Result Paper: Color 3D Printer

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Abstract— 3D printing is a technology that can perform complex object task directly from a digital model. Element folding of frequency selective array in 3 dimensional get important result in decrease in resonant frequency for additive manufacturing .In this method we used Single-color heads of current low end FDM (fused deposition modeling) 3D printer to give way continuous tone imaginary. The challenge is to produce a single-tone images how accurately include the single colors while attenuating the interchanging between print heads, making each color printed duration as long and to print continuous as possible to getaway mixing material connected with printing short parts. The work behind this technique is used geometric offsets quality can be different without the required to change color print heads inside a single layer. We can now effectively print surface mapped models capturing both geometric and color information in our output 3D prints.

Key words: FDM, Color 3D Printer

I. Introduction

3D Printing is the additive manufacturing (AM) technology where a 3-dimensional object is formed by laying down succeeding layer of plastic material. 3D Printer have different technology like fuse filament fabrication, Stereolithographic, Selective Laser Sintering. A 3D printer is a type of industrial robot.

Early AM tools and materials were used in the 1980s. In 1984, Chuck Hull invented a process known as stereo lithography using Ultraviolet lasers to remedy photopolymers. Hull also developed the "Standard triangle language" file format widely accepted by 3D printing software, as well as the digital slicing and infill approaches common to many processes today. Also during the 1980s, the metal sintering like selective laser and direct metal laser sintering of AM were being developed , although them not yet called 3D printing or AM at the time. In 1990, the plastic extrusion technology most widely related with the term "3D printing" was commercialized by Stratasys in the name fused deposition modeling (FDM). In 1995, Z Corporation commercialized an MIT-developed additive process in the trademark 3D printing (3DP), mentioning at that time to a proprietary process inkjet deposition of liquid binde on powder.

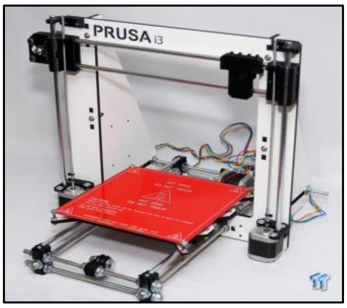

Fig. 1: Reference 3D printer model

A. Review

In 1981, Hideo Kodama of the Nagoya Municipal Industrial Research Institute (Nagoya, Japan) has studied and published for the 1st time the manufacturing of a printed solid model, the starting aim of the "additive manufacturing", "rapid prototyping" or "3Dprinting technology" [1]. In the next decades, this technology has been substantially improved and has evolved into a useful tool for researchers, manufacturers, designers, engineers and scientists.

The form digital data to print 3D object was firstly developed by charles hull in 1984. He named it as Stereo lithography and obtained a patent in 1986. While Stereo lithography systems had become famous by the end of 1980s, other similar technologies such as Fused Deposition Modeling (FDM) and Selective Laser Sintering (SLS) were introduced.

In 1993, Massachusetts Institute of Technology (MIT) patented another technology, named "3-Dimensional Printing techniques", which is similar to the inkjet tools used in 2D Printers. In 1996, three major products, "Genisys" from Stratasys, "Acute 2100" from 3D Systems and "Z402" from Z Corporation, were introduced. In 2005, Z Corp. launched a innovation product, named Spectrum Z510, which was the first high definition color 3D Printer in the market. Another innovation in 3D Printing occurred in 2006 with the beginning of an open source project, named Reprap, which was intended at developing a self-replicating 3D printer fused deposition modeling (FDM) 3D printers, such as the MakerBot Replicator 2X [MakerBot], support dual (or triple) extrusion. While these 3D printers are easier to build, the materials cannot be mixed at high spatial resolution. Stereolithography has been adapted to support various materials [Maruo et al. 2001; Inamdar et al. 2006; Han et al. 2010; Choi et al. 2011; Zhou et al. 2013].

This is accomplished by using multiple vats with UV-curable polymers. These systems canprovide high resolution, but changing materials for each layer makes the printing process very slow. There have also been efforts to use selective Laser sintering with multiple powder.

II. Literature Survey

In [1] the method that positioning the two color heads with fused deposition modeling 3D printers to produce continuity in picture. The challenge was to get two-tone imagery how it will to accurately interlace the two colors while minimizing the switching between print heads, making each color printed span as long and continuous as possible to avoid antiquity associated with printing short parts. The key insight behind our work is that by exploiting small geometric offsets, tone can be varied without the need to switch color print heads within a one layer. We can now effectively print (two-time) texture mapped models conquering both geometric and color information in our output 3D prints[1].

In [2] Fused Filament Fabrication (FFF) is an additive manufacturing method in which a 3D object is created from plastic filament. The filament is accelerated through a hot nozzle where it melts. The nozzle de-posits plastic layer by layer to create the final object. This process has been very famous by the RepRap association. These printers are largely based on the Fused Deposition Modeling technology, pioneered by Stratasys and popularized by the RepRap community and low-cost manufacturers like MakerBot or Ultimaker. The printers operate by adding layer by layer of material to form an object a concept known as additive Manufacturing. A plastic filament is accelerated through a heated nozzle. The thin cord of melted plastic that exits the edge of the nozzle immediately fuses with the layer below, creating a solid object. Typical layer thickness ranges from 0:1 to 0:3millimeters. The block formed by the stepper motor accelerating the filament and the heated nozzle is known as an extruder[2].

In [3] the recent technological advances the expenditure of 3D printing has been driven down to make the technology widely available for home users and projects such as RepRap have become much more widespread. RepRap is an open source project started by Adrian Bowyer of Bath University in 2005 which was designed around the model of creating a low cost home printer that could self-replicate a larger proportion of its own parts and is the only current project of its type. The printing process uses a fused filament fabrication (FFF) method which melts a filament of plastic which is deposited in fine layers to form a 3D object [3].

In the current prototypes of printers are rather imperfect to using the plastics that can be bought from a supplier so a nozzle has been designed and developed in this report to enable the home user to print in any color from only having to purchase a few colors. Finally when this nozzle is fully developed it could be used for progressive engineering component manufacture by using hard and soft plastics[3].

This report focusses on developing the mixing possessions of the nozzle to a high standard of mixing of plastics and the final design includes an active mixing system using a hex bar to generate the necessary crop in the viscous plastic to result in homogeneous mixing.

Following this project, research should continue into its presentation and development of the software and firmware should be carried out to further contrivance the nozzle into the RepRap design. Following the electronics being modified to increase full independent control of each filament, a color space map can be calibrated for use with the machine to make printing any color possible [3].

In [4] this method fabric forms each layer of a 3D object. The printer cuts this piece along the 2D delineation of the layer using a laser cutter and then pledges it to previously printed layers by using a heat sensitive adhesive. Neighboring fabric in each layer is temporarily engaged to provide a removable support structure for layers printed above it. This process is continual to build up a 3D object layer by layer. Our printer is capable of automatically nourishing two separate fabric types into a solitary print. This allows particularly cut layers of conductive fabric to be embedded in our soft prints. Using this competence we establish 3D models with touch sensing capability built into a soft print in one complete printing procedure, and a simple LED display making use of a conductive fabric coil for wireless power reception [4].

III. SYSTEM CONTAINS

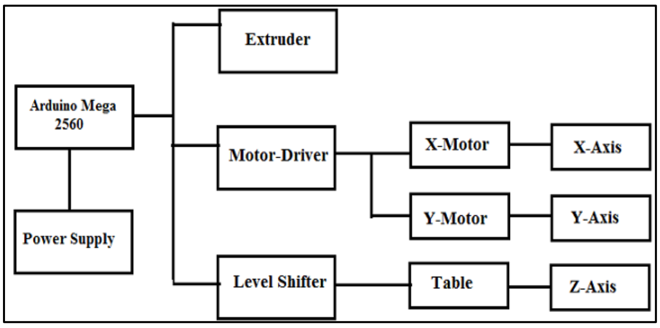

Fig. 1: Block Diagram

The picture shows the structure of a typical 3D printer. The print table is the platform where the objects for printing have been situated. It provides the basic support for manufacturing objects layer by layer.

The extruder is the most important part of a 3D-Printer. As the extruders in the normal paper printers, this extruder is also used to pour ink for printing. The movement of extruder in various dimensions creates the 3D print. For printing a 3d object, the extruder has to access X, Y and Z coordinates. For achieving this, many techniques are used according to the printer specification required for various applications.

If the 3D-Printer is a desktop printer, the Z axis movement of the extruder can be avoided and that function can be transferred to the print table. This will avoid complexity in 3D printing as well as time consumption.

When the STL file is input to the printer, the Ardunio Mega 2560 extracts each layer from it and also extracts each line segment from each layer. Then it gives controls to the movement of the extruder at required rate. The X-direction movement of extruder is made possible by the X-motor. When the X motor rotates, the shaft also rotates and the extruder moves in X direction. The Y-direction movement of extruder is made possible by the Y-motor. When the Y motor rotates, the shaft also rotates and the extruder moves in Y direction. The X direction movement is made by the print table.

In the case of desktop printers, the printing ink is usually plastic wire that has been melted by the extruder at the time of printing. While printing, the plastic wire will melt and when it fall down to the printing table.

Consider printing larger objects like house using 3D printer. There will not be any X motor or Y motor in that case. An extruder which can pour concrete mix is fixed on the tip of a crane. The crane is programmed for the movement of extruder in X, Y and Z axis. The concept and structure of 3D printer changes according to the type, size, accuracy and material of the object that has to be printed.

Generalizing the facts, the extruder need to access all the 3 coordinates in space to print and object. The method used for that doesn't matters much.

IV. RESULT

The 3D printer output is shown in above two figures the old model is not able to print the object, we remodified it and now it is able to print 3D object.

Fig. 2: 3D cube

Fig. 3: 3D object God Ganpati

We are modifying the earlier 3D printer with its overcoming its disadvantages like extrusion of filament not proper melting, axis was not proper align etc. From this modification the old printer now will able to print 3D object with good quality. From below figure 1 shows 3D printer and figure 3 shows object that we print on our 3D printer

A. Steps to Print 3D Object

1) Open sli3r software.
2) Load the dot stl file of object to be print.
3) Do the settings of print setting, filament setting, nozzle setting.
4) After setting export the g-code file and save it.
5) Open Pronterface software.
6) Load the g-code file from save location.
7) Connect the usb cod from the arduino to laptop/pc.
8) Select the com port if com port is not seen then install the arduino drivers.
9) Click on connect button to connect with printer.
10) Set the temperature of extruder and het bed.
11) Setting and checking all axis of printer is working or not.
12) Click on the print button to print the object.
13) For to visible temperature we can seeing by clicking display monitor box and check monitor button.

V. CONCLUSION

We have presented a 3D printing technology which impacts on society and economy. 3D printing uses a Additive manufacturing method which layer after layer down the plastic material to print the object. In introduction section we describe the history of 3D printers with their techniques used in it .In review paper section we describe the techniques used in that paper. In review paper section we survey the paper with our project ideas and gets difference of cost and applications. FDM (fused deposition modeling) is the technique which is the low cost application and it's based on additive manufacturing scheme which adds plastic material layer after layer down to printing 3D object .It has geometric fidelity quite high, that can print complex object very easy. With single nozzle it can print good quality of 3D object we can also change the color using manually inserting filament into extruder.

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