Optical diameter sensor: development and integration

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:

For the moment, the diameter sensor is mechanical which lacks accuracy. The first objective of this project is to design and manufacture an optical diameter sensor for the filament. Then, the student will focus on the data analysis in order to exploit data received from the sensor in the spooling system. Furthermore, the student will be a part of the Xplore plastic recycling team, they will need to attend to the team meetings as well as the working sessions.

Tasks:

- Strong literature review and familiarization with different subjects:
    - Implemented mechanical sensor and its limitations
    - General machine operation and sensor's role
    - Optical sensors
- Design the sensor
- Manufacturing of the sensor
- Data collection and treatment
- In-line integration of the sensor