A project report on

FABRICATION OF AUTOMATIC ELECTROMAGNETIC GEAR SHIFTING IN TWO WHEELERS

In partial fulfilment of requirements for the award of the degree in

BACHELOR OF TECHNOLOGY

in

DEPARTMENT OF MECHANICAL ENGINEERING

submitted by

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SRI KRISHNADEVARAYA UNIVERSITY

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CERTIFICATE

This is to certify that project entitled

FABRICATION OF AUTOMATIC ELECTROMAGNETIC GEAR SHIFTING IN TWO WHEELERS

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Submitted to the faculty of mechanical engineering in partial fulfilment for the award of degree of BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING from SRI KRISHNA DHEVARAYA UNIVERSITY COLLEGE OF ENGINEERING AND TECHNOLOGY, ANANTAPURAMU. During academic year 2021-2025. The results embodied in this project report have not been submitted to any other university or institute for the award of any Degree of Diploma.

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INTERNAL EXAMINAR

EXTERNAL EXAMINAR

DECLARATION

We R.V.V. SURYANARAYANA (2110345), B. CHAITHANYAKUMAR (2110302), K. BALAJI (2110334) P. RAGHAVENDHRA REDDY (23110342) Studying final year B. Tech in Mechanical Engineering & Technology. We have registered for the final year project under the guidance of DR.U.JAWAHAR SURENDRA M.TECH;Ph.D; MBA ; (Ph.D) And we promise to meet all the mandatory requirements as specified by the project review committee. We declare that we will not hold the college, the Department and Lecturers responsible for the outcome for our project result.

PLACE: Signatures of members

Date:

1.
2.
3.
4.

ACKNOWLEDGEMENT

- We would express our sincere thanks to various personalities who were responsible for the successful completion of this project.
- We thank our principal Prof. Dr. R. RAMACHANDRA M. Tech, Ph.D. for providing the necessary infrastructure required to our project.
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- We express our deep-felt gratitude to DR.U. JAWAHAR SURENDRA, M. Tech; Ph. D; MBA;(Ph.D.) with his valuable guidance and unstinting encouragement enabled us to accomplish our project successfully in time.
- We express our earnest thanks to all faculty members of mechanical engineering for extending their helping hands and valuable suggestions when we need.

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CHAPTER 1

ABSTRACT

The project aims to develop an automatic gear shifting system using electromagnetic coils, minimizing manual effort in gear transmission. Two electromagnetic coils are attached to the gear rod ends, controlled by a microcontroller unit. A proximity sensor detects the vehicle's wheel speed and sends signals to the microcontroller, which activates relays based on the speed. One relay handles gear upshifting, while the other manages gear downshifting. This setup ensures accurate and efficient gear transmission, improving vehicle performance and reducing manual intervention.

The main objective of our project is to fabricate an effective method of gear shifting system and thus we have arrived in an idea of automatic gear shifting system using the electromagnetic coils. There are disclosed an automatic gear change control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile i.e. a wheel arrangement. When a gear shifting-up of an automatic transmission is to be effected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. In our project, two electromagnetic coils are coupled to the gear rod of the two ends. The proximity sensor is used to sense the wheel speed and this signal is given to the microcontroller unit. The microcontroller is activate the relay depends upon the vehicle speed. There are two relays are used, one for gear increaser and another one for gear down. Thus the gear transmission is done with the help of electromagnetic coils and the microcontroller unit which reduces the manual work of gear transmission and also the gear transmission is done at the exact speed by using the proximity sensor.

CHAPTER 2

INTRODUCTION

A method of controlling a gear change of an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios; a load device selectively connectable to said output rotation shaft of said engine via selectively-connecting means; and means for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine said method comprising the steps of controlling said selectively-connecting means when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission, in such a manner that said selectively-connecting means connects said load device to said output rotation shaft of said engine.

An automatic gear change control apparatus for an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios; said apparatus comprising a load device for applying a load; means for connecting said load device to said output rotation shaft of said engine and for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine; and load control means for increasing the load of said load device when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission.

CHAPTER 3

LITERATURE REVIEW:

Danish scientist Hans Christian Orated discovered in 1820 that electric currents create magnetic fields. British scientist William Sturgeon invented the electromagnet in 1824. His first electromagnets
was a horseshoe-shaped piece of iron that was wrapped with about 18 turns of bare copper wire (insulated wire didn't exist yet). The iron was varnished to insulate it from the windings. When a current was passed through the coil, the iron became magnetized and attracted other pieces of iron; when the current was stopped, it lost magnetization. Sturgeon displayed its power by showing that although it only weighed seven ounces (roughly 200 grams), it could lift nine pounds (roughly 4 kilos) when the current of a single-cell battery was applied. However, Sturgeon's magnets were weak because the uninsulated wire he used could only be wrapped in a single spaced out layer around the core, limiting the number of turns. Beginning in 1827, US scientist Joseph Henry systematically improved and popularized the electromagnet. By using wire insulated by silk thread he was able to wind multiple layers of wire on cores, creating powerful magnets with thousands of turns of wire, including one that could support 2,063 lb (936 kg). The first major use for electromagnets was in telegraph sounders. The magnetic domain theory of how ferromagnetic cores work was first proposed in 1906 by French physicist Pierre-Ernest Weiss, and the detailed modern quantum mechanical theory of ferromagnetism was worked out in the 1920s by Werner Heisenberg, Lev Landau, Felix Bloch and others. An electromagnet is a type of magnet in which the magnetic field is produced by the flow of electric current. The magnetic field disappears when the current is turned off. Electromagnets are widely used as components of other electrical devices, such as motors, generators, relays, loudspeakers, hard disks, MRI machines, scientific instruments, and magnetic separation equipment, as well as being employed as industrial lifting electromagnets for picking up and moving heavy iron objects like scrap iron. Simple machines, such as the club and oar (examples of the lever), are prehistoric. More complex engines using human power, animal power, water power, wind power and even steam power date back to antiquity. Human power was focused using simple engines, such as the capstan, windlass or treadmill, and with ropes, pulleys, and block and tackle arrangements; this power was transmitted usually with the forces multiplied and the speed reduced. These were used in cranes and aboard ships in Ancient Greece, as well as in mines, water pumps and siege engines in Ancient Rome. The writers of those times, including Vitruvius, Frontinus and Pliny the Elder, treat these engines as commonplace, so their invention may be more ancient. By the 1st century AD, cattle and horses were used in mills, driving machines similar to those powered by humans in earlier times.

CHAPTER 4

COMPONENTS AND DESCRIPTION

The major components involved in the fabrication of the automatic gear shifting system for two wheelers are as follows.

- Frame
- Micro Control unit
- Battery
- Bearing with bearing cap
- Engine
- Proximity Sensor
- Sprocket and chain drive
- Wheel arrangement
- Electromagnetic coil

FRAME

This is made of mild steel material. The whole parts are mounted on this frame structure with the suitable arrangement. Boring of bearing sizes and open bores done in one setting so as to align the bearings properly while assembling. Provisions are made to cover the bearings with grease.

MICRO CONTROL UNIT

In automotive electronics, Electronic Control Unit (ECU) is a generic term for any embedded system that controls one or more of the electrical system or subsystems in a motor vehicle.

Types of ECU include Electronic/engine Control Module (ECM), Power train Control Module (PCM), Transmission Control Module (TCM), Brake Control Module (BCM or EBCM), Central Control Module (CCM), Central Timing Module (CTM), General Electronic Module (GEM), Body Control Module (BCM), Suspension Control Module (SCM), control unit, or control module. Taken together, these systems are sometimes referred to as the car's computer. Technically there is no single computer but multiple ones. Sometimes one assembly incorporates several of the individual control modules.

Some modern motor vehicles have up to 80 ECUs. Embedded software in ECUs continues to increase in line count, complexity, and sophistication. Managing the increasing complexity and number of ECUs in a vehicle has become a key challenge for original equipment manufacturers (OEMs).

In our project we use the control unit for controlling the DC motor that activates/deactivates the vehicle braking system. It is very simple in operation that, when the brake lock system is activated from the remote, the control unit switches on the motor and when it is deactivated from the remote, then the control unit reverses the motor direction

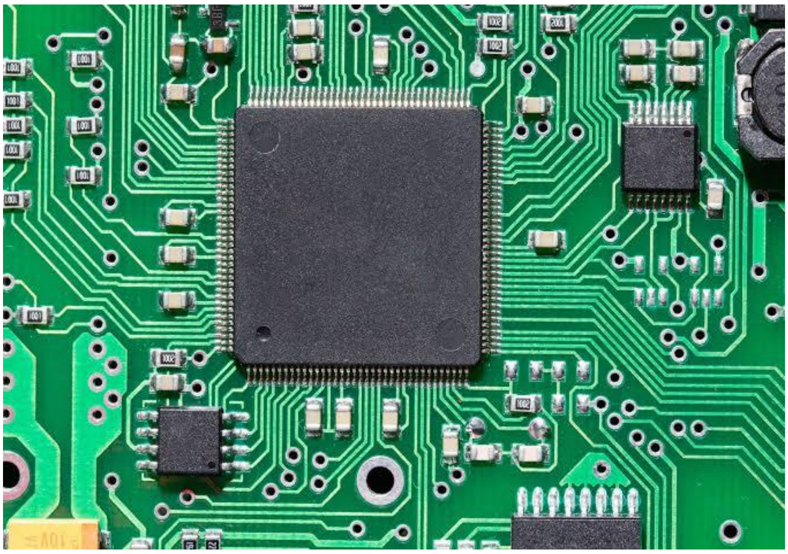

Fig 1: Micro Control Unit

BATTERY

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilowatt.

Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern.

To be economically attractive the storage of solar electricity requires a battery with a particular combination of properties:

(1) Low cost

(2) Long life

(3) High reliability

(4) High overall efficiency

(5) Low discharge

(6) Minimum maintenance

    (A) Ampere hour efficiency

    (B) Watt hour efficiency

FIG 2 : BATTERY

BEARING WITH BEARING CAP

The bearings are pressed smoothly to fit into the shafts because if hammered the bearing may develop cracks. Bearing is made up of steel material and bearing cap is mild steel.

Ball and roller bearings are used widely in instruments and machines in order to minimize friction and power loss. While the concept of the ball bearing dates back at least to Leonardo da Vinci, the design and manufacture has become remarkably sophisticated. This technology was brought to its present state of perfection only after a long period of research and development. The benefits of such specialized research can be obtained when it is possible to use a standardized bearing of the proper size and type.

However, such bearings cannot be used indiscriminately without a careful study of the loads and operating conditions. In addition, the bearing must be provided with adequate mounting, lubrication and sealing.

ENGINE:

An engine or motor, is a machine designed to convert one form of energy into mechanical energy. Heat engines, including internal combustion engines and external combustion engines (such as steam engines) burn a fuel to create heat, which then creates a force. Electric motors convert electrical energy into mechanical motion, pneumatic motors use compressed air and others—such as clockwork motors in wind-up toys—use elastic energy. In biological systems, molecular motors, like myosin's in muscles, use chemical energy to create forces and eventually motion.

In our project we use a sample engine which drives a wheel by a chain drive in order to show the exact working of the anti theft system

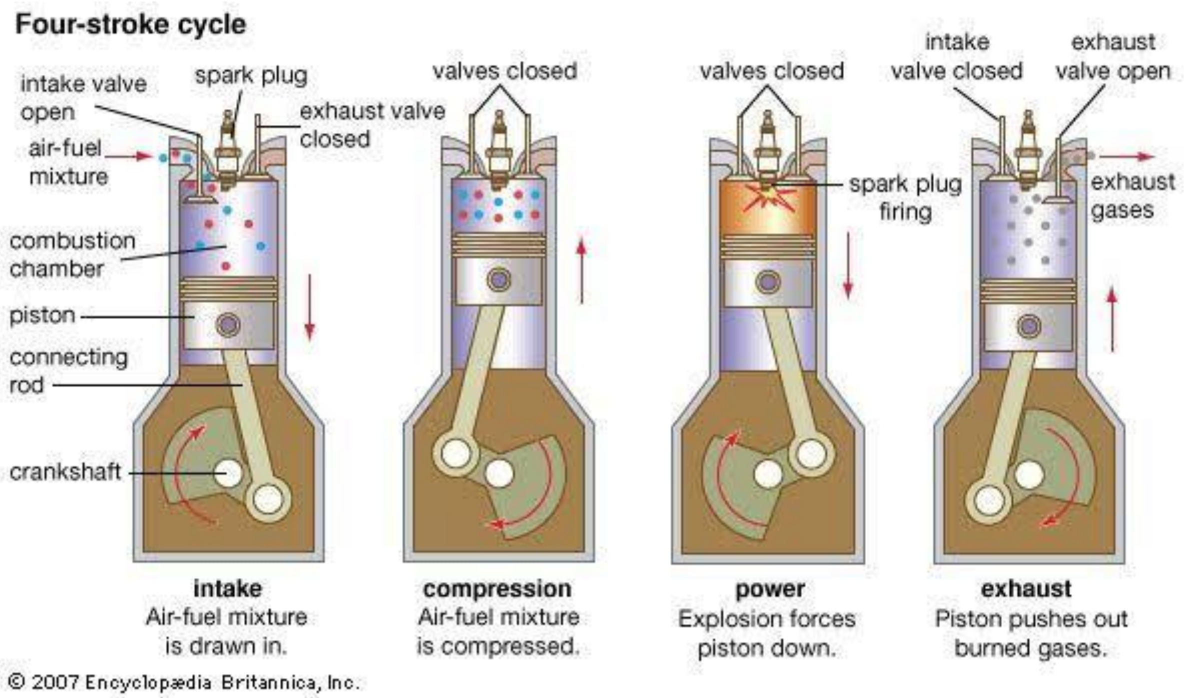

FIG 3: WORKING OF FOUR STROKE PETROL ENGINE

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A four-stroke cycle engine is an internal combustion engine that utilizes four distinct piston strokes (intake, compression, power, and exhaust) to complete one operating cycle. The piston makes two complete passes in the Cylinder to complete one operating cycle. An operating cycle requires two revolutions (720°) of the crankshaft. The four-Stroke cycle engine is the most common type of small engine.

A four-stroke cycle engine completes five Strokes in one operating cycle, including intake, compression, ignition, power, and exhaust Strokes.

Intake Stroke

The intake event is when the air-fuel mixture is introduced to fill the combustion chamber. The intake event occurs when the piston moves from TDC to BDC and the intake valve is open. The movement of the piston toward BDC creates a low pressure in the cylinder. Ambient atmospheric pressure forces the air-fuel mixture through the open intake valve into the cylinder to fill the low pressure area created by the piston movement. The cylinder continues to fill slightly past BDC as the air-fuel mixture continues to flow by its own inertia while the piston begins to change direction. The intake valve remains open a few degrees of crankshaft rotation after BDC. Depending on engine design, the intake valve then closes and the air-fuel mixture is sealed inside the cylinder.

Compression Stroke

The compression stroke is when the trapped air-fuel mixture is compressed inside the cylinder. The combustion chamber is sealed to form the charge. The charge is the volume of compressed air-fuel mixture trapped inside the combustion chamber ready for ignition. Compressing the air-fuel mixture allows more energy to be released when the charge is ignited. Intake and exhaust valves must be closed to ensure that the cylinder is sealed to provide compression. Compression is the process of reducing or squeezing a charge from a large volume to a smaller volume in the combustion chamber. The flywheel helps to maintain the momentum necessary to compress the charge.

Power Stroke

The power stroke is an engine operation Stroke in which hot expanding gases force the piston head away from the cylinder head. Piston force and subsequent motion are transferred through the connecting rod to apply torque to the crankshaft. The torque applied initiates crankshaft rotation. The amount of torque produced is determined by the pressure on the piston, the size of the piston, and the throw of the engine. During the power Stroke, both valves are closed.

Exhaust Stroke

The exhaust stroke occurs when spent gases are expelled from the combustion chamber and released to the atmosphere. The exhaust stroke is the final stroke and occurs when the exhaust valve is open and the intake valve is closed. Piston movement evacuates exhaust gases to the atmosphere.

As the piston reaches BDC during the power stroke combustion is complete and the cylinder is filled with exhaust gases. The exhaust valve opens, and inertia of the flywheel and other moving parts push the piston back to TDC, forcing the exhaust gases out through the open exhaust valve. At the end of the exhaust stroke, the piston is at TDC and one operating cycle has been completed.

PROXIMITY SENSOR

A sensor is a transducer used to make a measurement of a physical variable. Any sensor requires calibration in order to be useful as a measuring device. Calibration is the procedure by which the relationship between the measured variable and the converted output signal is established.

Care should be taken in the choice of sensory devices for particular tasks. The operating characteristics of each device should be closely matched to the task for which it is being utilized. Different sensors can be used in different ways to sense same conditions and the same sensors can be used in different ways to sense different conditions.

FIG 4: PROXIMITY SENSOR

SPROCKET AND CHAIN DRIVE

A chain is a reliable machine component, which transmits power by means of tensile forces, and is used primarily for power transmission and conveyance systems. The function and uses of chain are similar to a belt. There are many kinds of chain. It is convenient to sort types of chain by either material of composition or method of construction.

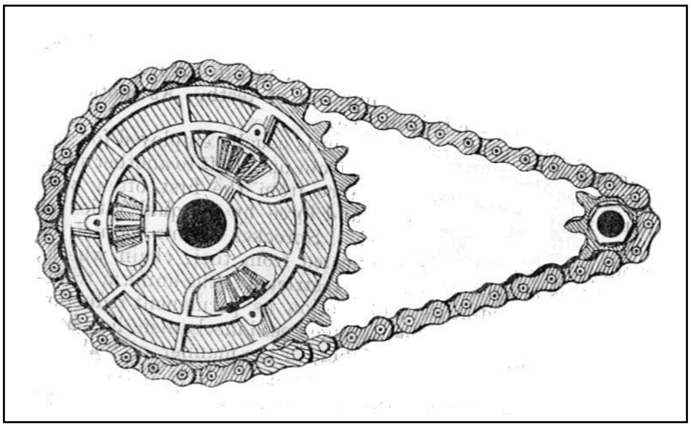

FIG 5 : SPOCKET AND CHAIN DRIVE

WHEEL ARRANGEMENT

The simple wheel and braking arrangement is fixed to the frame stand. Near the brake drum, the pneumatic cylinder piston is fixed. This wheel arrangement is setup for showing the successful working of our project. But the real implementation can be done in the automobile and the brakes can be applied to all the four wheels.

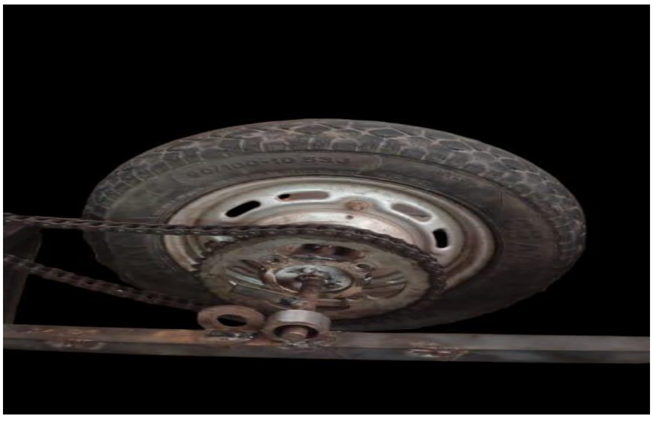

FIG 6: WHEEL ARRANGEMENT

ELECTROMAGNETIC COIL

The two electromagnetic coils are fixed to the gear shaft of the two ends. One is used to shift the gear in an upward direction. Another one is used to shift the gear in a downward direction. These two coils are operated depending upon the activation of the button.

FIG 7: ELECTROMAGNETIC COIL

CHAPTER 5

PROGRAM

```
// Crystal: 8.0000Mhz

#include <iom16v.h>

#include <macros.h>

extern int _textmode;

unsigned int

Start=1,Time=0,Count=0,Flag=0,Onesec=0,RPM=0,Flag1=0,Flag2=0,Flag3=0;

void port_init(void)

{

PORTA = 0x00;

DDRA  = 0xFF;

PORTB = 0xFF;

DDRB  = 0x00;

PORTC = 0x00; //m103 output only

DDRC  = 0xFF;

PORTD = 0x00;

DDRD  = 0xFF;

}

//TIMER1 initialize - prescale:64

// WGM: 0) Normal, TOP=0xFFFF

// desired value: 1mSec
```

```
// actual value:  1.000mSec (0.0%)

void timer1_init(void)

{

TCCR1B = 0x00; //stop

TCNT1H = 0xFF; //setup

TCNT1L = 0x83;

OCR1AH = 0x00;

OCR1AL = 0x7D;

OCR1BH = 0x00;

OCR1BL = 0x7D;

ICR1H  = 0x00;

ICR1L  = 0x7D;

TCCR1A = 0x00;

TCCR1B = 0x03; //start Timer

}

#pragma interrupt_handler timer1_ovf_isr:iv_TIM1_OVF

void timer1_ovf_isr(void)

{

//TIMER1 has overflowed

TCNT1H = 0xFF; //reload counter high value

TCNT1L = 0x83; //reload counter low value

if(Start == 0)

{
```

```
Time++;

if(Flag == 1)

{

if((PINB & 0X80) == 0)

{

Count++;

Flag=0;

}

}

if(Flag == 0)

{

if((PINB & 0X80) == 1)

{

Flag=1;

}

}

}

if(Time == 60)

{

//Count2++;

Onesec = Count;

RPM = (Onesec*60);

Count = 0;
```

```
Time = 0;
}
}
//UART0 initialize
// desired baud rate: 9600
// actual: baud rate:9615 (0.2%)
void uart0_init(void)
{
UCSRB = 0x00; //disable while setting baud rate
UCSRA = 0x00;
UCSRC = BIT(URSEL) | 0x06;
UBRRL = 0x33; //set baud rate lo
UBRRH = 0x00; //set baud rate hi
UCSRB = 0x18;
}
int puts(char *s)  //XCONST
{
while (*s)
{
putchar(*s);
s++;
}
//putchar('\n');
```

```
return 1;

}

char *gets(char *s)

{

char *s1 = s;

int c;

while ((c = getchar()) != '\n')

*s++ = c;

*s = 0;

return s1;

}

int getchar(void)

{

while ((UCSRA & 0x80) == 0)

;

   return UDR;

   }

int putchar(char c)

   {

   if (_textmode && c == '\n')

      putchar('\r');

   while ((UCSRA & 0x20) == 0)   // UDRE, data register empty

      ;
```

```
    UDR = c;
    return c;
    }
//call this routine to initialize all peripherals
void init_devices(void)
{
 //stop errant interrupts until set up
CLI(); //disable all interrupts
port_init();
timer1_init();
uart0_init();
MCUCR = 0x00;
GICR  = 0x00;
TIMSK = 0x04; //timer interrupt sources
SEI(); //re-enable interrupts
//all peripherals are now initialized
}
//
void main(void)
{
init_devices();
//insert your functional code here...
while(1)
```

```
{
if(Start == 1)
{
if((PINB & 0X01) == 0)
{
PORTC |=(1<<0);
PORTA = 0XFF;
Delay();
PORTC &=~(1<<0);
PORTA = 0X00;
Start=0;
}
}
//Flag1=0,Flag2=0,Flag3=0;
if(Start == 0)
{
if(Flag1 == 0)
{
if(RPM >105)
{
PORTC |=(1<<0);
PORTA = 0XFF;
Delay();
```

```
PORTC &=~(1<<0);
PORTA = 0X00;
Flag1 = 1;
Flag2 = 0;
}
}
if(Flag1 == 1)
{
if(RPM <95)
{
PORTC |=(1<<4);
PORTD = 0XFF;
Delay();
PORTC &=~(1<<4);
PORTD = 0X00;
Flag1 = 0;
Flag2 = 0;
}
}
if(Flag2 == 0)
{
if(RPM >205)
{
```

```
PORTC |=(1<<0);
PORTA = 0XFF;
Delay();
PORTC &=~(1<<0);
PORTA = 0X00;
Flag2 = 1;
Flag3 = 0;
}
}
if(Flag2 == 1)
{
if(RPM <195)
{
PORTC |=(1<<4);
PORTD = 0XFF;
Delay();
PORTC &=~(1<<4);
PORTD = 0X00;
Flag2 = 0;
Flag2 = 0;
}
}
if(Flag3 == 0)
```

```
{
if(RPM >305)
{
PORTC |=(1<<0);
PORTA = 0XFF;
Delay();
PORTC &=~(1<<0);
PORTA = 0X00;
Flag3 = 1;
//Flag3 = 0;
}
}
if(Flag3 == 1)
{
if(RPM <295)
{
PORTC |=(1<<4);
PORTD = 0XFF;
Delay();
PORTC &=~(1<<4);
PORTD = 0X00;
Flag3 = 0;
//Flag2 = 0;
```

```
}
}
}
}
}
void Delay(void)
{
unsigned int a,b;
for(a=0;a<2500;a++)
for(b=0;b<250;b++);
}
```

CHAPTER-6

WORKING PRINCIPLE

A method of controlling a gear change of an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios; a load device selectively connectable to said output rotation shaft of said engine via selectively-connecting means; and means for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine said method comprising the steps of controlling said selectively-connecting means when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission, in such a manner that said selectively-connecting means connects said load device to said output rotation shaft of said engine.

Battery is giving the supply to the electromagnetic coil. The two electro-magnetic coils are fixed to the gear shaft of the two ends. One is used to shift the gear in upward direction. Another one is used to shift the gear in downward direction. These two coil is operated depends upon the activation of the push button

CHAPTER-7

2D DRAWING:

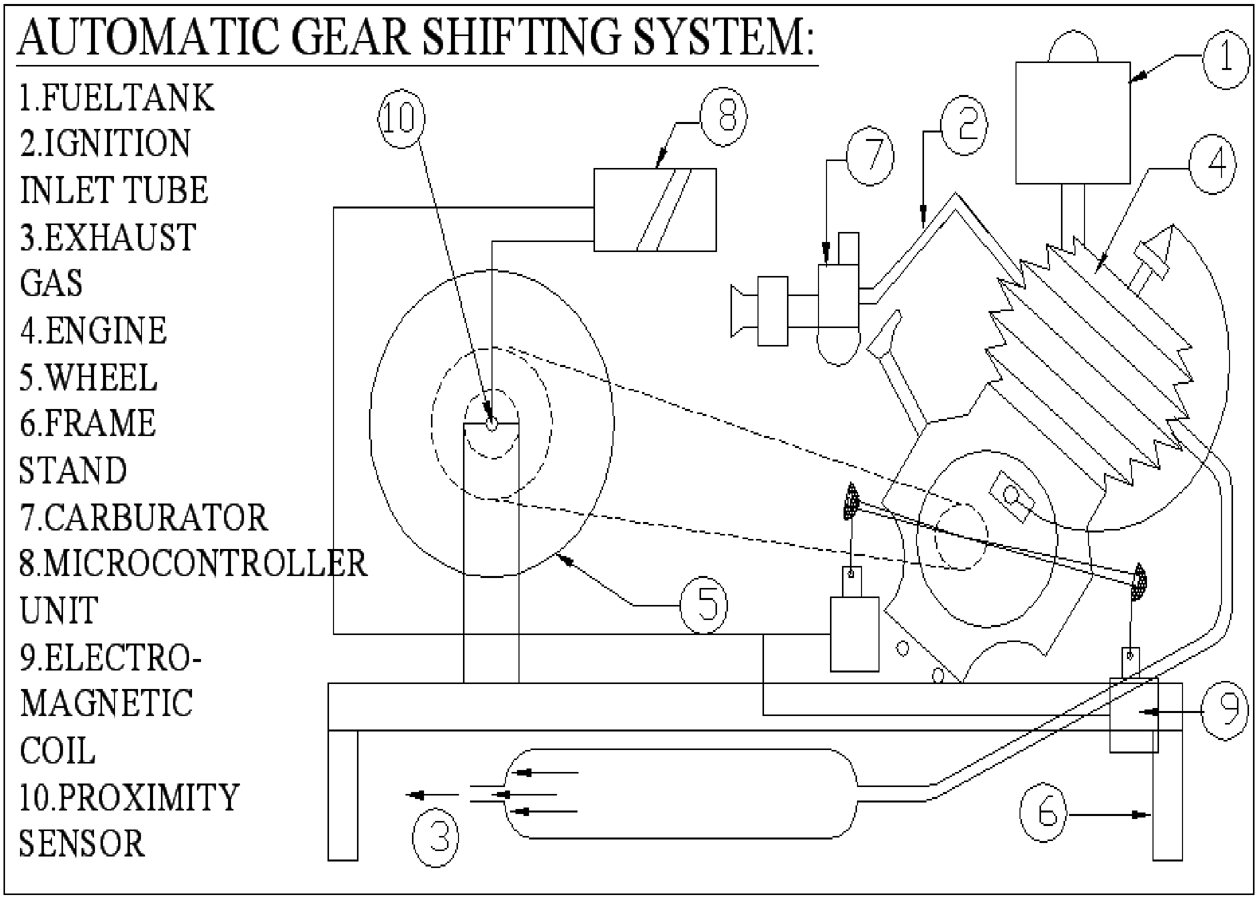

FIG 1 : AUTOMATIC ELECTROMAGNETIC GEAR SHIFTING IN TWO WHEELERS

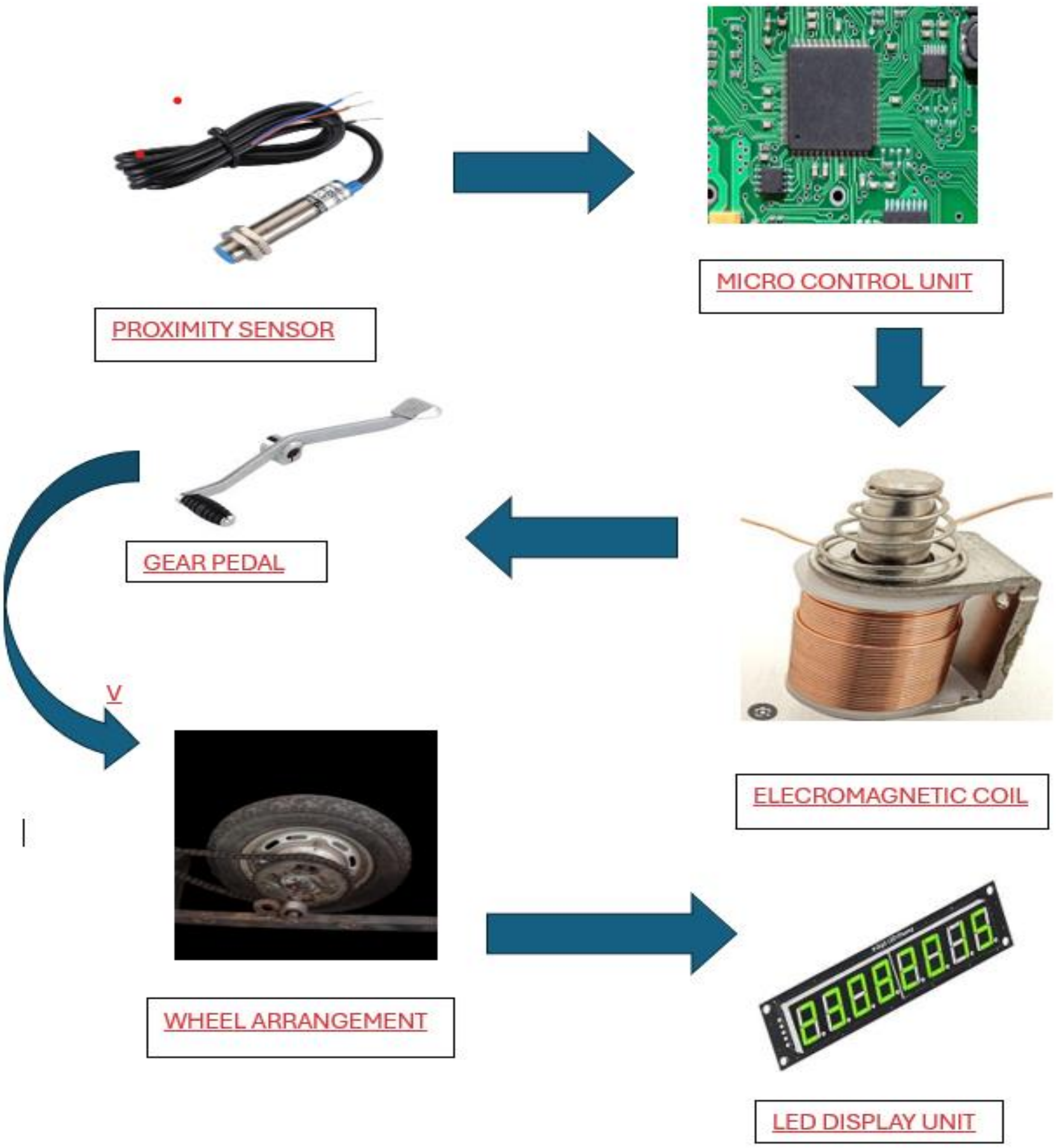

FIG: BLOCK DIAGRAM

CHAPTER-8

ADVANTAGES

Fabricating an automatic electromagnetic gear shifting system in two-wheelers can offer several advantages, including:

1. **Smooth and Precise Shifting**: Electromagnetic gear shifting provides smooth and precise shifting, resulting in improved ride quality and reduced wear on the transmission.

2. **Increased Convenience**: Automatic gear shifting eliminates the need for manual gear shifting, making the riding experience more convenient and enjoyable.

3. **Improved Safety**: Automatic gear shifting reduces the risk of accidents caused by manual gear shifting errors, such as skipping gears or riding in the wrong gear.

4. **Enhanced Performance**: The electromagnetic gear shifting system can optimize gear shifting for maximum performance, resulting in improved acceleration and responsiveness.

5**. Reduced Rider Fatigue**: Automatic gear shifting reduces the physical effort required to shift gears, reducing rider fatigue on long trips.

6. **Low Maintenance**: The electromagnetic gear shifting system can require less maintenance than traditional manual gear shifting systems.

7. **Improved Fuel Efficiency**: The optimized gear shifting can result in improved fuel efficiency, reducing fuel consumption and emissions.

Potential Benefits for Two-Wheelers:

1. Increased Accessibility: Automatic gear shifting can make two-wheelers more accessible to a wider range of riders, including those with limited experience or physical abilities.

2. Enhanced Urban Mobility: Automatic gear shifting can improve the overall riding experience in urban environments, where frequent stops and starts can be challenging.

3. Improved Traffic Safety: Automatic gear shifting can help reduce the risk of accidents in heavy traffic, where riders need to focus on navigating through crowded roads.

Technical Advantages:

1. Electromagnetic Actuation: The use of electromagnetic actuation provides fast and precise gear shifting, resulting in improved performance and responsiveness.

2. Advanced Control Systems: The system can be controlled by advanced algorithms and sensors, allowing for optimized gear shifting and improved performance.

3. Compact Design: The electromagnetic gear shifting system can be designed to be compact and lightweight, making it suitable for use in two-wheelers.

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CHAPTER 9

DISADVANTAGES:

Here are the disadvantages of fabricating an automatic electromagnetic gear shifting system in two-wheelers:

1. Increased Complexity: The automatic electromagnetic gear shifting system can be more complex than traditional manual gear shifting systems, requiring advanced electronics and control systems.

2. Higher Cost: The fabrication of an automatic electromagnetic gear shifting system can be more expensive than traditional gear shifting systems, making it less accessible to some riders.

3. Dependence on Electronics: The system relies on electronic components, which can be prone to faults or failures, potentially causing shifting issues or system failures.

4. Power Consumption: The electromagnetic gear shifting system requires power to operate, which can drain the battery or affect the overall electrical system of the two-wheeler.

5. Weight and Size: The addition of electromagnetic components can increase the weight and size of the gear shifting system, potentially affecting the overall weight distribution and handling of the two-wheeler.

6. Maintenance and Repair: The system may require specialized tools and expertise for maintenance and repair, potentially increasing costs and downtime.

7. Potential for Electromagnetic Interference (EMI): The electromagnetic gear shifting system can potentially generate EMI, which can affect other electronic systems on the two-wheeler.

8. Limited Customization: The system may not offer the same level of customization as manual gear shifting systems, potentially limiting the rider's control over gear shifting.

9. Potential for Software Issues: The system's software can be prone to bugs or glitches, potentially causing shifting issues or system failures.

10. Compatibility Issues: The system may not be compatible with all types of two-wheelers or gearboxes, potentially limiting its application.

Potential Challenges:

1. Reliability and Durability: Ensuring the reliability and durability of the electromagnetic gear shifting system can be a challenge, particularly in harsh environments.

2. Heat Management: Managing heat generated by the electromagnetic components can be a challenge, potentially affecting the system's performance and reliability.

3. Safety and Security: Ensuring the safety and security of the system, particularly in the event of a failure or malfunction, can be a challenge.

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CHAPTER 10

APPLICATIONS:

The fabrication of automatic electromagnetic gear shifting in two-wheelers can have various applications, including:

1. Commuter Bikes: Automatic gear shifting can enhance the riding experience for daily commuters, reducing fatigue and improving convenience.

2. Touring Bikes: Automatic gear shifting can provide a more enjoyable and stress-free touring experience, allowing riders to focus on the road and scenery.

3. Off-Road Bikes: Automatic gear shifting can improve traction and control on uneven terrain, reducing rider fatigue and improving overall performance.

4. Scooters: Automatic gear shifting can make scooters more accessible and convenient for urban commuters, particularly in heavy traffic.

5. Electric Two-Wheelers: Automatic gear shifting can optimize the performance and efficiency of electric two-wheelers, reducing energy consumption and improving range.

6. Racing and Sports Bikes: Automatic gear shifting can provide faster and more precise shifting, improving acceleration and overall performance.

7. Adaptive Vehicles: Automatic gear shifting can be integrated with adaptive technology to assist riders with disabilities or limitations.

Benefits for Riders

1. Increased Convenience: Automatic gear shifting reduces the need for manual gear shifting, making the riding experience more enjoyable and convenient.

2. Improved Safety: Automatic gear shifting can reduce the risk of accidents caused by manual gear shifting errors.

3. Enhanced Performance: Automatic gear shifting can optimize gear shifting for maximum performance, improving acceleration and responsiveness.

4. Reduced Rider Fatigue: Automatic gear shifting reduces the physical effort required to shift gears, reducing rider fatigue on long trips.

CHAPTER-11

LIST OF MATERIALS:

SL. NO.	NAME OF THE PARTS	MATERIAL	QUANTITY
1	Frame Stand	Mild Steel	1
2	Battery	Lead Acid	1
3	Electromagnetic coil	Coil	2
4	Engine	75 Cc	1
5	Chain with Sprocket	M.S	1
6	Connecting Tube	Plastic	1 meter
7	Bolt and Nut	M.S	-
8	Wheel Arrangement	-	1
9	Control unit	-	1
10	Proximity sensor	-	1
11	Bearing with bearing cap	MS	6
12	Fuel tank	Plastic	1

CHAPTER 12

CONCLUSION:

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries. We are proud that we have completed the work with the limited time successfully. The FABRICATION OF AUTOMATIC ELECTROMAGNETIC GEAR SHIFTING SYSTEM FOR TWO WHEELER is working with satisfactory conditions. We can able to understand the difficulties in maintaining the tolerances and also the quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed an “AUTOMATIC ELECTROMAGNETIC GEAR SHIFTING SYSTEM FOR TWO WHEELER” which helps to know how to achieve low cost automation. The application of electro-magnetic coil produces smooth operation. By using more techniques, they can be modified and developed according to the applications.

CHAPTER 13

FUTURE SCOPE

The future scope of automatic electromagnetic gear shifting in two-wheelers is promising, offering potential benefits like enhanced driver convenience, improved fuel economy, and reduced effort for riders, particularly those with physical limitations. However, significant advancements are needed in research, development, and cost reduction to make this technology widely accessible and efficient.

- Improved Driver Convenience
- Enhanced Fuel Economy
- Accessibility for Special Needs
- Cost Reduction is Crucial
- Addressing System Complexity

In essence, the future of automatic electromagnetic gear shifting in two-wheelers hinges on ongoing research, cost reduction, and practical implementation to create a system that is affordable, reliable, and beneficial for a wide range of riders.

CHAPTER 14

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