



3D Printer and It's Application

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ABSTRACT

Three-dimensional (3D) printing, also known as additive manufacturing (AM) and rapid prototyping, is a process of joining materials to make objects from 3D model data usually layer-by-layer, as opposed to subtractive manufacturing methodologies. 3D printing is a versatile technique to fabricate a variety types of materials including polymers, ceramics, metals and composites, with customized shapes and dense or macro/micro porous architecture 3D printed objects can be used in many sectors for applications such as manufacturing of knuckle joint cotter joint mould making, cone solid cone etc. Our present paper is focused on a brief overview of benefits and limitations of 3D printing applications in field of mechanical engineering.

Keywords : Three-dimensional, layer-by-layer

I. INTRODUCTION

3D printing, additionally mentioned as additive manufacturing, could also be a way of basically making a three-dimensional object from a package model. The thing could also be of almost any form. the tactic of creating these objects in largely additive. Within the additive method, an object to be written is made from the base-up by successively adding it to

layers of the development material. The additive method could also be contrasted with the subtractive process, where material is removed from a block by methods like sculpting or drilling. the most material utilized within the development of 3D objects is plastic, though recently, there has additionally been a slew of innovation toward using alternative materials like metals of various sorts and additionally organic matter like carbon and its varied derivatives.

II. PRINCIPLE OF 3D PRINTING

The main principle of 3D printing is stereolithography, outlined by Charles Hull during a 1984 patent as “a system for generating three-dimensional objects by making a cross-sectional pattern of the thing to be formed”. This means that any 3D object generated employing a 3D drawing software is first split into layers and these layers are then successively printed by the machine on top if one another.

Step one of 3D printing is that the generation of a 3D printable model. This model is generated using a computer aided design software or via a 3D scanner. A real life object are often set to be 3D printed by scanning it to get a 3D model that's realistically within the bounds of the 3D printer's capability. Then the STL file is generated by running the planning through a converting software. You can customize various aspects of the design like the layer thickness, temperature, and outer finish, etc. Once the STL file is generated, then the thing is prepared

to be printed. After the designing step comes the printing part. The converted STL file is fed into the printer and consistent with the layers we've anything starting from liquid, powder, paper or sheet material. The layers are automatically fused to urge the ultimate shape. Its advantage over conventional machining techniques is that it are often wont to create almost any geometric shape.

3D PRINTERS

Although most 3D printers are expensive, recently there has been a steep decline within the prices of 3D printers. This has led to it going from being a niche industry novelty to a hobbyist's item. There are many affordable 3D printers that are available for much less than they are worth, if we take all its production capabilities into account. Companies have also realized the potential of a consumer marketplace for 3D printers and intrinsically are aggressively courting enthusiasts with cheaper and better models. There are many communities formed around these enthusiast groups which are active on the internet set up to share projects and ideas and new possibilities.

THE APPLICATIONS OF 3D PRINTING AEROSPACE INDUSTRY

3D printing technology provides unparalleled freedom design in production. In aerospace industry, 3D printing technology is using to make lightweight parts, improved and complex geometries, which can reduce energy requirement and resources. by using 3D printing technology, it can lead to fuel savings because it can reduce the material used to produce aerospace's parts. Furthermore, 3D printing technology has been widely applied to produce the spare parts of some aerospace components such as engines. The engine's part is easily damaged, which require regular replacement. Therefore, 3D printing technology is a good solution to the procurement of such spare parts. In aerospace industry, nickel-based alloys is more preferred due to the tensile properties, oxidation/corrosion resistance and damage tolerance.

obtained, the machine starts out laying the plastic out layer by layer. The material needn't be plastic but it are often **AUTOMOTIVE INDUSTRY**

3D printing technology have quickly changed our industry to design, and manufacture new things. In the automotive industry, 3D Printing method have made phenomena to bring new shines. For instance, Local Motor had printed the first 3D printed electric car in 2014. Not only cars, Local Motors also extended the wide range application of 3D printing technology by manufacturer a 3D-printed bus called OLLI. OLLI is the driverless, electric, recyclable and smart 3D printed bus. Furthermore, Ford is the leader in the use of 3D printing technology also apply 3D printing technology to produce prototype and engine parts. In addition, BMW uses 3D printing technology to produce hand tools for automobile testing and assembly. Meanwhile, in 2017, AUDI was collaborated with SLM Solution Group to produce spare parts and prototype.

By using 3D printing technology in automotive industry enable company to try various alternatives and emphasize right in the improvement stages, prompting ideal and effective automotive design. At the same time, 3D printing technology can reduce the wastage and consumption of the materials. 3D printing technology can reduce costs and time, and it allows to test new designs in a very fast time.

III. FOOD INDUSTRY

3D printing technology opens the doors not only for aerospace industry, but also for food industry etc. Now there is a growing demand for the development of customized food for such as athletes, children, pregnant woman, and so on which requires a different amount of nutrients by reducing a amount of unnecessary ingredients and enhancing the presence of healthy ingredients. However, the development of customized foods must be conducted in a very detailed and inventive way, which is where the adoption of 3D-food printing appears. Food layer manufacture also known as 3D-food printing

fabricated through the deposition of successive layers by layer derived directly from computer-aided design data. By using 3D printing technology, specific materials can be mixed and processes into various complicated structures and shape. Sugar,

chocolate, pureed food and flat food such as pasta, pizza and crackers can be used to create new food items with complex and interesting designs and shape

IV. MEDICAL INDUSTRY

The technique has been applied to (and utilised by) many various industries, including medical technology. Often medical imaging techniques, like **BOI PRINTING TISSUES AND ORGANOIDS**

One of the various types of 3D printing that utilized in the medical field is bioprinting. instead of printing using plastic or metal, bio printers use a computer-guided pipette to layer living cells, mentioned as bio-ink, on top of 1 another to make artificial living tissue during a laboratory.

These tissue constructs or organoids are often used for medical research as they mimic organs on a miniature scale. they're also being trialled as cheaper alternatives to human transplant.

X-rays, computerized tomography (CT) scans, resonance imaging (MRI) scans and ultrasounds are wont to produce the first digital model, which is subsequently fed into the 3D printer.

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