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Automatic Gold Sphere Drill Machine

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Abstract - *Gold sphere auto drill machine has been brought up, to minimise the adverse effect of manually drilling the sphere, such as sphere crack, breaking of the sphere, bend and many other circumstances which can be completely avoided using this automatic drilling machine. In Automatic drill machine Arduino Uno, Atmega 16, Stepper motor, Servo motor, Dc motor, Display, Keypad, Power supply and also a mechanical ARM, this complete model plays a vital role in Automation. This complete auto drill machine model will avoid redesigning of the sphere, due to crack bent and other effects.*

***Key Words*: Arduino Uno, Atmega 16, Stepper Motor, Dc Motor, Servo Motor, 7 Segment Display, Keypad**

1. INTRODUCTION

Automatic drilling machine minimises the adverse effects of manually drilling the sphere, such as sphere crack, breaking of the sphere, and many other effects which can be completely avoided using this model. In which, Arduino Uno, At mega 16, Stepper motor, DC motor, Servo motor, Display, Keypad, Power supply, using mechanical ARM this complete model will play a vital role for automation. When a Goldsmith drills a gold sphere manually, the diameter of gold sphere is very small so it is very difficult to drill it, during this process the sphere gets damaged, due to which, goldsmith has to reprocess & remake a new sphere. Which makes it a very lengthy and time consuming process, also the efforts for keen designing of the sphere and hole making manually makes it quiet difficult ,so drilling it manually makes the process much faster than other conventional process.

2. Working Principle

When a Goldsmith drills a gold sphere manually, the diameter of gold sphere is very small it is very difficult to drill it. During manual process the sphere gets damaged, due to which, goldsmith has to reprocess & make a new sphere. Which makes it a very lengthy and time consuming process hold drilling process is much faster than other conventional process. In above technology DC Motor & Servo Motors for drilling process. In which spheres are placed on a conveyer belt where it gets fixed on tray. The tray consist of the gold sphere diameter sized holes, where the sphere gets fixed within it. Micro controller initialize the servo and stepper motors And hence drilling process starts working by mechanical arms and mechanical drill. The size of drill is similar to thread which is used to design gold necklace.

3. Block diagram

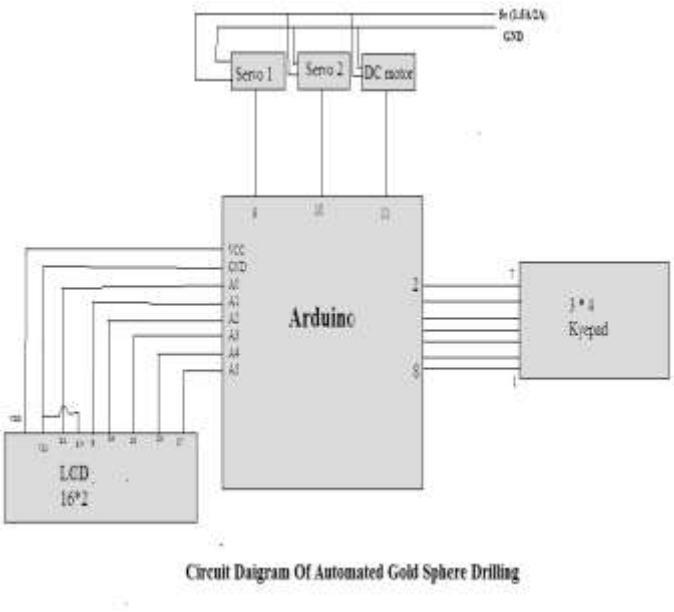

Fig -1: Block Diagram

2. Hardware Description

(1)Hardware Description

1) Arduino

Arduino UNO is an open-source microcontroller board. It consists of set of digital and analog input/output that is (I/0) pins that can be interfaced to various expansion boards (shields) and other circuits. The board consists of 14 Digital pins, 6 Analog pins, and programmable with (Integrated Development Environment) that is ARDUINO IDE via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, which provides a voltage between 7

and 20 volts. It is similar to the Arduino Nano and Leonardo. "Uno" means one in Italian.Arduino Software (IDE) the Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform. The ATmega328 on the Arduino Uno comes preprogrammed with a boot loader which allows uploading a new code to it without use of an external hardware programmer.

Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital Input/output Pins: 14 (6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 mA
- DC Current for 3.3V Pin: 50 mA
- Flash memory: 32 KB out of which 0.5kb used by boot loader
- SRAM: 2 KB
- EEROM:1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm
- Weight: 25 g

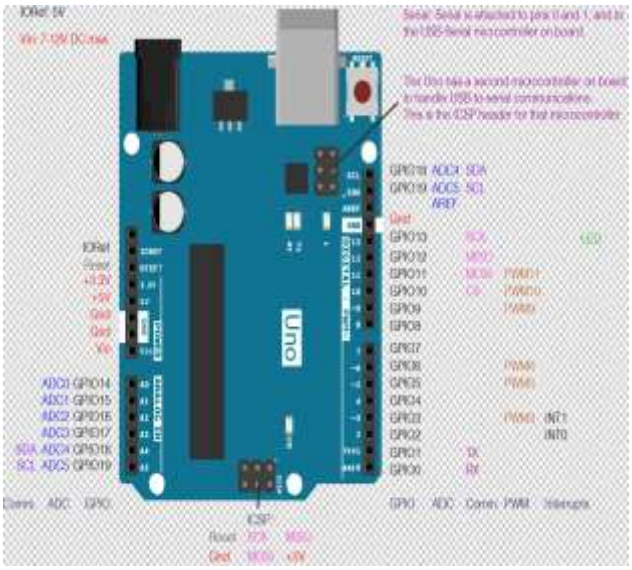

Fig -2: Arduino Uno

Servo motor

A servomotor basically is a rotary actuator or linear actuator which allows velocity, acceleration and precise control of angular or linear position. It also consists of a suitable motor coupled to a sensor for position feedback, and also high torque MG996R Digital servo with high 10kg extra stalling torque. To improve dead bandwidth and centering upgradation in motor and gear being done, the high torque standard can rotate approximately up to 120degree(60 in each direction).The MG996R metal gear also comes with a selection of arms and hardware to get fast servo control.

Fig -2: Servo Motor

Dc motor

A Dc motor converts direct current that is electrical energy into mechanical energy, which depend on magnetic fields. Maximum motors have internal mechanism which can be electromechanical or electronic, which changes direction of current flow periodically in part of the motor. A DC motor speed can be controlled using either a variable supply voltage or by changing the strength of current in its field windings. A universal motor can operate on direct current but is a light weight brushed motor used for portable power tools and appliances. Large DC motors are currently used in elevator and hoists, and in drives for steel rolling mills.

Fig -3: Dc Motor

LCD display

LCD (Liquid Crystal Display) screen is an electronic display module and used in wide range of applications. A 16x2 LCD display is most commonly and widely used for many applications. These modules are used for seven segment and other multi segment LEDs. The reasons being LCDs are economical, which can be easily programmed has no

limitation of displaying special characters & even custom characters unlike seven segment display.16x2LCD determines or displays 16 characters per line and there are 2 such lines. And 5x7 pixel matrix each character is displayed. LCD consist of two registers command and data ,in which command register stores command instruction given to the LCD.A command is an instruction to complete a predefined task like initializing it, clearing its screen, setting the cursor position controlling display. Data register stores the data which is to be displayed on the LCD .It is an ASCII value of the character to be displayed on the LCD.

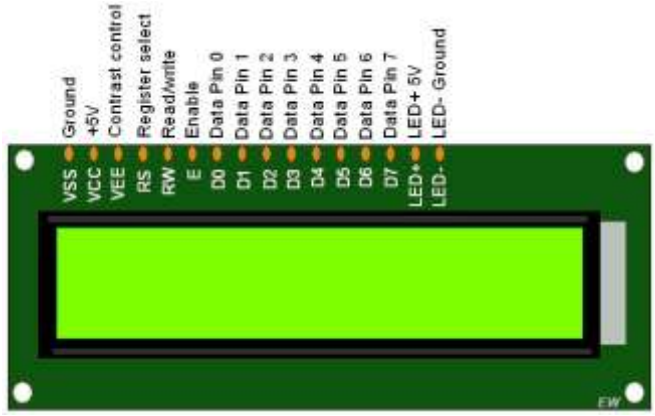

Fig -4: LCD 7 segment display

3. CONCLUSIONS

From an AUTOMATIC GOLD SPHERE DRILL MACHINE plays an important task of drilling a sphere automatically which avoids bend or crack, due to which redesigning of the sphere is completely avoided due to manual drilling.Hence, it can be further modified.

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