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Operate Railway Using Internet of Things (IOT)

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ABSTRACT:

Now a days, People are facing the problem of waiting at Railway gates that leads to wasting of time and traffic jams. In order to overcome these problems, An android application has to be developed which shows that weather the gate is opened or closed. This should be monitored by using two modules namely "ESP8266 WIFI MODULE" and "Aurdino UNO R3" by integrating both as "Nodemcu" module this is the microcontroller. A "Connecting Switch" is used to trigger out the status of Railway gate. This modules are placed at the Railway gates to monitor the gate i.e., either the railway gate is closed oropened.

The Connection with android application should be maintained by using the Connecting Switch. When the Railway gate was make contact on connecting switch. Then it sends the electrical signals to the nodemcu. This microcontroller will sends data to cloud from that cloud data can be send to the android application. Whenever the connecting switch was closed then the android Application will show the Status of railway gate as gate is closed to the user. This will helpful to manage the time and choosing the alternateroutes.

1. INTRODUCTION

The Railway Gate Tracking system using IoT is used to monitor the railway gate and notify the status of it to the user. As this is the IoT project in which different elements are connected through internet and the elements are monitored using the cloud or any end system. The reason behind developing this project is to reduce the traffic jams and waiting time at "level crossing". Level crossing is the place where the railway track and the road intersect each other at the same point, this place is called as level crossing. The Railway Gate is becoming big problem in rural areas. To overcome these problems an android application should be developed in which status of the railway gate whether the gate is opened or closed.

By using this application the users can choose the alternate routes or they can manage their time. This will be helpful for the ambulances and the people who are rushing to works. To provide the connectivity we used the microcontroller and connecting switch these are placed near the railway gate. so, that whenever the railway gate is fell on the connecting switch then the signals will be passed to the microcontroller then the controller will configure the signals received from the connecting switch and will send that signals to the cloud by using the wifi signals, this wifi module will be triggered with in the microcontroller. Whenever the controller is connected with the wifi then it is ready for sending or retrieving the data to cloud.After the data is send to the cloud then by using the interface between the android and the cloud then the url and api keys that are generated by the cloud are used by the android to retrieve the data.so thatwe can show the status in the android application.

The Railway Gate is also causing big problem now a days. As the population increases the traffic on the road is also increased rapidly. Along with this there railway Transport is also increased rapidly. The main level crossing that are present near the Railway Junctions will take a lot of time to open the gate when it closed because the number of trains that are travelling between the cities will be more and at the same time there will be more traffic also waiting at levelcrossing. Recently there was a incident taken place at Guhathi where an ambulance was struck near the railwaygate for more than one hour due to large traffic the patient present in that ambulance had dead because of late admitting him to the hospital. To overcome this type problems in future we are developing this project as Railway Gate Tracking System usingIoT.

As the project is based on the Railway System that belongs to central government which is the biggest economy provider in India. But there is some problems with this system as it will uses the transport that will passes through the roads in that case the Railway gate came into the sight of Idea and increases the traffic jams and lot of time consuming near the railway gates. As they may very large in number there is no way to removing the railway gates in order to overcome this type of problems the Idea that was described earlier needed to be developed and needed to beimplemented.

To implement this type of project we definitely needed to use the Stream of IoT because this provide us the connectivity between the railway gate so that we can monitor the railway gate with internet facility and the major requirement of using this project is cost efficient for developing and implementing. By using this project the user can know about the status of the railway gates whenever user need to pass through the level crossing.

2. SYSTEMANALYSIS

Problem Definition:-

Despite a high number of deaths occurring at railway level-crossings across India every year, the Indian Railways has been unable to speed up its elimination of unmanned crossings and believes road users bear greater responsibility in ensuring their safety. India has more than 30,300 level-crossings at which vehicles can cross the railway tracks, according to the Indian Railways public relations office. More than 11,000 of these are unmanned crossings. This is where most of the accidents occur. Along with this there is a problems like people are waiting at level-crossings and Causes the more Waitingtime.

Now a days, People are facing the problem of waiting at Railway gates that leads to wasting of time and traffic jams. In order to overcome these problems, An android application has to be developed which shows that whether the gate is opened or closed. Whenever the railway gate was closed then the android application will show the notification to theuser.

Existing System:-

The existing system is Google maps it display only traffic. but cannot display whether the gates are opened or closed. To overcome the above problem we proposed an android app called “RAILWAY GATE TRACKING SYSTEM USING IOT” to know whether a gate is opend or closed.

ExistingProblems:

The main problem is railway gates at level crossing (intersection of railway gate and roads). Due to this problem peoples are facing the problems of wasting of time and traffic jams. To implement this type of project we definitely needed to use the Stream of IoT because this provide us the connectivity between the railway gate so that we can monitor the railway gate with internet facility and the major requirement of using this project is cost efficient for developing and implementing. By using this project the user can know about the status of the railway gates whenever user need to pass through the levelcrossing.

Fig 2.1: Existing problems

Disadvantages of existing system:-

- Cannot display status of gates.
- Cannot display correct reason about traffic whether traffic due to accidents or railway gates.

ProposedSystem:-

In proposed system we develop an android app that will display status of the gates i.e., whether gate is opened or close to know this we add IOT module to railway gates.

To know the status of gate we add switches and node MCU module to the railway gates.

To store and access data send by node MCU module we use CLOUD CHIP cloud platform for analysing & visualising for every second.

Advantages of proposed system:-

- Know status ofgates.
- Reduce traffic at levelcrossing.
- Reduce peoples weighting time at railwaygates.
- Know correct reason for traffic whether traffic due to accidents orgates.
- Cost effective and provide updated information at everytime.

3. HARDWAREEQUIRMENTS

We used three Hardware equipments. They are
1.NodeMCU
2. ConnectingSwitch
3.JumperWires

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the dev kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson, and spiffs. NodeMCU was created shortly after the ESP8266 came out. On December 30, 2013, Espressif Systems began production of the ESP8266. The ESP8266 is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications (see relatedprojects). NodeMCU started on 13 Oct 2014, when Hong committed the first file of nodemcu- firmware to GitHub.

Two months later, the project expanded to include an open-hardware platform when developer Huang R committed the gerber file of an ESP8266 board, named devkit v0.9. Later that month, Tuan PM ported MQTT client library from Contiki to the ESP8266 SoC platform, and committed to NodeMCU project, then NodeMCU was able to support the MQTT IoT protocol, using Lua to access the MQTT broker. Another important update was made on 30 Jan 2015, when Devsaurus ported the u8glib to NodeMCU project, enabling NodeMCU to easily drive LCD, Screen, OLED, even VGA displays.In summer 2015 the creators abandoned the firmware project and a group of independent but dedicated contributors took over. By summer 2016 the NodeMCU included more than 40 different modules. Due to resource constraints users need to select the modules relevant for their project and build a firmware tailored to theirneeds.

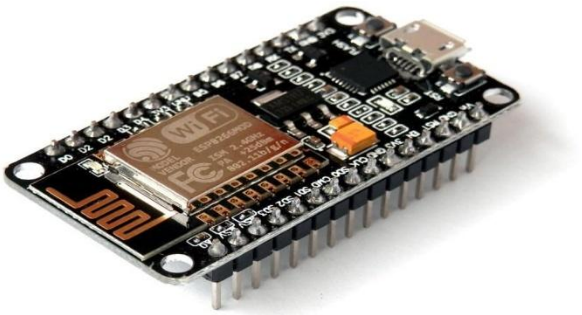


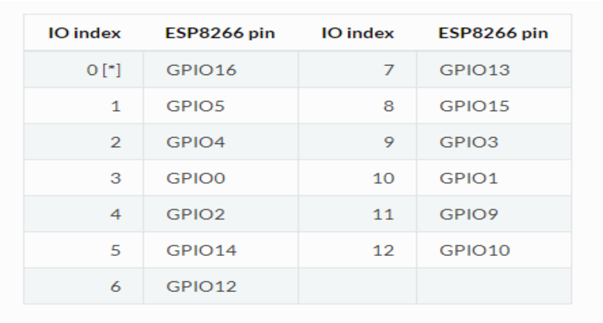
Fig 3.1 :- NodeMCU

As Arduino.cc began developing new MCU boards based on non-AVR processors like the ARM/SAM MCU and used in the Arduino Due, they needed to modify the Arduino IDE so that it would be relatively easy to change the IDE to support alternate tool chains to allow Arduino C/C++ to be compiled down to these new processors. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file down to the target MCU's machine language. Some creative ESP8266 enthusiasts have developed an Arduino core for the ESP8266 WiFi SoC that is available at the GitHub ESP8266 Core webpage. This is what is popularly called the "ESP8266 Core for the Arduino IDE" and it has become one of the leading software development platforms for the various ESP8266 based modules and development boards, includingNodeMCUs.

Pins ofNodeMCU:-

NodeMCU provides access to the GPIO (General Purpose Input/Output) and for developing purposes below pin mapping table from the API documentation should be referenced.

Tab 3.1 :- Pins of NodeMCU



IO index	ESP8266 pin	IO index	ESP8266 pin
0 [*]	GPIO16	7	GPIO13
1	GPIO5	8	GPIO15
2	GPIO4	9	GPIO3
3	GPIO0	10	GPIO1
4	GPIO2	11	GPIO9
5	GPIO14	12	GPIO10
6	GPIO12		

Serialize output based on a sequence of delay-times in µs. After each delay, the pin is toggled. After the last cycle and last delay the pin is not toggled.The function works in wo modes: synchronous - for sub-50 µs resolution, restricted to max. overall duration, asynchrounous - synchronous operation with less granularity but virtually unrestricted duration.

The Whether the asynchronous mode is chosen is defined by presence of parameter. If present and is of function type the function goes asynchronous andthe

callback function is invoked when sequence finishes. If the parameter is numeric the function still goes asynchronous but no callback is invoked when done.For the asynchronous version, the minimum delay time should not be shorter than 50 µs and maximum delay time is 0x7fffff µs (~8.3 seconds). In this mode the function does not block the stack and returnsimmediately

before the output sequence is finalized.HWtimer mode is used to changethe states. As there is only a single hardware timer, there are restrictions on which modules can be used at the same time. An error will be raised if the timer is already in use.

Note that the synchronous variant (noornil parameter) function blocks thestack andassuchanyuseofitmustadheretotheSDKguidelines(alsoexplainedhere).Failuretodo so may lead to WiFi issues or outright to crashes/reboots. In short it means that the sum of all delay times multiplied by the number of cycles should not exceed 15 ms.

ESP8266 WiFiModule:-

The ESP8266is a low-costWi-Fimicrochip with full TCP/IPstack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems. The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-stylecommands.

However, at the time there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.

The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi. The successor to these microcontroller chips is the ESP32. These are the first series of modules made with the ESP8266 by the third-party manufacturer Ai-Thinker and remain the most widely available They are collectively referred to as "ESP-xx modules". To form a workable development system they require additional components, especially a serial TTL-to-USB adapter (sometimes called a USB-to-UART bridge) and an external 3.3 volt powersupply.

Novice ESP8266 developers are encouraged to consider larger ESP8266 Wi-Fi development boards like the NodeMCU which includes the USB-to-UART bridge and a Micro- USB connector coupled with a 3.3 volt power regulator already built into the board. When project development is complete, these components are not needed anymore and it can be considered using these cheaper ESP-xx modules as a lower power, smaller footprint option for productionruns.

The popularity of many of these "other boards" over the earlier ESP-xx modules is the inclusion of an on-board USB-to-UART bridge (like the Silicon Labs' CP2102 or the WCH CH340G) and a Micro-USB connector coupled with a 3.3 volt regulator to provide both power to the board and connectivity to the host (software development) computer commonly referred to as the console. With earlier ESP-xx modules, these two items (the USB-to-Serial adaptor and a 3.3 volt regulator) had to be purchased separately and be wired into the ESP-xx circuit. Modern ESP8266 boards like the NodeMCU boards are a lot less painful and offer more GPIO pins to play with. Most of these "other boards" are based on the ESP-12E module, but new modules are being introduced seemingly every fewmonths.

The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.This module has a powerful enough on- board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the0front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existance interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external

RF parts.The applications of ESP8266 are Smart power plugs,Home automation ,Wi-Fi location- aware devices,Industrial wireless control,Security ID tags.

Connecting Switch:-

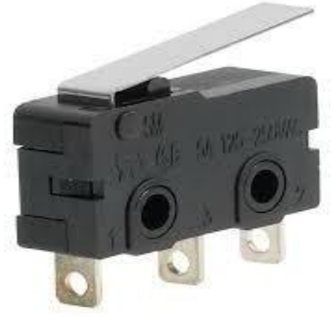


Fig 3.2 :- Connecting Switch

A miniature snap-action switch, also trademarked and frequently known as a micro switch, is an electric switch that is actuated by very little physical force, through the use of a tipping-point mechanism, sometimes called an "over-center" mechanism.Switching happens reliably at specific and repeatable positions of the actuator, which is not necessarily true of other mechanisms. They are very common due to their low cost and durability, greater than 1 million cycles and up to 10 million cycles for heavy duty models. This durability is a natural consequence of thedesign.

The defining feature of micro switches is that a relatively small movement at the actuator button produces a relatively large movement at the electrical contacts, which occurs at high speed (regardless of the speed of actuation). Most successful designs also exhibit hysteresis, meaning that a small reversal of the actuator is insufficient to reverse the contacts; there must be a significant movement in the opposite direction. Both of these characteristics help to achieve a clean and reliable interruption to the switchedcircuit.

WorkingProcess:-

In one type of microswitch, internally there are two conductive springs. A long flat spring is hinged at one end of the switch (the left, in the photograph) and has electrical contacts on the other. A small curved spring, preloaded (i.e., compressed during assembly) so it attempts to extend itself (at the top, just right of center in the photo), is connected between the flat spring near the contacts and a fulcrum near the midpoint of the flat spring. An actuator nub presses on the flat spring near its hinge point.Because the flat spring is anchored and strong in tension the curved spring cannot move it to theright.

The curved spring presses, or pulls, the flat spring upward, that is away, from the anchor point. Owing to the geometry, the upward force is proportional to the displacement which decreases as the flat spring moves downward. (Actually, the force is proportional to the sine of the angle, which is approximately proportional to the angle for small angles.) As the actuator depresses it flexes the flat spring while the curved spring keeps the electrical contacts touching. When the flat spring is flexed enough it will provide sufficient force to compress the curved spring and the contacts will begin tomove.

As the flat spring moves downward the upward force of the curved spring reduces causing the motion to accelerate even in the absence of further motion of the actuator until the flat spring impacts the normally-open contact. Even though the flat spring unflexes as it moves downward, the switch is designed so the net effect is acceleration. This "over-center" action produces a very distinctive clicking sound and a very crisp feel.

In the actuated position the curved spring provides some upward force. If the actuator is released this will move the flat spring upward. As the flat spring moves, the force from the curved spring increases. This results in acceleration until the normally-closed contacts are hit. Just as in the downward direction, the switch is designed so that the curved spring is strong enough to move the contacts, even if the flat spring must flex, because the actuator does not move during thechangeover.

Applications:-

Common applications of micro switches include the door interlock on a microwave oven, levelling and safety switches in elevators, vending machines, and to detect paper jams or other faults in photocopiers. Micro switches are commonly used in tamper switches on gate valves on fire sprinkler systems and other water pipe systems, where it is necessary to know if a valve has been opened or shut.

Micro switches are very widely used; among their applications are appliances, machinery, industrial controls, vehicles, convertible tops and many other places for control of electrical circuits. They are usually rated to carry current in control circuits only, although some switches can be directly used to control small motors, solenoids, lamps, or other devices. Special low-force versions can sense coins in vending machines, or with a vane attached, air flow. Micro switches may be directly operated by a mechanism, or may be packaged as part of a pressure, flow, or temperature switch, operated by a sensing mechanism such as a Bourdon tube. In these latter applications, the repeatability of the actuator position when switching happens is essential for long-term accuracy. A motor driven cam (usually relatively slow-speed) and one or more micro switches form a timer mechanism. The snap-switch mechanism can be enclosed in a metal housing including actuating levers, plungers or rollers, forming a limit switch useful for control of machine tools or electrically-drivenmachinery.

JumperWires:-

Jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable – named for one manufacturer of them) is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, withoutsoldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment

Fig 3.4:- Jumper WiresTypes:-

There are different types of jumper wires. Some have the same type of electrical connector at both ends, while others have different connectors. Some common connectors are:

- Solid tips – are used to connect on/with a breadboard or female header connector. The arrangement of the elements and ease of insertion on a breadboard allows increasing the mounting density of both components and jump wires without fear of short-circuits. The jump wires vary in size and colour to distinguish the different workingsignals.
- Crocodile clips – are used, among other applications, to temporarily bridge sensors, buttons and other elements of prototypes with components or equipment that have arbitrary connectors, wires, screw terminals,etc.
- Banana connectors – are commonly used on test equipment for DC and low-frequency AC signals.
- Registered jack (RJnn) – are commonly used in telephone (RJ11) and computer networking (RJ45).
- RCA connectors – are often used for audio, low-resolution composite video signals, or other low-frequency applications requiring a shieldedcable.
- RF connectors – are used to carry radio frequency signals between circuits, test equipment, andantennas.

Architecture of MIT appinventor

App Inventor lets you develop applications for Android phones using a web browser and either a connected phone or emulator. The App Inventor servers store your work and help you keep track of your projects.

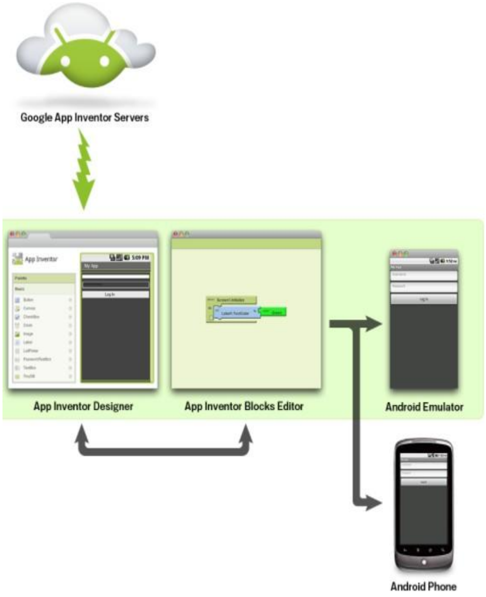


Fig 3.5 :- MIT app inventor architecture

You build apps by working with:

- The App Inventor Designer, where you select the components for yourapp.
- The App Inventor Blocks Editor, where you assemble program blocks that specify how the components shouldbehave.
- You assemble programs visually, fitting pieces togetherlike pieces of a puzzle.Your app appears on the phone step-by-step as you add pieces to it, so you can test your work as you build. When you're done, you can package your app and produce a stand-alone application toinstall.

If you don't have an Android phone, you can build your apps using the *Android emulator*, software that runs on your computer and behaves just like the phone.

The App Inventor development environment is supported for Mac OS X, GNU/Linux, and Windows operating systems, and several popular Android phone models. Applications created with App Inventor can be installed on any Android phone.

Before you can use App Inventor, you need to set up your computer and install the App Inventor Setup package on your computer.

4. ARCHITECTURE

This project consists of three phases. In the first phase the requirement is coverting of data to digital such that whenever the gate is placed on the roller of the connecting switch then the current supply will be flow from the positive and the central ground to the nodemcu. Then the nodemcu is connected

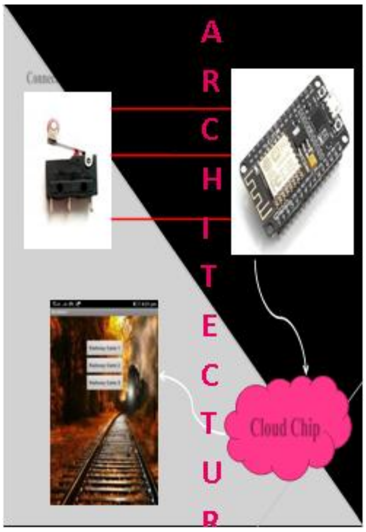


Fig 4.1 :- Architecture of RGTS

with the esp8266 wifi module such that the data is send in the way of 0/1 so, the connected method needed to be obtained in order to provide the internet facility to establish the internet so that the required amount of data is send to the cloud. The process is established such that http protocol in which the transferring of the data is very simple and performance is veryeasy.

The data present upto the NodeMCU is the visible to the user in the serial moniter. Then next process is send to the cloud in the way of protocol by using the server values and the connections required to maintain concureently and requirement of the cloud with channel is also required. In that clod there is a channel in which we need to select the device id. The devices is selected in ordered to connect to our circuit nodemcu so that the data will transferred to the cloud. This device will be given the APIkey and the device id such that this given the unique id in order to select the device and also to provide the security to the cloud device the API key is used. By using this API key the data can be send to the cloud and then we can store thedata.

After the data reaching the cloud such that the maintainance of the cloud will be more. The Status of the Railway Gate can also be maintained and perform the Status of required process in which the cost maintaince will be low and retrieving the data is also very simple.The data needed to be send to the android application, to do this process the cloud should be performed to obtained the status that was used that will be send and the required performance of the cloud needed to maintained accurately.The android application that was used to develop is the MIT app Inventor which is the free platform in order to develop the applications at very free of cost and the requirement for developing the application is the working with the control strings that should be maintained and the performance of the maintained blocks that are needed to be correctly establish the operations according to the desiredworking.

This environment is used because by developing the android application the required performance for the user can be maintained accordingly and the requirments also should me properly connected to internet facility.Whenever the gate is closed then the signals will be passed to the nodmcu and the data will be send to cloud. From the cloud the required data can be seen from the application.

5. WORKINGPRINCIPLE

The main working principle behind the project is attaching switches to the railway gate to monitor the gates. Place the switches to the gate that must be applied pressure when gate closed because based on that pressure only we identify whether a gate is opened or closed. In this procedure first the gate will be falling on switch that means pressure will be applied on the switch. The switch takes pressure as input and produce electrical energy as output. These electrical energy will be supplied to node MCU module for further process. To transfer output of switch to node MCU we must give some connections asfollows.

1. Connect switch normal pin to ground pin in node MCU module (Normalpin->GND).
2. Connect switch off pin to Datapin(D1) in node MCU module (Offpin->D1).

Connect all switches to another gates as same as above pin declarations. After connecting the switch with node MCU we must give power supply to node MCU by using USB port.

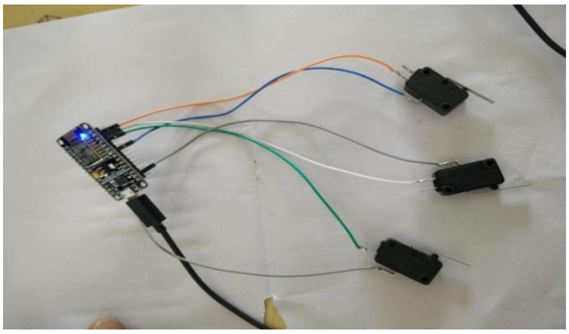


Fig 5.1 :- Circuit Connection

The document generally lists the associated hazards involved in performing a task, what risk score is associated with the hazards (using a risk matrix), what personal protective equipment is required, and the steps involved to complete the activity without incident.The term Safe Work Procedure originated in Victoria, Australia, and is predominantly used as a riskmanagement tool by industries throughout Australia, particularly in the mining sector. SWPs are also referred to using other terms, such as Standard Operating Procedure . A Safe Work Procedure is a step by step description of a process when deviation may cause a loss. This risk control document created by teams within the company describes the safest and most efficient way to perform a task. This document stays in the Health & Safety system for regular use as a template or guide when completing that particular task onsite.

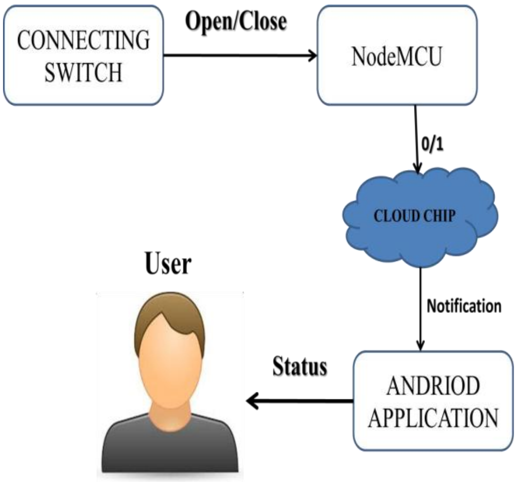


Fig 5.2:- Data flow diagram

6. EXECUTION

Networking hardware, also known as network equipment or computer networking devices, are physical devices which are required for communication and interaction between devices on a computer network. Specifically, they mediate data in a computer network. Units which are the last receiver or generate data are called hosts or data terminal equipment. Networking devices may include gateways, routers, network bridges, modems, wireless accesspoints, networking cables, line drivers, switches, hubs, and repeaters; and may also include hybrid network devices such as multilayer switches, protocol converters, bridge routers, proxy servers, firewalls,network address translators, multiplexers,network interface controllers, wireless network interface controllers, ISDN terminal adapters and other related hardware.

The most common kind of networking hardware today is a copper- based Ethernet adapter which is a standard inclusion on most modern computer systems. Wireless networking has become increasingly popular, especially for portable and handheld devices.Other networking hardware used in computers includes data center equipment (such as file servers, database servers and storage areas), network services (such as DNS, DHCP, email, etc.) as well as devices which assure content delivery.

Taking a wider view, mobile phones, PDAs and even modern coffee machines may also be considered networking hardware. As technology advances and IP-based networks are integrated into building infrastructure and household utilities, network hardware will become an ambiguous term owing to the vastly increasing number of "network capable" endpoints.execution is an optimization technique where a computer system performs some task that may not be needed. Work is done before it is known whether it is actually needed, so as to prevent a delay that would have to be incurred by doing the work after it is known that it is needed. If it turns out the work was not needed after all, most changes made by the work are reverted and the results areignored.

The objective is to provide more concurrency if extra resources are available. This approach is employed in a variety of areas, including branch prediction in pipelined processors, value prediction for exploiting value locality, prefetching memory and files, and optimisticconcurrency control in database systems.

The Connection should be Performed between the modules as described in the above process .

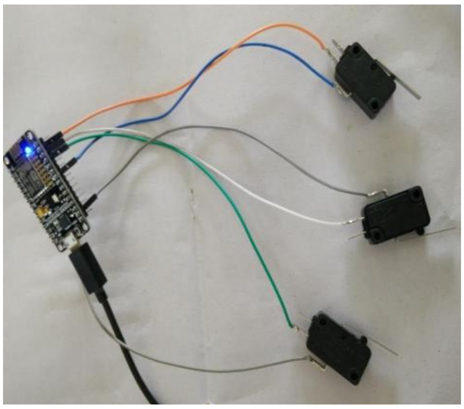
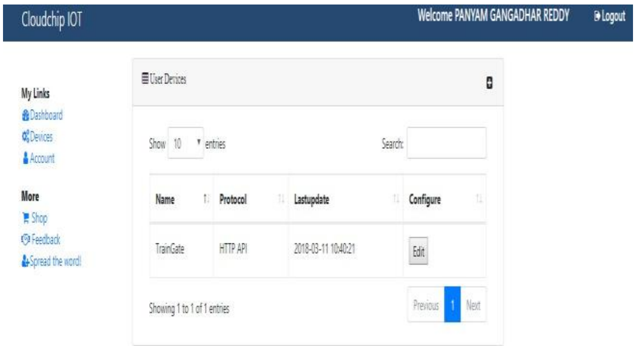


Fig 6.1 :- Hardware Setup

The only way to obtain up-to-date information in this rapidly changing field is directly from the manufacturers: advertisements, specification sheets, price lists, etc. Forget books for performance data, look in magazines and your daily newspaper. Expect that raw computational speed will more than double each two years. Learning about the current state of computer power is simply not enough; you need to understand and track how it is evolving.

Keeping this in mind, we can jump into an overview of how execution speed is limited by computer hardware. Since computers are composed of many subsystems, the time required to execute a particular task will depend on two primary factors: (1) the speed of the individual subsystems, and (2) the time it takes to transfer data between these blocks. Figure 4-5 shows a simplified diagram of the most important speed limiting components in a typical personnel computer. The Central Processing Unit (CPU) is the heart of the system. As previously described,it consists of adozenorso registers,each capable of holding 32 bits(in present generation personnel computers). Also included in the CPU is the digital electronics needed for rudimentary operations, such as moving bits around and fixed point arithmetic.

The Channel needed to be created on the cloud so that we can store the data on the cloud. The following is the creation of the channel in the cloud.



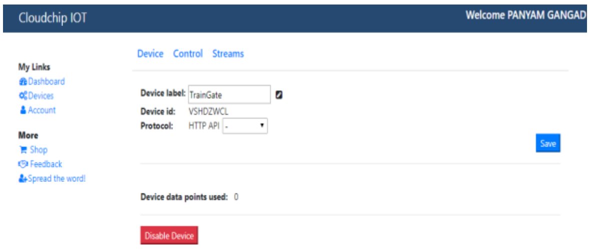
Show 10 entries Search:

Name	Protocol	Lastupdate	Configure
TrainGate	HTTP API	2018-03-11 10:40:21	Edit

Showing 1 to 1 of 1 entries

Fig 6.2 :- Creating Channel in Cloud

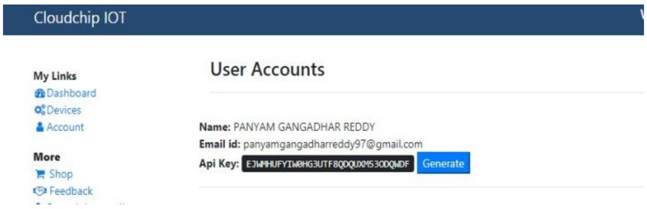
More involved mathematics is handled by transferring the data to a special hardware circuit called a math coprocessor (also called an arithmetic logic unit, or ALU). The math coprocessor may be contained in the same chip as the CPU, or it may be a separate electronic device. For example, the addition of two floating point numbers would require the CPU to transfer 8 bytes (4 for each number) to the math coprocessor, and several bytes that describe what to do with the data. After a short computational time, the math coprocessor would pass four bytes back to the CPU, containing the floating point number that is the sum.The next is it will generates the device Id and the API key by using this keys the data presented in the cloud will be safe and also the accessing of the data is verysimple.



Device label: TrainGate
Device id: VSHDZWCL
Protocol: HTTP API -

Device data points used: 0

Fig 6.3:-Device Id of cloud



User Accounts

Name: PANYAM GANGADHAR REDDY
Email id: panyamgangadharreddy97@gmail.com
Api Key: EJWMHUFYIW0HG3UTF8QDQUXM53ODQWDF

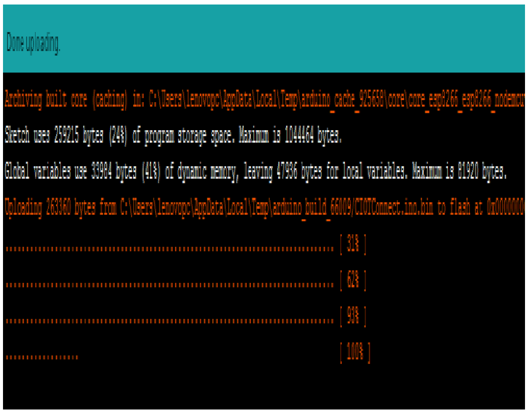
Fig 6.4:-API key of Cloud

More involved mathematics is handled by transferring the data to a special hardware circuit called a math coprocessor (also called an arithmetic logic unit, or ALU). The math coprocessor may be contained in the same chip as the CPU, or it may be a separate electronic device. For example, the addition of two floating point numbers would require the CPUto transfer 8 bytes (4 for each number) to the math coprocessor, and several bytes that describe what to do with the data. After a short computational time, the math coprocessor would pass four bytes back to the CPU, containing the floating point number that is the sum. The most inexpensive computer systems don't have a math coprocessor, or provide it only as an option. For example, the 80486DX microprocessor has an internal math coprocessor, while the 80486SX does not. These lower performance systems replace hardware with software. To make speculative execution as efficient as it can be, some combinations of operating system and underlying hardware let it touch data in the operating-system's private memory before it is actually needed. The vulnerabilities stem from the ability of a malicious program to then infer what this otherwise inaccessible data was, after thefact.

The more widely discussed of the two vulnerabilities, Meltdown, relies on certain hardware choices to read users' sensitive information, but can be addressed using software updates of the relevant computing platforms. Spectre, the lesser known and more difficult to apply of the two, makes it possible for a program to access data in a separate program running on the chip, and is far more difficult to fix with a single solution. While not ideal, the best general defences suggested involve detection on the one hand, and separation of running processes' cache activity from each other. The latter mitigation can carry a significant performance penalty on some architectures, and over particular workloads.

Both flaws work by performing an indexed load from memory. During this load, a first piece of data A (supposed to be off-limits) is read from memory, and then this piece of data is used to calculate the address of another piece of data BA (accessible) to be read from memory as well. As A is off-limits, the processor ultimately cancels any direct effect of the operation on the registers and on memory once it notices that the read should not have been allowed. However, BA is still present in the cache, and this condition can be detected by the attacker by reading BA for all possible values of A, and observing which read operation performs noticeably faster than the others. To make speculative execution as efficient as it can be, some combinations of operating system and underlying hardware let it touch data in the operating-system's private memory before it is actually needed. While not ideal, the best general defences suggested involve detection on the one hand, and separation of running processes' cache activity from eachother.

The Output screens of the project is mainly based on accurate results that was seen earlier. After doing all the process as described previously then the following will be the output.Firstly We can see the uploading output in which after successful completion of writing the code in the ardiuno IDE then the code needed to uploaded into the nodeMCU in that Case the following output isgenerated.

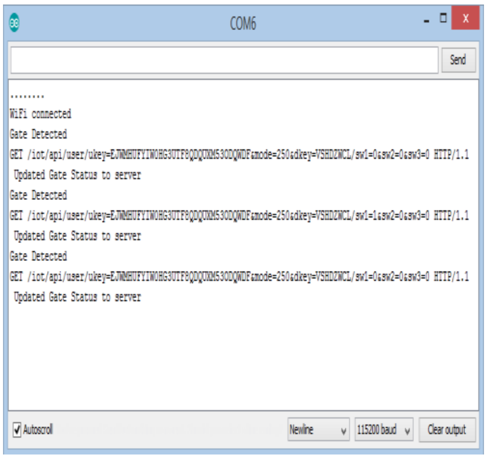


```
Done uploading.

Archiving built core (caching) in: C:\Users\lenovopc\AppData\Local\Temp\arduino_cache_925658\core\core_esp8266_esp8266_nodemcu
Sketch uses 259215 bytes (24%) of program storage space. Maximum is 1044464 bytes.
Global variables use 33984 bytes (41%) of dynamic memory, leaving 47936 bytes for local variables. Maximum is 81920 bytes.
Uploading 263360 bytes from C:\Users\lenovopc\AppData\Local\Temp\arduino_build_66009/CIOTConnect.ino.bin to flash at 0x0000000
................................................................................ [ 31% ]
................................................................................ [ 62% ]
................................................................................ [ 93% ]
..................                                                               [ 100% ]
```

Fig 6.5 :- After completion of uploading

Then after the uploading of sketch to the module is completed now open the serial monitor in the IDE there you can see the status of switches in which there is a connection or not if the switch is closed then it will shows the 0 on other case it will shows the status as 1.The following will be serial monitor. As A is off-limits, the processor ultimately cancels any direct effect of the operation on the registers and on memory once it notices that the read should not have been allowed. However, BA is still present in the cache, and this condition can be detected by the attacker by reading BA for all possible values of A, and observing which read operation performs noticeably faster than theothers.



```
........
WiFi connected
Gate Detected
GET /iot/api/user/ukey=EJWMHUFYIW0HG3UTF8QDQUXM53ODQWDF&mode=250&dkey=VSHDZWCL/sw1=0&sw2=0&sw3=0 HTTP/1.1
 Updated Gate Status to server
Gate Detected
GET /iot/api/user/ukey=EJWMHUFYIW0HG3UTF8QDQUXM53ODQWDF&mode=250&dkey=VSHDZWCL/sw1=1&sw2=0&sw3=0 HTTP/1.1
 Updated Gate Status to server
Gate Detected
GET /iot/api/user/ukey=EJWMHUFYIW0HG3UTF8QDQUXM53ODQWDF&mode=250&dkey=VSHDZWCL/sw1=0&sw2=0&sw3=0 HTTP/1.1
 Updated Gate Status to server
```

Fig 6.6 :- Serial monitor in IDE

Now, let see the process of project that will be gives the status in android application. If the Gate is closed as shown below

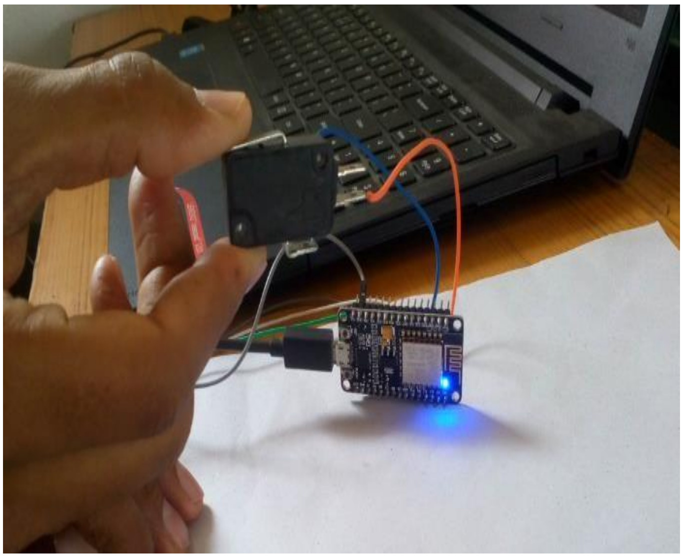
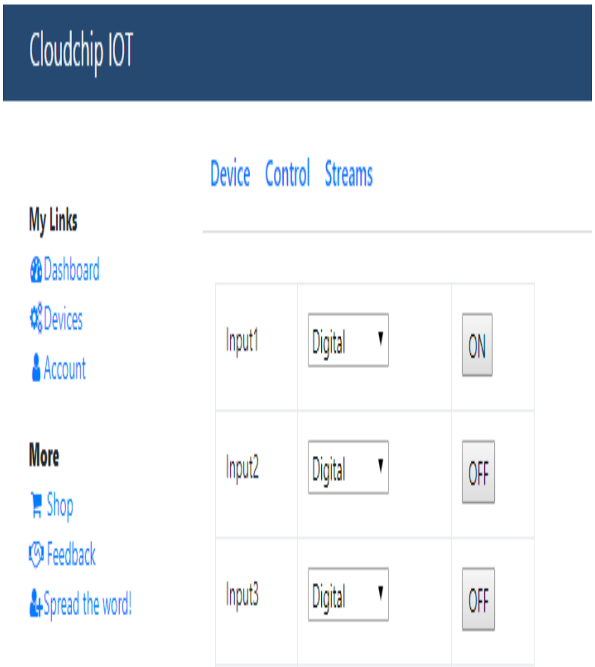


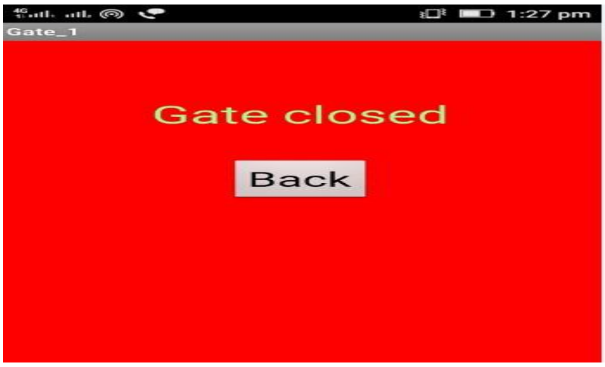
Fig 6.7:-Gate is Closed

Then we can see the Status in both cloud and android application as shown below.



Input1	Digital	ON
Input2	Digital	OFF
Input3	Digital	OFF

Fig 6.8 :-Update in cloud



Gate closed

Fig 6.9:- Status in android application

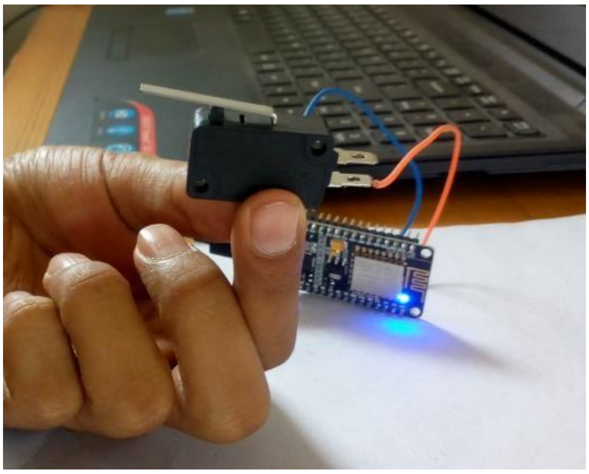
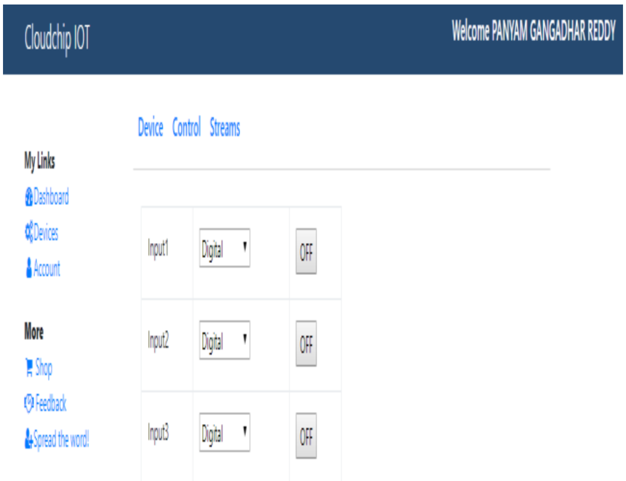


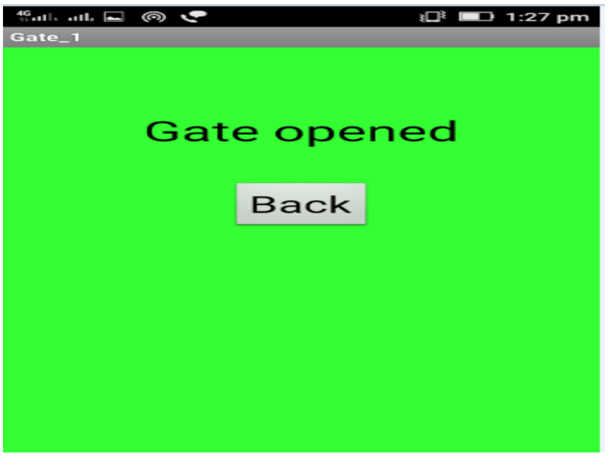
Fig 6.10:-Gate is Opened

Then the Status in the android application and cloud can be seen below.



Input1	Digital	OFF
Input2	Digital	OFF
Input3	Digital	OFF

Fig 6.11 :- Update in cloud



Gate_1

Gate opened

Fig 6.12 :- Status in android application

7. FUTURESCOPE

The future scope for this project is adding timers. The timer indicates if gate is opened approximate time the gate is closed. If gate is closed at what approximate time the gate isopen.so, that the user can manage the time anddirection.

Another future scope is sending notification to the user if he registers. This will helps when a person is daily travelling in a same root. Mostly used for employees and students. Firstly, we can take the details about the user and required number of gates he required to know about the status in that case whenever the gate status is changed then user can get thenotification.

This project can be included in the goggle maps such that while the user is choosing the road, he can get only the route but he cannot see the presence of the level-crossing in such situation we can include this system so, that user can also monitor the status of level-crossing in the goggle maps.

8. CONCLUSION

By using this application the users can choose the alternate routes or they can manage their time. This will be helpful for the ambulances and the people who are rushing to works. To provide the connectivity we used the microcontroller and connecting switch these are placed near the railway gate. so, that whenever the railway gate is fell on the connecting switch then the signals will be passed to the microcontroller then the controller will configure the signals received from the connecting switch and will send that signals to the cloud by using the wifi signals, this wifi module will be triggered in themicrocontroller.

Whenever the controller is connected with the wifi then it is ready for sending or retrieving the data to cloud.After the data is send to the cloud then by using the interface between the android and the cloud then the url and api keys that are generated by the cloud are used by the android to retrieve the data.so thatwe can show the status in the android application. To implement this type of project we definitely needed to use the Stream of IoT because thisprovide us the connectivity between the railway gate so that we can monitor the railway gate with internet facility and the major requirement of using this project is cost efficient for developing and implementing. By using this project the user can know about the status of the railway gates whenever user need to pass through the levelcrossing.

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