Robotic 3D Printing

Robotic 3D printing is a novel yet promising approach to manufacturing. Two main drivers are pushing its development: the need to additively create large objects more accurately and repeatedly, and also the opportunity to achieve more automated and integrated production with 3D printing. The development of 3D printers over the last 10 years has been amazing and now it is possible to make your own printer with 50% of the parts printed on another machine. That brought the cost down several times. But current machines are limited by volume. One way to overcome that constraint is to use a robotic arm. Robotic manipulation and 3D printing are closely related, but they have remained mostly separate until now.

The aim of this project is to join 3D printing and robotics together, to make 3D printing more flexible and to remove limits. To make it possible, in this project the following main aspects have been developed: designing and 3D printing the extruder's housing and filament guidance system, mounting the created part onto the robotic arm, programming software to control the necessary hardware like the stepper motor or cooling system. Finally, the system developed consists of a 3D extruder mounted onto an AGILUS robotic arm capable of printing 3D models. The project has been developed using different hardware and software. The most remarkable hardware used is AGILUS robotic arm, MakerBot 3D printer, extruder, Arduino board and some Arduino shields. The software used has been SolidWorks and Arduino Software. Therefore, in this project, brief and basic information about these technologies has been included.