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REVERSE PRINTER

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Abstract - *A printer is a device that accepts text and graphic output from a computer and transfers the information to paper, usually to standard size sheets of paper. Printers vary in size, speed, sophistication, and cost. Conventional printers cannot reuse printed papers, owing to the need of paper reusability, the idea of a reverse printer can be implemented by remodelling a laser printer. The process is to melt away the ink from the paper by means of heating using laser beam and finally getting rid of the ink particles off the paper.*

***Key Words*: Arduino uno, NEMA17 stepper motor, A4988,L298,532nm laser.**

1.INTRODUCTION

Printer has made it possible for books, newspapers, magazines, and other reading materials to be produced in great numbers, and it plays an important role in promoting literacy among the masses. It has undergone many modifications over the years to meet the needs of people in different eras. Printers vary in size, shape ,sophistication and cost. Printers kill trees over a large amount. On average, a smaller office with 10 to 15 employees will consume enough paper to necessitate cutting down 18 trees a year. Toner and ink are made with chemicals that can cause environmental damage. The paper and toner or ink get delivered to your office generates carbon, and the garbage gets hauled away, which generates more material in landfills and more carbon for the delivery process. Printers also consume a great deal of power, with the fusers in laser printers consuming hundreds of watts when they run.

In general , more expensive printers are used for higher resolution colour printing. Printers have some disadvantages, with people having great benefits with the capability of printer to instantly produce hard copies of data results to high amount of wasted paper,its toner/ink are made of chemicals that cause environmental pollution, also printers consume a great deal of power , with the fusers in laser printers consuming hundreds of watts when they run .But the main problem with printers is the non- reusability of papers and too much paper wastage.

So in order to overcome this problem the idea of a reverse printer can be made possible by re-modelling a laser printer. The process is to melt away the toner from the paper by means of heating using laser beam and finally getting rid of the toner particles off the paper .By implementing this idea paper reusability can be practiced . This could reduce environmental pollutions and save trees. This project aims to boost paper reuse over recycling.

2. LITERATURE REVIEW

The history of computer printing started in 1938 when chester carlson invented a dry printing process called electrophotography commonly called xerox. Modern days possess a wide range of printers used for different purposes in printing. Laser printers use very advanced technology and produce a high quality output. Laser printers can also produce high quality graphics images, resolution is 600 to 1200dpi.They use heat and pressure to bond particles of toner to paper. Laser printers are available for color and black-and-white printing. Laser Printers are used in many workplaces because they are quiet, they print a large number of sheets very quickly and they produce high quality documents.

Upon experimenting with several solvents and combinations ,the researches found that applying a mixture of 60% Dimethylsulphoxide and 40% chloroform,followed by an application of ultra sound agitation to separate the pigment from the paper. It could make the paper sufficiently reusable,but it will highly effect the paper quality.

3. COMPONENTS

3.1 Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

3.2 A4988

This stepper motor drive control bipolar stepper motor at up to 2 A output current per coil. This carrier has reverse power protection on the main power input and built-in 5 V and 3.3 V voltage regulators that eliminate the need for separate logic and motor supplies and let you control the driver with microcontrollers powered at 5 V or 3.3 V.

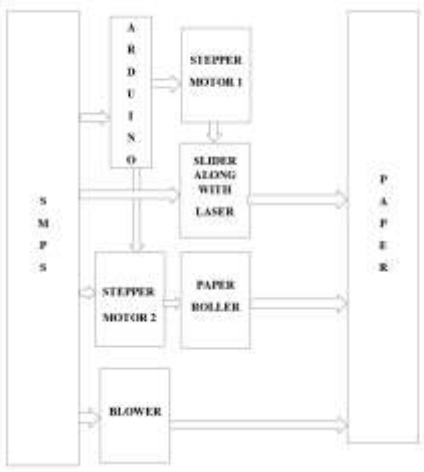
3.3L298

The L298N is an integrated monolithic circuit in a 15- lead Multiwatt and PowerSO20 packages. It is a high voltage , high current dual full-bridge driver de-signed to accept standard TTL logic level sand drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the in-put signals .The emitters of the lower transistors of each bridge are connected together rand the corresponding external terminal can be used for the connection of an external sensing resistor. An additional Supply input is provided so that the logic works at a lower voltage.

NEMA 17 STEPPER MOTOR

NEMA 17 stepper motor is a stepper motor type specified by NEMA. NEMA 17 steppers have a 1.7 x 1.7 inch faceplate. NEMA 17 steppers have usually more torque than the smaller variants, such as NEMA 14. NEMA 17 steppers are commonly used in 3D printers.

4. BLOCK DIAGRAM



It mainly follows a paper rolling and a slider mechanism. Two aluminium channels are also provided along with a foam board basement for the smooth paper movement. A paper roller is mounted to intiates the forward paper movement. The roller mechanism comprises of a stepper motor ,paper roller ,timing belt and gears. The laser unit is mounted on a sliding mechanism which is designed from two 6mm steel rods, stepper motor and timing belt along with custom made plastic support structures. The paper is inserted through the Al channel ,the paper roller will initiate its forward movement. Then the laser unit attached to the slider scans the paper horizontally. Due to the highly energized laser beam the toner particles get loose out from the paper. At the same time blower will sucks out the toner particles.

5. CONCLUSION

This is a practically possible idea . This will improve the paper reusability. Through this technique paper could be reused at least for 3times. Hence it helps to reduce the carbon emission to 40%. This idea of reverse printer can be implemented by remodelling an ordinary laser printer. By implementing this idea power consumption can be reduced to a certain limit.

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