

Automation of the spooling system

General context:

The association EPFL Xplore wants to develop a 3D printed parts recycling machine. After one semester of development, a first version of the machine is ready. Nevertheless, to improve the capacity of the machine and the general understanding of the parameters, a lot of work remains to be done. This is why we offer semester projects to EPFL students. The recycling process of 3D printing filament can be decomposed in the following steps: grinding, drying, extrusion, cooling and spooling.

Project description:

The objective of this project is to develop a solution to control the diameter of the recycled filament during spooling as well as automate the machine from the grinder to the spooler. This will lead to minimal user intervention. The filament must keep a constant diameter to be properly extruded afterward. Using a mechanical sensor that has already been integrated, the student will design and implement a control network of the multiple motors involved (grinder, extruder, cooling system and spooler).

The student will be part of the Xplore plastic recycling team, they will need to attend the team meetings as well as the working sessions.

Tasks:

- Strong literature review and familiarization with different subjects:
 - o Motor control
 - o Arduino
 - o The subsystems developed during the previous semester
 - o Acquisition of sensor data
- Treatment of sensor data
- Implementation of a solution to keep the same diameter by adjusting the motor speed
- Control the spooler and ensure the filament is properly spooled without entanglement