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Digital Photo Frame Printing using 3D Printer

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Abstract: 3D printing gives life to all your best projects. Do you know that it could also give life to your picture? Yes, you read it right, if you have a picture of it then you can turn it into a 3D model and 3D print it! From 1 to 100 hundred pictures, several effective solutions are available to help you convert photos into a 3D model.
Keywords: 3D printer, Additive Manufacturing, Plastic, Printer, Recycling for 3D printing.

I. INTRODUCTION

In comparison to the wood-carving method typically used to create picture frames during the Baroque period, this custom 3D printed frame is significantly lighter and was produced in a much more time-efficient manner. Not only did 3D printing technology allow this custom frame to be produced in a much faster and more affordable way, Get Models Now also utilized eco-friendly and biodegradable materials to minimize the impact that the project has on the environment.

To make a 3D Print, these printers have to first create a fundamental design of the object that needs to be printed. This is done through CAD (Computer-aided design) Software or can also be done by a 3D Scanner which replicates the exact model of the object as well as creates a digital file of the object.

Different techniques are used by these scanners to make a 3D model. When these slices are uploaded to the printer, the final object is printed as layers of additive materials are layered one above the other creating the exact replica of the 3D model.

Thermoplastic inks are used in the printing process of most 3D printers that are available in the consumer market. These plastic polymers become soft and pliable when they reach their melting point and then re-solidifies when allowed to cool.

II.LITERATURE SURVEY

Founded at the start of the 17th century in Western Europe, the Baroque period is a highly regarded artistic period that was defined by excessiveness and religious exuberance. The influential and popular style can still be seen in museums and churches across the world, and is still considered as a foundation for many modern artists as well.

3D printing was invented by Charles Hull using something called stereolithography. In which a platform is placed under a vat of photopolymer. Basically, 3D Printing is a technology that creates a solid three-dimensional object by layering many thin layers of material over each other.

The biggest use of 3D Printer is in the Medical Field where Doctors use them to create a mock-up of parts from patient's bodies that are supposed to be operated on by them. With the help of a 3D Printer, it is possible to develop does mock-ups in mear hours. Some well-known companies are already using it in their manufacturing. Ford, General Electric, and Mattel. Ford is already beginning mock trials in which customers use 3D printers to get on-demand replacement parts for their cars.

In the medical field, 3D printing is taking the various fields by storm but the highly affected field is Skin Transplantation. For skin grafting on patients that have been burned, Bio-Printers are used to print fake skins. Another huge advancement has allowed scientists to successfully print a transplantable, working kidney in which 90% of the cells are living.

The 3D printer is also used by designers to design their pieces, it brings the 2D images of the idea to exact replica, hence contributing to the development of the product alongside that it also brings the most unimaginable thoughts to life using the printer.

Almost everything from aerospace components, manufacturing parts, and even toys are getting built with the help of 3D printers.3D printing can also be used for jewelry and architecture, fashion design, and interior design. It brings a new twist to the concept of interchangeable parts as it is pocket-friendly, easy to access, and more efficient. [9]

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III.GENERAL PRINCIPLES

A. Modelling

3D Modelling is a process where the shape of the object is analyzed and data is collected on the specific shape and appearance required in creating the model of the object. The outcome of this data can be used to produce the 3D model of the object. To create a 3D model is created using software known as CAD or Computer-Aided Design, it can also be done via a 3D Scanner. There are two methods to create a 3D model: Manual and Automatic. The manual method of creating the 3D model is very much similar to the sculpting method. As both the methods of creating 3D printed models are difficult, several market-places have emerged in the past year around the world. Widely used are Shape ways Thingiverse, My Mini Factory, and Threading. [4]

B. Printing

Before printing a 3D model from.STL file must be processed by a piece of software called a "slicer" which converts the 3D model into a series of thin layers and produces a G-code file from.STL file containing instructions to a printer. There are several open-source slicer programs that exist, including, Slic3r, KISSlicer, and Cura. The 3D printer follows the G-code instructions to put down successive layers of liquid, powder, or sheet material to build a model from a series of cross-sections of a model. These layers, which correspond to the virtual cross-sections from the CAD model, are joined or fused to create the final shape of a model. The main advantage of this technique is its ability to create almost any shape or geometric model. Construction of a model with existing methods can take anywhere from several hours to days, depending on the method used and the size and complexity of the model. Additive systems can typically reduce this time to very few hours; it varies widely depending on the type of machine used and the size and number of models being produced.[4]

C. Finishing

Even though the printer-produced resolution is enough, in some cases a slightly oversized version in a standard resolution and then removing material with a higher resolution can achieve better precision. As with the Accucraft iD-20 and other machines Press Release. As shown by International Manufacturing Technology some additive manufacturing techniques use multiple materials in a single course. [4]

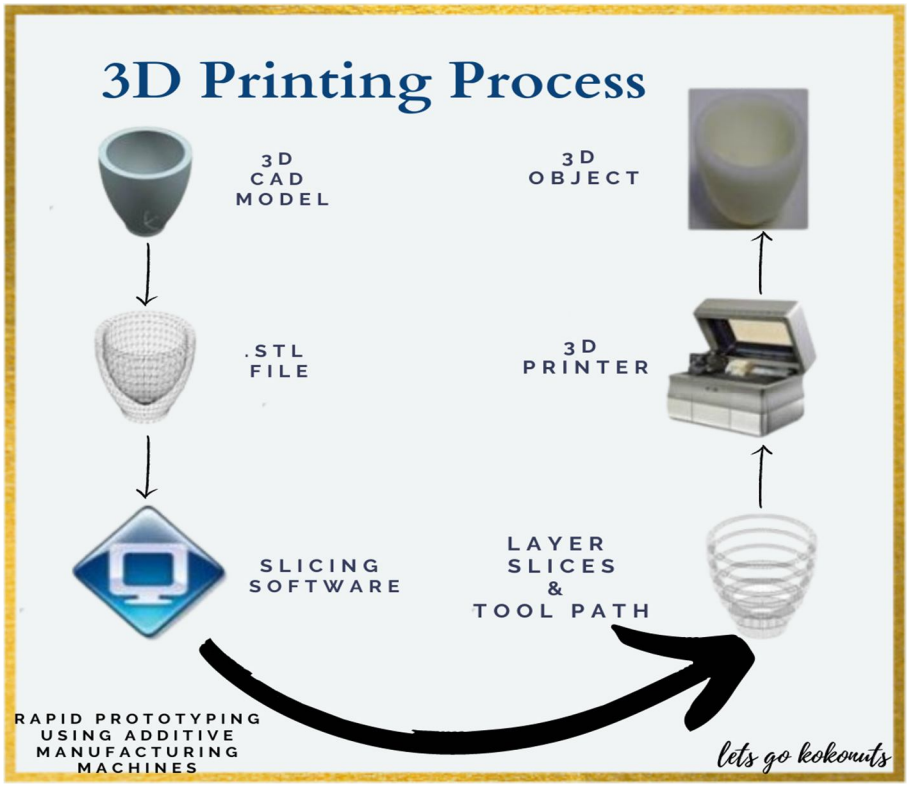

Figure.1: Printing Process

IV.PROCESSES

A. From one 2D image to 3D Model

1) *Use the Extrude Tool:* A picture is a 2D file, meaning that you will only be able to play with two axes to use it in your 3D model. The extrude tool will help you to create a third axis to create new geometry from a selected component. This tool will help you to give volume to your 2D model based on a specific algorithm (most common is converting your image in levels of grey and calculates the height based on the intensity of grey). It's a pretty common tool that you can find on CAD software. If you don't own a graphic software you can have a look at one of these free amazing 3D software: SketchUp, Blender or Meshmixer.
2) *Smoothie 3D:* To convert your 2D photo Smoothie 3D might be the easiest solution. This free online software is a game-changer in the creation of a 3D model based on a single picture. With only one picture it helps you to create a simple digital model online that looks closer to the kind of result that you get with a scan or photogrammetry. What's the trick? Well, if your 2D images can be symmetrically replicated you can get a surprisingly lookalike 3D model. However, if you need to create an asymmetrical model with a lot of details you will probably need to use another software with more pictures.
3) *Artificial Intelligence:* This AI powered tool, developed by researchers, is able to convert one single photo into a 3D model. This 3D Face Reconstruction online app explores a face, using one picture and generate a model that you can totally use for 3D printing.
4) *Lithophane:* First, what is a lithophane? A lithophane is a way to 3D print a photo using the thickness of the print to show different shades of grey, some will be dark when others will be brighter when illuminated from behind. To generate a 3D model, there are options available: Cura, or Image to Lithophane. Once your model is generated, you will have to slice your model. In order to slice the model, you will have to choose a slicing software, to create layer and guide your 3D printer. To get a good 3D printed lithophane, it is not recommended to use an FDM printer, the layer height might not be good enough.

V. SOFTWARE

Software apps and Online Services used:

Even if 3D printing enables you to create 3D objects with complex shapes you first have to create a detailed model to get an optimized result. To do so, the best way for you is to use photogrammetry.

This technique implies a process of collecting a series of points in space from a series of photographs. First, you snap a series of photos of the object from every angle that you can, once you have those photos you upload them into a photogrammetry software and you can generate a file to 3D print it.

SLic3r: Slic3r is open-source software, licensed under the AGPLv3 license. The development is centered on GitHub and the #slic3r IRC channel on FreeNode, where the community is highly involved in testing and providing ideas and feedback

Printrun: Printrun is a powerful software toolchain for reading and modifying STL files, slicing them and preparing the resulting g-code, and sending the g-code to your printer.

VI.CONCLUSION

Three-dimensional printing technology can revolutionize the world. The development in the technology of 3D printing will change the way people do manufacturing of products and production of goods in such a drastic way. Using Computer-assisted Design software, an item can be scanned or built, which is further divided into thin layers that are printed out for forming a solid object having a 3D dimensional structure. It can be used in all fields of human need. It will help in manufacturing products of any shape and size and will be fast and easy. 3D printing will allow quick, reliable, and repeatable means of the manufacturing of personalized goods which will give easy access to any good in the world.

VII.FUTURE SCOPE

As the development in Additive Manufacturing is taking place some great things are coming to light. The future scope of 3D Printing is vast as new projects and ideas are developing in every sector and with the help of 3D printing, the research part will become much easier.3D Printing has a great scope in the medical field, automotive industry, industrial printing, and education as this will help the field workers to develop the required material themselves and decide the pros and cons of the object at the given moment. 3D Printing is a technology that can revolutionalize every industry that is known to mankind.[6]

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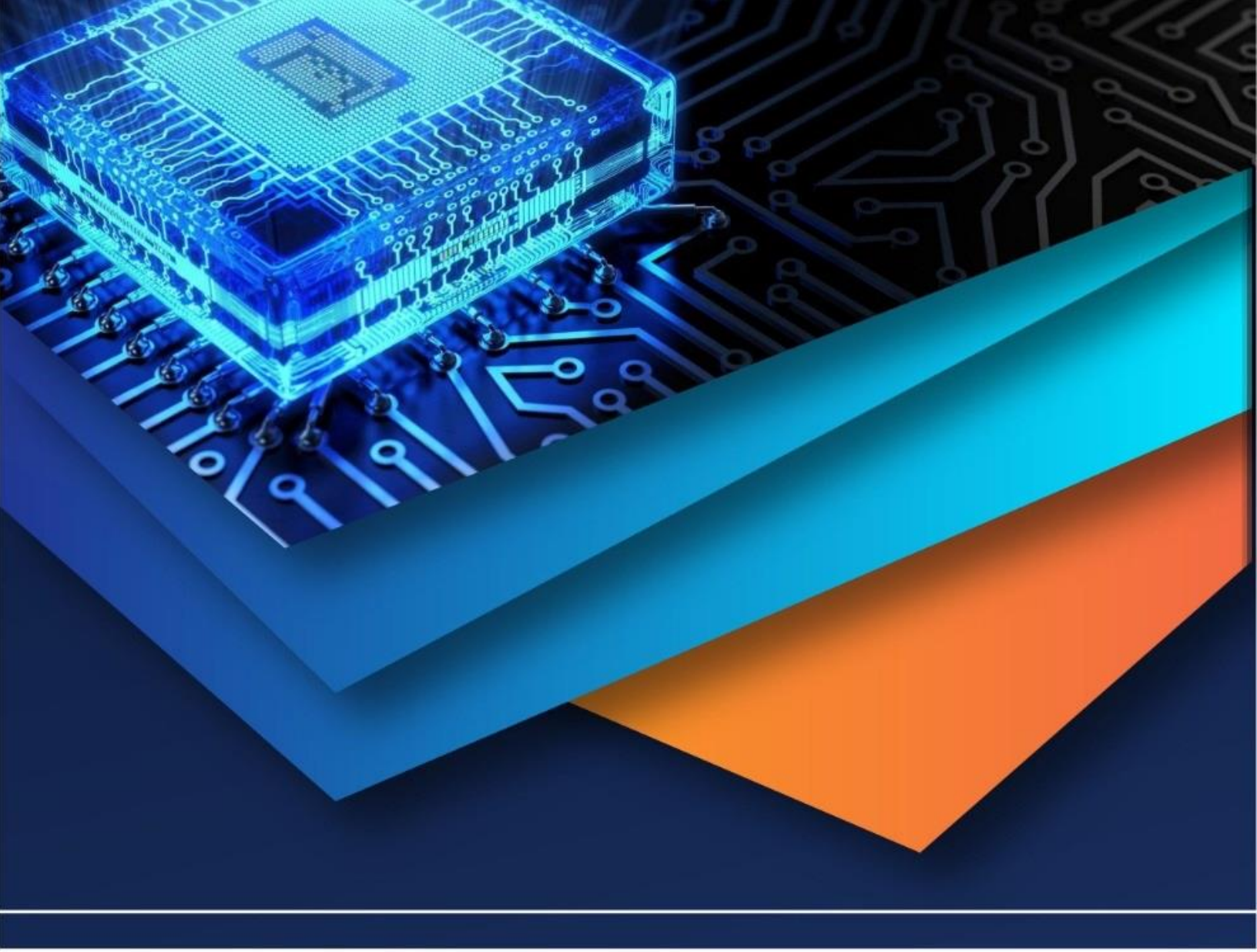

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