things (Iot) Sistem Pengendalian Lampu Menggunakan Raspberry Pi Berbasis Mobile,” *J. Ilm. Ilmu Komput.*, vol. 4, no. 2, pp. 21–27, 2018, doi: 10.35329/jiik.v4i2.41.
- [6] A. Siregar, D. Setiawan, and M. Iswan, “Kontrol Rumah Pintar Dengan Google Assistant Berbasis Iot (Internet of Things),” *J. CyberTech*, vol. 1, no. 4, pp. 1–18, 2018, [Online]. Available: <https://ojs.trigunadharma.ac.id/>
- [7] Saleh Muhamad and Haryanti Munnik, “Rancang Bangun Sistem Keamanan Rumah Menggunakan Relay,” *J. Teknol. Elektro, Univ. Mercu Buana*, vol. 8, no. 2, pp. 87–94, 2017.
- [8] T. Listyorini, P. S. T. I. U. M. K. Dosen Fakultas Teknik, A. Widodo, and P. S. S. I. U. M. K. Dosen Fakultas Teknik, “PERANCANGAN MOBILE LEARNING MATA KULIAH SISTEM OPERASI BERBASIS ANDROID,” vol. 3, no. 1, pp. 1–23, 2019.