

3d Printers

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Abstract: “3d printers:”The 3d printers is for methods of generating auto stereoscopic lenticular images, see lenticular printer and holography.

I. INTRODUCTION

The term “3d printers” The earliest talk of producing three-dimensional objects through additive layering goes back to the 1970s, if not earlier. But it wasn’t until 1981 that the first 3D printing patent was awarded to Hideo Kodama of Japan in 1981. Kodama had invented a device which used a UV light to harden photo reactive polymers. Like other early forms of additive manufacturing, the idea was that the technology would be useful for creating models and prototypes. Since then, additive manufacturing technologies have been used for rapid prototyping, where it has significantly improved the speed of the product development process. One of the world's first three-dimensional FDM printers, developed by S. Scott Crump in the 1980s. The raw material for printing comes from a plastic rod (yellow, 46), melted by the print head. The heating process is carefully regulated by a thermocouple (electrical heat sensor) connected to a temperature controller (purple, 86).

II. HOW DO 3D PRINTER WORKS

A typical 3D printer is very much like an inkjet printer operated from a computer. It builds up a 3D model one layer at a time, from the bottom upward, by repeatedly printing over the same area in a method known as fused depositional modeling .Working entirely automatically, the printer creates a model over a period of hours by turning a 3D CAD drawing into lots of two-dimensional, cross-sectional layers effectively separate 2D prints that sit one on top of another, but without the paper in between. Instead of using ink, which would never build up to much volume, the printer deposits layers of molten plastic or powder and fuses them together (and to the existing structure) with adhesive or ultraviolet light.

ADVANTAGES OF 3D printers

- A. **More Affordable:** These 3D printing deals with a low cost of labor and this are one of the most important pros of 3D Printing technology.
- B. **Faster Production** : 3d printing is much quicker and easier than the conventional methods of manufacturing. From the stage of blueprint to the final product, 3D printing incorporates ideas and designs quickly.

- C. **Better Quality of Objects:** This process is so efficient that it doesn’t require any interaction of the machine operator during the build phase.
- D. **Risk Reduction:** 3D printing technology helps in checking a design by printing a production-ready prototype before investing in expensive manufacturing tools, thus it removes the risk during the prototyping process.
- E. **Accessibility** :Today, more and more people are getting access to 3D printing. 3D pens are also produced that can give the same results as that of the 3D printer.

III. DISADVANTAGES OF 3D PRINTERS¹.

1. **Size:**Most 3D printers sold to hobbyists print objects that are smaller than 10 inches -- sometimes significantly smaller.

2. **Cost:**The price of 3D printers is regularly decreasing, with many options in the low four to mid three figures.

3. **Maintenance:**The capabilities of 3D printers are constantly improving, which means any unit you purchase today may be outdated within months and certainly in a year or two.

4. **Limited Material Options:** Most 3D printers create objects using plastic filament. Printing with other materials, such as metal, is becoming more commonplace, but only high-end printers are currently capable of metal additive manufacturing.

V.APPLICATIONS OF 3D PRINTERS

- a. **Additive manufacturing:**This can also be referred to as rapid manufacturing or rapid prototyping. It normally functions by building solid objects in layers which are then stacked on top of each other. In this case, 3D printing is applied to produce many items in a single command. For a long time, rapid manufacturing could not prove many of its processes.
- b. **Research:** Due to its ability to make complex, bespoke and specialized geometries, 3D printing has been very useful in the

Research Laboratories. Research has shown that this technology can be used to aid in the production of complex chemical compounds.

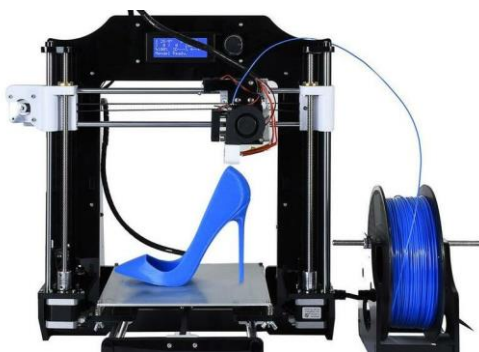
- c. **Agile tooling:** This is the process that involves the use of modular means in designing the tooling to be used in additive manufacturing or in 3D printing to enhance or enable rapid prototyping and quick responses to fixture needs.
- d. **Education:** By the use of 3D printing, the students are able to realistically interact with the subject matter and this makes the learning process easy. The best 3D printer under 500 USD in the market can be used for both quality output and affordability.
- e. **Art and creativity:** When it comes to the presentation of ideas and creativity, a person needs a platform where the idea can be actualized either in form of a drawing or a real product. Modern artistic designs have employed the use of 3D printing to come up with unique, sophisticated and elegant products that can never be made using the conventional methods.

VI. EXMPLES OF 3D PRINTERS

3D printing encompasses many forms of technologies and materials as 3D printing is being used in almost all industries you could think of. It's important to see it as a cluster of diverse industries with a myriad of different applications.

A few examples:

- Consumer products (eyewear, footwear, design, furniture)
- Industrial products (manufacturing tools, prototypes, functional end-use parts)
- Dental products
- Prosthetics
- Architectural scale models & Marquette's
- reconstructing fossils
- _replicating ancient artifacts
- _ reconstructing evidence in forensic pathology
- _ movie props



1) **Rapid Prototyping & Rapid Manufacturing:**

Companies have used 3D printers in their design process to create prototypes since the late seventies. Using 3D printers for these purposes is called rapid prototyping.

Why use 3D Printers for Rapid Prototyping?

In short: it's fast and relatively cheap. From idea, to 3D model to holding a prototype in your hands is a matter of days instead of weeks. Iterations are easier and cheaper to make and you don't need expensive molds or tools.

Besides rapid prototyping, 3D printing is also used for rapid manufacturing. Rapid manufacturing is a new method of manufacturing where businesses use 3D printers for short run or small batch custom manufacturing.

2) **Automotive:**

Car manufacturers have been utilizing 3D printing for a long time. Automotive companies are printing spare parts, tools, jigs and fixtures but also end-use parts. 3D printing has enabled on-demand manufacturing which has led to lower stock levels and has shortened design and production cycles.

Automotive enthusiasts all over the world are using 3D printed parts to restore old cars. One such example is when Australian engineers printed parts to bring a Delage Type-C back to life. In doing so, they had to print parts that were out of production for decades.

3) **Aviation:**

The aviation industry uses 3D printing in many different ways. The following example marks a significant 3D printing manufacturing milestone: GE Aviation has 3D printed 30,000 Cobalt-chrome fuel nozzles for its LEAP aircraft engines. They achieved that milestone in October of 2018, and considering that they produce 600 per week on forty 3D printers, it's likely much higher than that now.

Around twenty individual parts that previously had to be welded together were consolidated into one 3D printed component that weighs 25% less and is five times stronger. The LEAP engine is the best selling engine in the aviation sector due to its high level of efficiency and GE saves \$3 million per aircraft by 3D printing the fuel nozzles, so this single 3D printed part generates hundreds of millions of dollars of financial benefit.

CONCLUSION

Many people believe 3D printing will herald not merely a tidal wave of brash, plastic gimmicks but a revolution in manufacturing industry and the world economy that it drives. Although 3D printing will certainly make it possible for us to make our own things, there's a limit to what you can achieve by yourself with a cheap printer and a tube of plastic. The real economic benefits are likely to arrive when 3D printing is universally adopted by big companies as a central pillar of manufacturing industry. First, that will enable manufacturers to offer much more customization of existing products, so the affordability of off-the-shelf mass-production will be combined with the attractiveness of one-off, bespoke artisan craft. Second, 3D printing is essentially a robotic technology, so it will lower the cost of manufacturing to the point where it will, once again, be cost-effective to manufacture items in

North America and Europe that are currently being cheaply assembled (by poorly paid humans) in such places as China and India. Finally, 3D printing will increase productivity (since fewer people will be needed to make the same things), lowering production costs overall, which should lead to lower prices and greater demand—and that's always a good thing, for consumers, for manufacturers, and the economy.

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