VEHICLE FOR PHYSICALLY CHALLENGED PERSON USING TUMBLER GEAR

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Abstract: In this paper we design and implement the motor bike with reverse gear system which is helpful for physically challenged person to take reverse their bike from parking without another person help. Here we used "tumbler gear " mechanism for our prototype model the gear usually used to change the direction of gear it consist of two gear which place in parallel by changing their position with motor direction of rotation can be changed but in real time application we need to use ideal gear system with gear box also the bike consist of ultrasonic sensor which work based on echo signals to give alert on taking reverse to avoid collision between other object it consist of "GPS" which help their family to locate their position easily in case of any emergency and no board is used to control all these electronic modules which is pre-programmed to do this operation of ultrasonic and GPS module and relay driver circuit is used to drive the motor in our prototype.

1. Introduction

In our day to day life we are crossing many physically challenged persons they driving their two wheelers but they are really struggling to take reverse their vehicle they need the help of other people we partially proposed a solution for them to operate the vehicle in reverse direction which in prototype consist of "Tumbler Gear" mechanism but when we go to normal motor bike we need to fit an gear box with ideal gear, lets we see how it works.

Tumbler gear

The mechanisms are the a part of the machines and wont to transfer one sort of motion into other types there are many sorts of mechanisms let here we see about Tumbler gear . The tumbler gear is typically wont to change the direction of feed rod and lead screw. The mechanism is often described as an appointment of drugs wheels which is employed to reverse the direction of rotation of any machinery. During this mechanism, the technique used is, increasing the amount of engaged gear which may be easily performed.
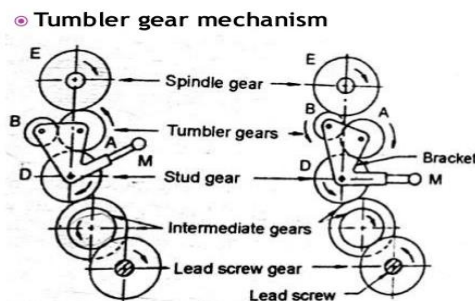

Fig. 1 – Tumble Gear Mechanism

The above diagram can explain about the tumbler gear mechanism when the liver is in normal position it connected with gear 'A' rotates in forward direction by pulling the liver 'B' is connected to the motor and rotates in backward direction. Mechanism Back gears (BG) mounted on an eccentric

shaft. Handle to rotate an the eccentric mounting shaft then engage the rear gears Pin (P) to attach and disconnect Bull Wheel and V-pulley. rather than a pin, some lathes use a stud and nut arrangement - or even a quick-release fitting. Bull Wheel (BW) - during this case with a hoop of useful indexing holes, the locating plunger passing through the front face of the headstock casting. The rear gear may be a clever but essentially simple mechanism probably conceived around 1817 by Richard Roberts, an English engineer and prolific inventor. If you've got to read the subsequent several time to know how it works, don't be concerned , everybody does…. within the picture above (a 1934 Atlas lathe) the 4-step V-pulley (V) features a small gear (SG) permanently attached to its smaller end. the whole length of V-pulley and kit are bushed - and ready to rotate freely on the headstock spindle.

2. Components of Vehicle

a. Wheel Assembly (Supporting Wheels)
- For grip in the road areas/surfaces.
- Flexibility for shocks.
- For perfect dynamic balance.

b. Tyre Assembly
- For Load support.
- For providing shocks cushion.

c. Suspension System
- For the separation of axle and wheels.
- For the isolation of vehicle from shocks and vibrations.

3. Hardware Components

3.1 Ultrasonic sensor

It emits an ultrasound at 40 000 Hz which travels through the air and if there's an object or obstacle on its path it'll recover to the module. Considering the time period and therefore the speed of the sound you'll calculate the space . The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. the bottom and therefore the VCC pins of the module must be connected to the bottom and the 5 volts pins on the Arduino Board respectively and the trig and echo pins to any Digital I/O pin on the Arduino Board. so as to get the ultrasound you would like to line the Trig on a High State for 10 µs. which can send an 8 cycle sonic burst which will travel at the speed sound and it will be received within the Echo pin. The Echo pin will output the time in microseconds the acoustic wave traveled.

An ultrasonic sensor may be a device which will measure the space of the thing by using acoustic wave at a selected frequency and listening for that acoustic wave to recover . By recording the time period between the acoustic wave being generated and therefore the acoustic wave bouncing back. Here we connected it to the Arduino and placed at rear of the vehicle which measures the space between the thing behind the vehicle and provides signal to the Arduino board to which connected to buzzer to supply sound when certain distance is reached to avoid accidents. The sensor module contains four pins ground, VCC, trigger, Echo which the bottom and VCC are connected to respective supply pins with Arduino and trigger and echo connected to any digital I/O pins of Arduino board.
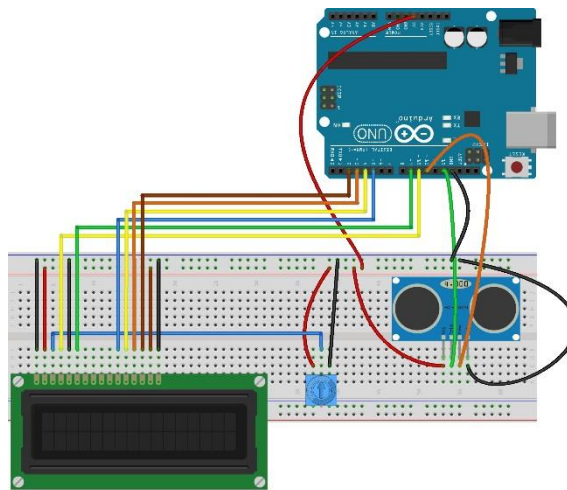
Fig. 2 – Pin Configuration

3.2 Arduino

The Arduino Uno is one quite microcontroller supported ATmega328, and Uno is an Italian term which suggests one. Arduino Uno is known as for marking the upcoming release of microcontroller board namely Arduino Uno Board 1.0. This board includes digital I/O pins-14, an influence jack, analog i/ps-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. of these can support the microcontroller for further operation by connecting this board to the pc . the facility supply of this board are often through with the assistance of an AC to DC adapter, a USB cable, otherwise A battery . this text discusses what's an Arduino Uno microcontroller, pin configuration, Arduino Uno specifications or features, and applications.

The ATmega328 is one quite single-chip microcontroller formed with Atmel within the mega AVR family. The architecture of this Arduino Uno may be a customized Harvard architecture with 8 bit RISC processor core. Other boards of Arduino Uno include Arduino Pro Mini, Arduino Nano, Arduino Due, Arduino Mega, and Arduino Leonardo.

It is an open source computer hardware we used Arduino UNO board the board is pre-programmed with help of embedded c in Arduino IDE compiler. The board is used to control the ultrasonic, buzzer, GPS module, and display to give instructions and get the proper output which is easily programmable and cheap to install totally it act as brain for those operation which need low power and high efficiency
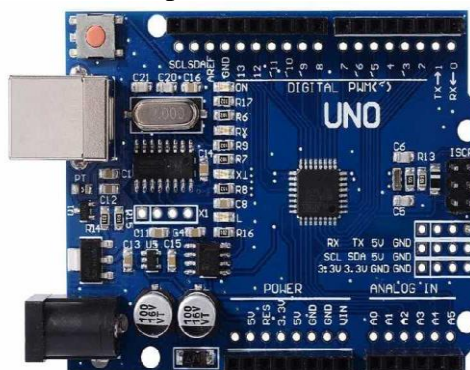

Fig. 3 – GPS module

3.3 GPS Module

The GPS module is employed to locate the position of the vehicle incase of any emergency like loss of auto or any accidents happen to the one that drives which their relations can found the place easily. It needs 12v here we used a GPS transmitter (HC-12) which transmits the knowledge from GPS with no additional programming which transmits GPS coordinates to remote location with as

small GPS receiver which received by another HC-12 transceiver which processed by Arduino board. The GPS module for Arduino may be a small electronic circuit that permits to attach to your Arduino board to urge position and altitude, also as speed, date and time on UTC (Universal Time Coordinated). It uses the quality NMEA protocol to transmit the position data via interface.
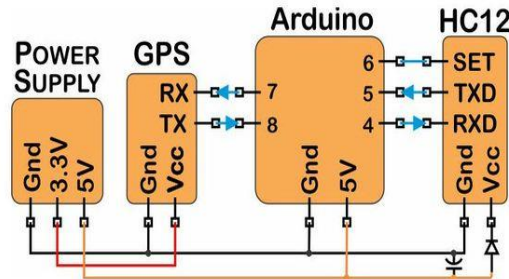
3.4 Buzzer

Fig. 4 – Buzzer

The device used for giving noise for alerting the driver when it reaches the certain distance from the object behind vehicle it is connected to the Arduino board which gets the signal from the ultrasonic about the distance.

3.5 Motor

Fig. 5 - Motor

Here we used 60 RPM motor for our prototype which makes the small gear to run

4. **Advantages of the Proposed System**
   - Highly comfortable.
   - Easy reverse gear operation.
   - Independent of others.
   - Improved guidance level.
   - Reduced time.

5. **Conclusion**

The disabilities of the physically challenged people are taken as a main constraint in this system. Here we proposed a small solution for driving two wheelers in reverse direction. But in large scale, we need to improve this system further. Our next work is rely on the cost optimization and an autonomous biking system.

Fig. 6 – Prototype

6. References

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