HOW TO BUILD YOUR FIRST 3D PRINTER AND YOUR VOCABULARY

Dainis Dzenushko
Saint-Petersburg State Polytechnic University, the Institute of Applied Mathematics and Mechanics, undergraduate student, Russia
Scientific adviser
Olga Belyaeva
Saint-Petersburg State Polytechnic University, Russia

Nowadays 3D printers are spread worldwide and coming to any prototyping. That is because you can easily make any part for your structure just making a 3D model and printing it. There are several 3D printing processes, the most widespread one being Fused Deposition Modelling (FDM), i.e. pushing plastic through a heating nozzle where plastic is melted and extruded through the nozzle, that moves to build, layer by layer, the solid object. This technology is becoming a household appliance with many people, using their own 3D printers at homes, and many more going to.[1] So I am building mine too and would like to share my experience in this area.

To start building your own 3D printer you should choose what kind of printer you need. There are some types of FDM printers that differ by the way the printer positions its nozzle. I have chosen the printer with heating platform going X-axis and extruder going YZ. Choosing the most suitable model you need to find out what machinery you have access to, because usually you need a 3D printer to build a 3D printer. This is the ideology of the RepRap community, that develops self replicating printers, containing printable plastic parts.[2]

For a beginner in this area the best option is probably a durable frame that has been probed by many users with detail assembly documentation and complete bill of materials (BOM). Yet this is an easy way, that I did not choose, thus I am building my own modification of Prusa i3 printer. Firstly I recommend to check if the structure can actually be assembled. For this you can use any CAD program, or if you have a perfect imagination, assemble it in your mind. Read the BOM attentively and check if all items are accessible. The most expensive parts are steppers, hotend (heating nozzle) and electronics, but they are same for all printers. The assembly starts with X carriage and frame, then YZ carriage and extruder, finally mounted together. I recommend placing linear bearings on smooth rods before fixing carriages to them. The most common solution to control the printer is Arduino board with RAMPS1.4 shield, that is what I am using. Then do the wiring. Now it is time to calibrate the printer. Upload the firmware to the board, install printer software and calibrate the firmware so that the distances in program are identical to the actual printer's distances. Stick the Kapton tape to the heating bed and you are ready for the first prints. To tell the printer what to do you need a slicing program, that will generate an operating track. To find a place to do all this work is a different issue. My printer is being built in the Fab Lab Polytech (fabrication laboratory), that gives students an opportunity to implement their technological ideas.[3]

In this work the main steps of building your first 3D printer are described. 3D printing is not only a prototyping technique, it is a really exciting hobby, that will keep you interested for a long time. 3D printing brings new vocabulary since building it you should read the documentation in English. 3D printer makers use specific terms like abbreviations: BOM, IDE FDM; merges of everyday words: firmware, steppers, stopend; common words that acquired new meanings: slicer, extruder, filament, machine zero. It should be noted that specialists use some of them without translation and they can stay in language as neologisms.

References

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