

3D Printing Technology

Yashwanth Balan

T John College, Bangalore, India

I. INTRODUCTION

The new evolution which will to change the world will be 3D printing technology.

3D printing is a process of making three-dimensional objects from a digital file created in design software. Every 3D printer follows a method that adds the material (needed to build a 3D object) layer by layer to create the desired shape. The design files are sliced into thin layers which are then sent to the 3D printer. 3D printing is an additive manufacturing process of making three dimensional solid objects from a SVG (digital file). The creation of a 3D printed object is achieved using additive processes, where a product is built using layer by layer method. It helps us to built complex (functional) shapes using less material than traditional manufacturing methods.

Additive manufacturing is gained much interest in the world of educational and industries to make the models using the 3D printing technology. Which resulted in innovative ideas and research based on the technology?

Additive Manufacturing gives the ideas for new possibilities in science, the concept behind it and how it works is simpler than any other technologies which we are familiar with

Conventional manufacturing won't be replaced by Additive Manufacturing, not in the coming future, but there are some types of example which gives values from this new technology in a number of different ways.

Additive Manufacturing is a more effective way of working, requiring less intervention from machinists and delivering far greater degrees of precision, being printed digitally and directly from a developed model rather than subject to interpretation.

There can be different varieties to make the work simpler and get a good final result, but each broadly goes through the same steps in the process.

Working of 3D Printing technology

3D printing technologies always follow a method to make an output. The life cycle mainly covers the 4 areas

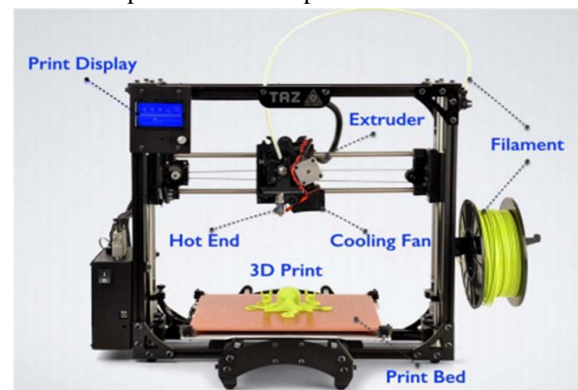
1. Creation of STL files using TINKERCAD
2. Converting images into 3D model
3. Printing the STL file

Printing 3D objects

The 3D printing technology allows you to create a physical object from a digital model. A 3D printed object is created by using the additive processes. In this format the model is created using the one layered method will be used until the model get finished. The models are initially sliced into layers since the 3D printer prints model layer by layer. The 3D printing process converts the .STL object into thousands of little slices and then builds it from the bottom to up format. These layers stick each other to join to form a solid object. Some of the important components of a 3D printer are given below:

Printing Material	PLA (Polylactic Acid)
Layer Thickness	0.35 – 0.5mm
Filament size	1.75 mm
Print Size	152 × 152 × 152mm
Printer Weight	13KG
Printer Size	300 × 500 × 430mm
Nozzle size	0.35mm and 0.5mm
Extrusion Temperature	185°- 220°

Main Components of a 3D printer



Steps to print 3D object:

Once your design is done, you can export the design by clicking on the Export button for 3D printing. From the download menu, you can select the following:

Include option:

Everything in the design: It is used to print the

- Entire model at the same time. Selected shapes: It is used to print the different
- Parts of your design separately.

For 3D print option: Click on.

- STL option to save the file in STL format. Once you click on .STL, the 3D model is saved locally with an .STL file extension and it gets downloaded in the
- Downloads folder of the C drive.

Advantages and Disadvantages of 3D printing

1. Advantages

- Reduce Cost, Machine Cost, Labour Cost, Material cost, Less Waste
- Less travel cost, Complex models are easy to use, Reduce Time
- Provides an Enhanced Competitive Advantage, Reduce Errors, Confidentiality
- Product on demand, Delivers customer satisfaction

2. Disadvantages

1. High Energy Consumption, 2.3D Printing Technology is Expensive, 3.Limited Materials, 4. 3D Printers Aren't that User-friendly, 5.Harmful Emissions, 6.Too Much Reliance on Plastic 7.3D Printers are Slow, 8.Production of Dangerous Weaponry, 9.Copyright Infringements, 10.Manufacturing Job Losses

Applications of 3D Printing technology

- In Architecture and Construction, Even in Maritime Industry, also uses in Health care and Medical
- Chemical industry, Mechanics, Food Industry, Education
- Aeronautics and space, Applications for Drones, in Retail, in energy field
- Textile and fashion, Applications in robotics, Optics, Entertainment and broadcasting

CONCLUSION

The developed 3D prototype is a good step in building local knowledge in this new and fast-growing technology. The presented work followed a step-by-step design which can be used as a case study for a beginning education of 3D technology. The paper also summarized and highlighted about the parts of software and the components of the 3D printer in detail.

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