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Enhanced GUI for Controlling & Interfacing Network Connected 3D-Printer

Abhishek Chauhan [1], Aditya Kelkar [2], Yash Keshan,[3] Dr. Raghavendra Sedamkar [4]
[1, 2, 3, 4] *Computer Engineering, Thakur College of Engineering and Technology, Kandivali (E), Mumbai 400101.*

Abstract: ***Three-Dimensional Printing Machines based on Fused Deposition Modelling (FDM), Stereolithography (SLA) or Selective Laser Sintering (SLS) Techniques are simply not so easy to use like the traditional printers. In order to help people, embrace this contemporary technology in their day to day life and be a part of this ever-growing 3D Printing Community it is essential to provide an architecture to make using this Simpler for the User and provide with a better overall Experience using this machine. We plan to make our 3D printer remote.***

With all the remote limits we can print from any area and wherever using cloud propels. This suggests you don't should be physically present at the zone itself and you can print it from any area. This will make it less complex for organizations as 3D printing will make a lot of potential results appear. At last with time, we can in like manner use computerization, with the help of robotization, a 3D printer can do the larger part of its work separately and automation can later be used for future augmentations. Sought after by this, with the happening to machine learning, we can basically enhance the printer and wiser through the range of time.

This entire procedure will be actualized inside a time span of two semesters. In seventh semester we will create different documentations. Following are the documentation that are being readied: Customer Correspondence, Achievability Examination, Framework Investigation, Programming Outline, Necessity Investigation. In eight semester we will execute equipment outline and programming plan. Likewise, the undertaking of consolidating the two will be done in the eighth semester. After such a lot of testing will be performed on the task.

This Project aims to Implement a Graphical User Interface to run over a dedicated Server on a microprocessor running a 3D Printer which would facilitate and allow easy use of 3D Printers intended for use in this Mobile Environment while allowing the authorised to Monitor, Control, Command this Device seamlessly over the Internet. Implementation of this Application would also facilitate further development in the field of Internet of Things by forming the basis of usage of this device over the Internet This GUI runs based on a Multi-Threaded Environment to keep track of various Processes over the course of time. This project is a step to bring this handy tool a step closer to the consumers by making it easier to work with.

Keywords: Graphical User Interface, 3-D Printer, Stereolithography (SLA), Fused Deposition Modelling (FDM).

I. INTRODUCTION

A 3D Wireless Printer which gives the easy of printing from anywhere and everywhere. A very simple easy to use Graphical User Interface which makes it so easy that anyone can understand as to how to use the printer.

3D Printing Technology is budding in the industry of additive manufacturing , but this machine potentially a very handy device for everybody let alone the Skilled Professionals in the fields of Engineering, Architecture and Design.

Added substance Assembling (AM) is a suitable name to depict the innovations that construct 3D protests by including endless supply of material, regardless of whether the material is plastic, metal, concrete or one day human tissue. Basic to AM advances is the utilization of a PC, 3D demonstrating programming (PC Supported Outline or computer aided design), machine gear and layering material.

Once a computer aided design outline is delivered, the AM gear peruses in information from the computer aided design document and lays downs or includes progressive layers of fluid, powder, sheet material or other, in a layer-upon-layer form to manufacture a 3D question.

The term AM incorporates numerous advancements including subsets like 3D Printing, Quick Prototyping (RP), Coordinate Computerized Assembling (DDM), layered assembling and added substance manufacture. AM application is boundless. Early utilization of AM as Quick Prototyping concentrated on preproduction perception models. All the more as of late, AM is being utilized to manufacture end-utilize items in air ship, dental reclamations, medicinal embeds, autos, and even mold items.

II. LITERATURE SURVEY

Octoprint: OctoPrint is an open source web-based host which sets up a virtual server to host Octoprint's server that forms the basis more or less like an integrator for our application binding the front end and the back-end code for the 3D Printer.
Octoprint was developed by a group of developers so as to bring in more functionality and encourage more people to use their 3D Printing machine over the Network. Octoprint allows the user to basically operate the Printer over and through the web browser.
Python: Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace.
Kivy: Kivy is an open source Python library for developing mobile apps and other multitouch application software with a natural user interface (NUI). It can run on Android, iOS, Linux, OS X, and Windows. Distributed under the terms of the MIT license, Kivy is free and open source software.
Jinja (Templating engine for Python Programming): It is a text-based template language and thus can be used to generate any mark-up as well as source code. The Jinja template engine allows customization of tags, filters, tests, and globals. Also, unlike the Django template engine, Jinja allows the template designer to call functions with arguments on objects. Jinja is Flask's default template engine.

III.PROPOSED WORK

We plan on making a product where we have the ease of use with a very simple Graphical User Interface. With a very simple GUI we can have anyone who can easily use the 3D printer and any layman can use it. We also plan to make our 3D printer wireless. With all the wireless capabilities we can print from anywhere and everywhere using cloud technologies. This means that you do not have to be physically present at the location itself and you can print it from anywhere. This will make it easier for industries as 3D printing will make a lot of possibilities come true.
Eventually with time, we can also use automation, with the help of automation, a 3D printer can do all of its work on its own and automation can later be used for future expansions. Followed by this, with the advent of machine learning, we can significantly make the printer better and smarter over the course of time.

IV.SYSTEM OVERVIEW

A. Operational Feasibility

The proposed system is concerned with the Industries and the Organizations. At initial phase the scope of the system will be at local level which will be helpful for the locals.
The printer can easily be taken care by the people involved in this Industry and makes it easy to operate. The end users of the system will be the companies (at local level) or the government officials (at global level). The important stakeholder of the system will be the clients using the product, however they won't be directly using the system. If the usage of the system is very beneficial and helpful to locals then the system can be expanded at the global level also. At the end the system will contribute to improving manufacturing process using Artificial Intelligence and very simple User Interface.

B. Methodology

1) Conceptualization of the Interface: This piece of the undertaking required serious research in the field of Added substance Assembling to dissect the whole procedure concerning Intertwined Statement Demonstrating since this style of Added substance Assembling was trailed by the 3D Printing Machines at Boson Machines with the end goal to comprehend the diverse activities that are to be completed utilizing this interface. This progression likewise included distinguishing the Equipment and Programming Required for this task.
2) Setting up Vaults: Since the Application to be utilized for interfacing is produced on Python dependent on a couple of archives , the accompanying must be at first set up to have the capacity to outline a Graphical UI like Octoprint and Kivy on a Raspberry Pi to set up a situation for this Application on a Bit of equipment like a Raspberry (Pi 3, Show B+ was utilized for the usage of this application) Setting up a Fundamental Application An open source archive for Octoprint was utilized as a kind of perspective apparatus to comprehend the fundamental working of a Graphical UI bolstered over Octoprint that Ties the Front end of the Printer to the Back end. This archive is called Octoscreen.

3) Building up a content in Kv Dialect: Content was produced in kv dialect that is the essential scripting dialect utilized with kivy vaults for building up an application in python condition. The kv document was bolstered by a couple of help records for this kv record scripted in python which was incorporated into the libraries.

C. Technology

1) Fused Deposition Modelling (FDM): Material Expulsion gadgets are the most ordinarily accessible — and the least expensive — kinds of 3D printing innovation on the planet. You may be acquainted with them as Combined Testimony Displaying, or FDM. They are additionally some of the time alluded to as Melded Fibre Manufacture, or FFF. The manner in which it works is that a spool of fibre is stacked into the 3D printer and nourished through to a printer spout in the expulsion head. The printer spout is warmed to a coveted temperature, whereupon an engine pushes the fibre through the warmed spout, making it liquefy. The printer at that point moves the expulsion head along indicated facilitates, setting out the liquid material onto the manufacture plate where it chills off and sets. Once a layer is finished, the printer continues to set out another layer. This procedure of printing cross-areas is rehashed, fabricating layer-upon-layer, until the point when the question is full-fledged. Contingent upon the geometry of the question, it is at times important to include bolster structures, for instance if a model has soak overhanging parts.

2) Stereolithography (SLA)S: LA holds the authentic qualification of being the world's initial 3D printing innovation. Stereolithography was concocted by Toss Frame in 1986, who recorded a patent on the innovation and established the organization 3D Frameworks to market it. A SLA printer utilizes mirrors, known as galvanometers or galvos, with one situated on the X-hub and another on the Y-hub. These galvos quickly point a laser shaft over a vat of tar, specifically restoring and hardening a cross-segment of the protest inside this fabricate zone, developing it layer by layer. Most SLA printers utilize a strong state laser to fix parts. The disservice to these sorts of 3D printing innovation utilizing a point laser is that it can take more time to follow the cross-segment of a question when contrasted with DLP.

3) Selective Laser Sintering (SLS): Making a protest with Powder Bed Combination innovation and polymer powder is by and large known as Specific Laser Sintering (SLS). As mechanical licenses lapse, these sorts of 3D printing innovation are winding up progressively normal and lower cost. Initial, a canister of polymer powder is warmed to a temperature just underneath the polymer's dissolving point. Next, a recoating sharp edge or wiper stores a thin layer of the powdered material — ordinarily 0.1 mm thick — onto an assemble stage. A CO2 laser pillar at that point starts to filter the surface. The laser will specifically sinter the powder and set a cross-area of the protest. Much the same as SLA, the laser is centered around to the right area by a couple of galvos. At the point when the whole cross-area is checked, the assemble stage will move down one-layer thickness in tallness. The recoating sharp edge stores a crisp layer of powder over the as of late filtered layer, and the laser will sinter the following crossarea of the question onto the beforehand hardened cross-areas. These means are rehashed until the point when all articles are completely produced. Powder which hasn't been sintered stays set up to help the protest that has, which takes out the requirement for help structures.

V. CONCLUSION

In the Cutting-edge world innovation goes about as the greatest facilitator from straightforward computerized thermometer to something as intricate as a substantial hadron collider.

Everything works and breeds on developing advancements, 3D printing isn't only a rising innovation yet has turned out to be a shelter for the innovators and makers all around the world to render an unmistakable yield to their work. This task has been a greater amount of an open door for me to open up to the introduction that there is in to the business of Added substance Assembling and the advancements associated with the procedure. This venture has furnished me with a superior comprehension of the 3D Printing Machine advances from down underneath the exposed essentials to the development tasks and philosophies of both the Product and the Equipment included.

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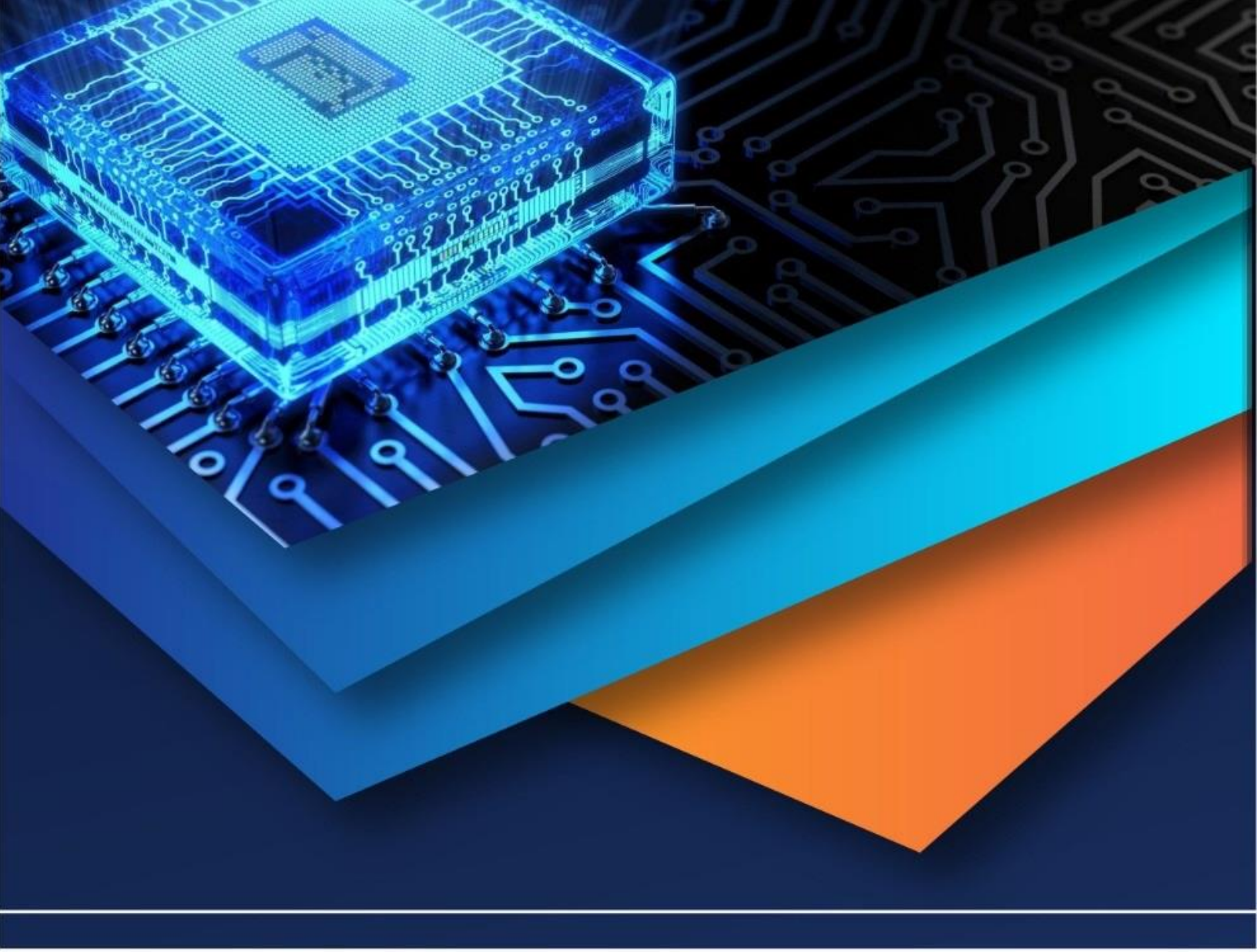
REFERENCES

[1] [1] http://www.restapitutorial.com/lessons/whatisrest.html, May 24th, 2018
[2] [2] https://en.wikipedia.org/wiki/Representational_state_transfer, May 24th ,2018
[3] [3] https://kivy.org/docs/gettingstarted/intro.html, May 24th,2018
[4] [4] http://docs.octoprint.org/en/master/, May 26th,2018
[5] [5] https://github.com/timothyhollabaugh/octoscreen, May 27th, 2018
[6] [6] https://www.dexterindustries.com/howto/run-a-program-on-your-raspberry-pi-atstartup/, Jun 1st,2018
[7] [7] http://jinja.pocoo.org/docs/2.10/, Jun 1st,2018
[8] [8] https://github.com/BCN3D/BCN3D-Moveo (Link for Robot Assembly), Jun 5th,
[9] 2018
[10] [9] https://github.com/jesseweisberg/moveo_ros, Jun 6th, 2018
[11] [10] https://github.com/MarlinFirmware/Marlin, Jun 10th ,2018
[12] A. Karnik, “Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP,” M. Eng. thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.
[13] J. Padhye, V. Firoiu, and D. Towsley, “A stochastic model of TCP Reno congestion avoidance and control,” Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.
[14] *Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification*, IEEE Std. 802.11, 1997.



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