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Title: Cost-effective automatic winder machine for optical fiber filament

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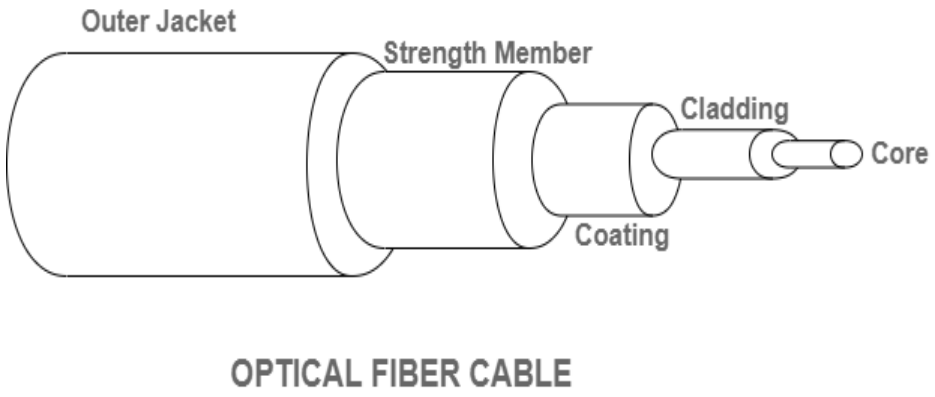
Introduction

Optical fiber filaments

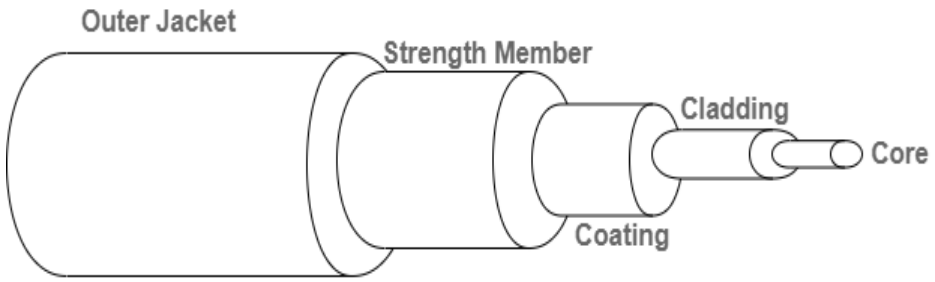


OPTICAL FIBER CABLE

10 km - Spool of optical fiber filament

Introduction

Optical fiber filaments



OPTICAL FIBER CABLE

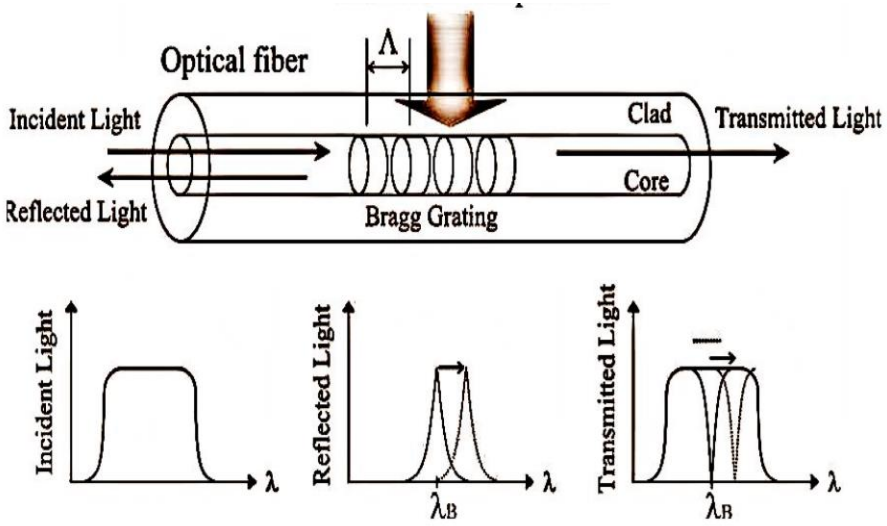
1 km - Spool of optical fiber filament

100 - Spool of optical fiber filament

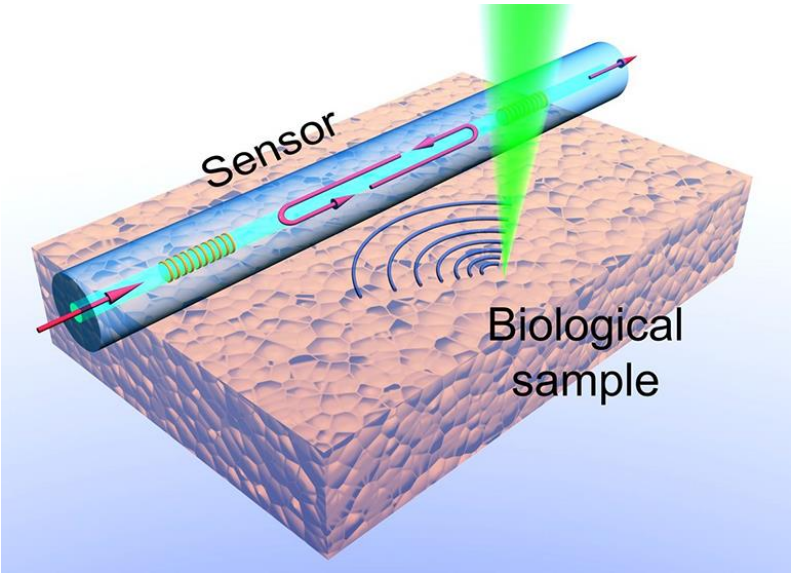
Introduction

Applications

Filament detectors for 3D printers



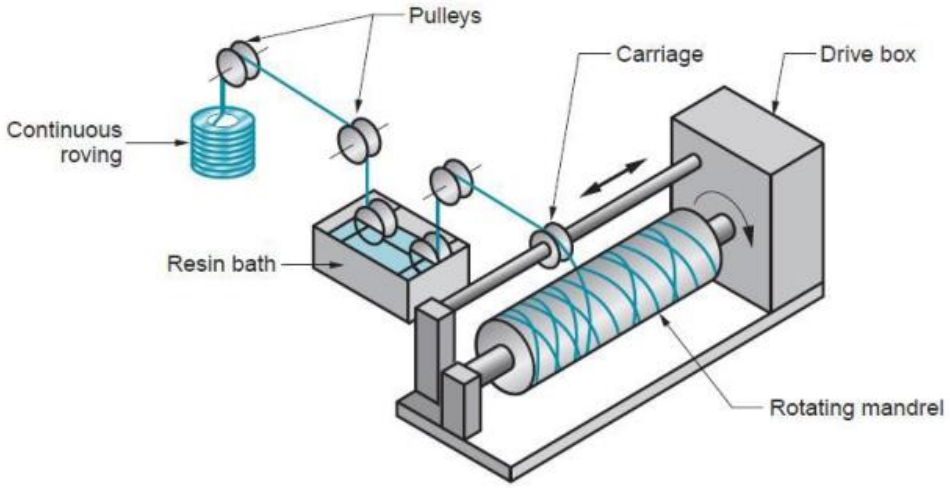
Strain and temperature sensors

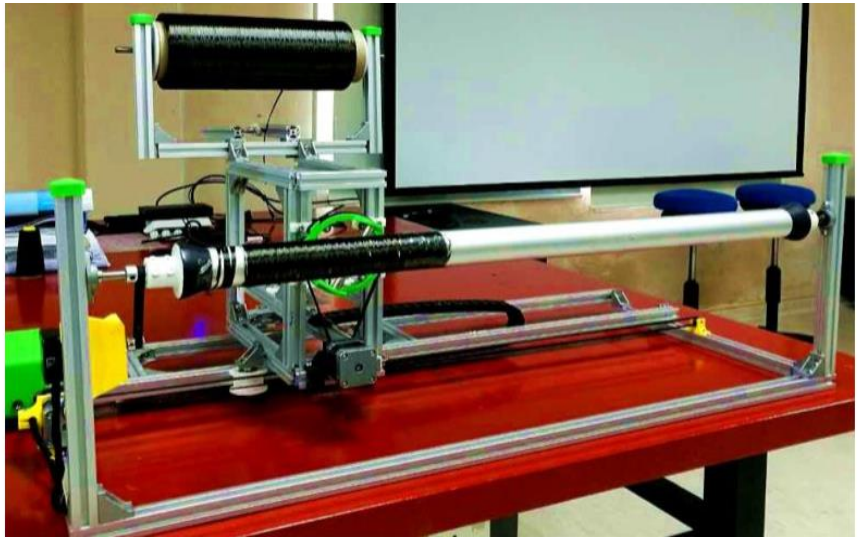


Fiber Optic Sensor for In Vivo Photoacoustic Imaging

Introduction

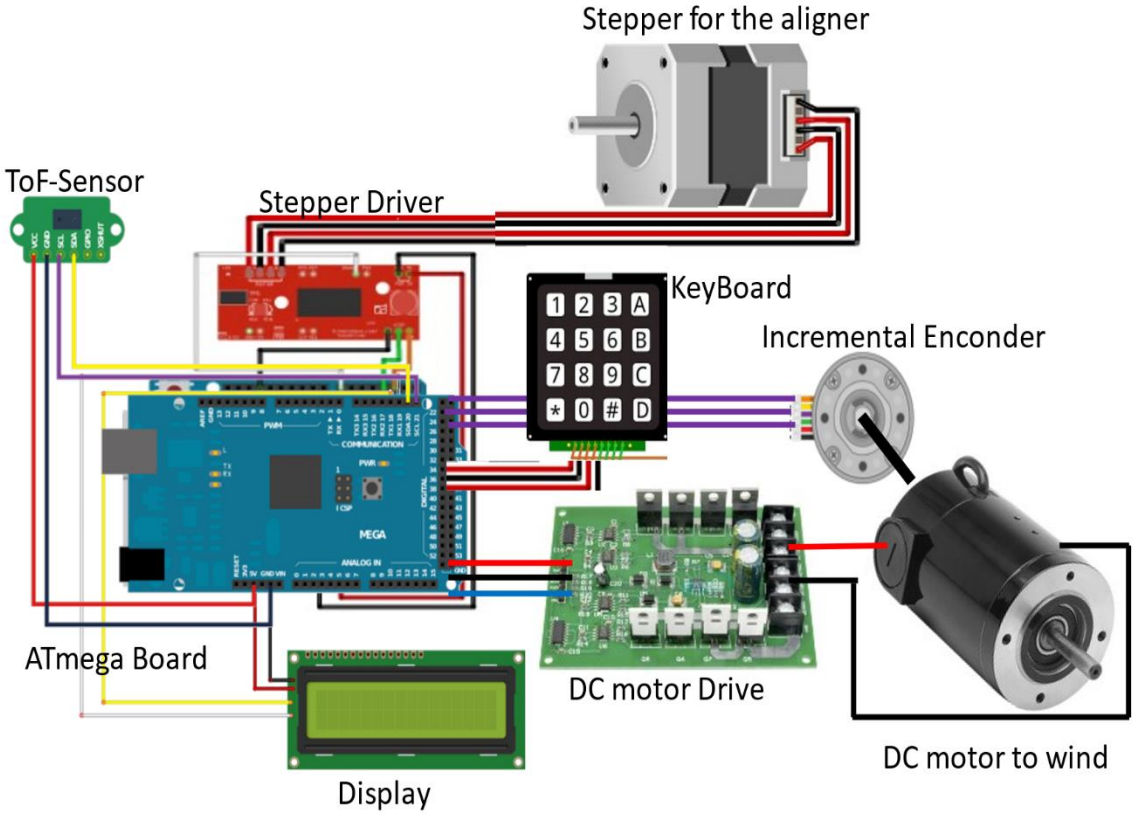
Types of winding machine

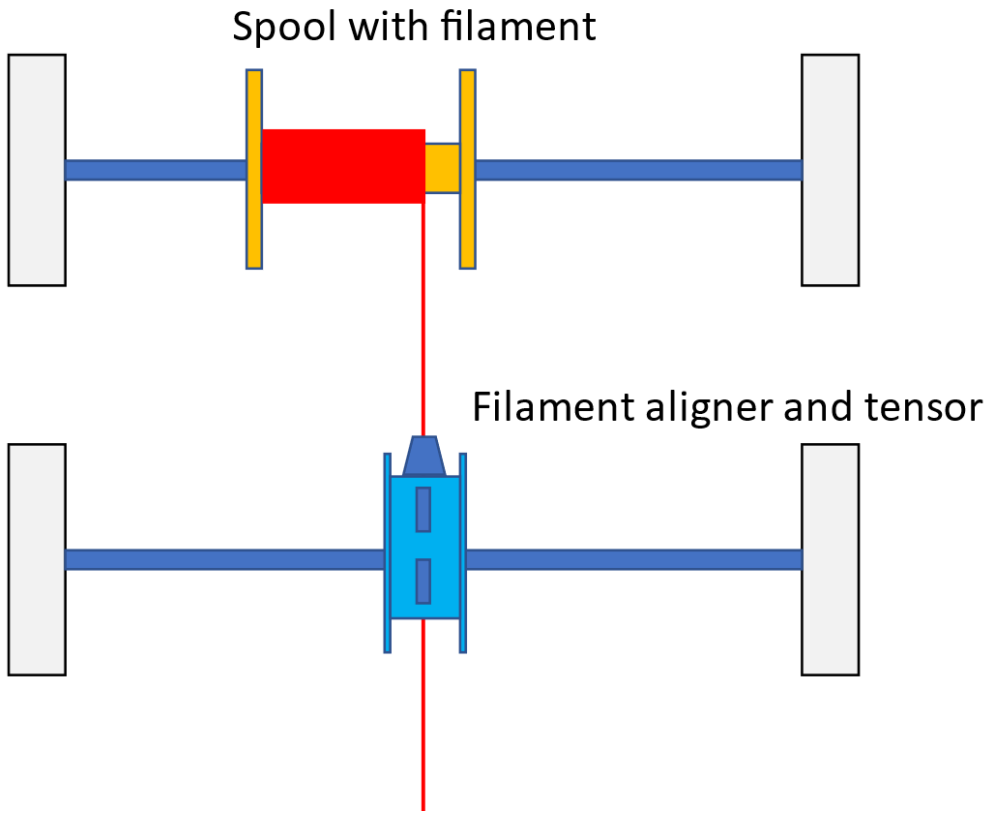




Methodology

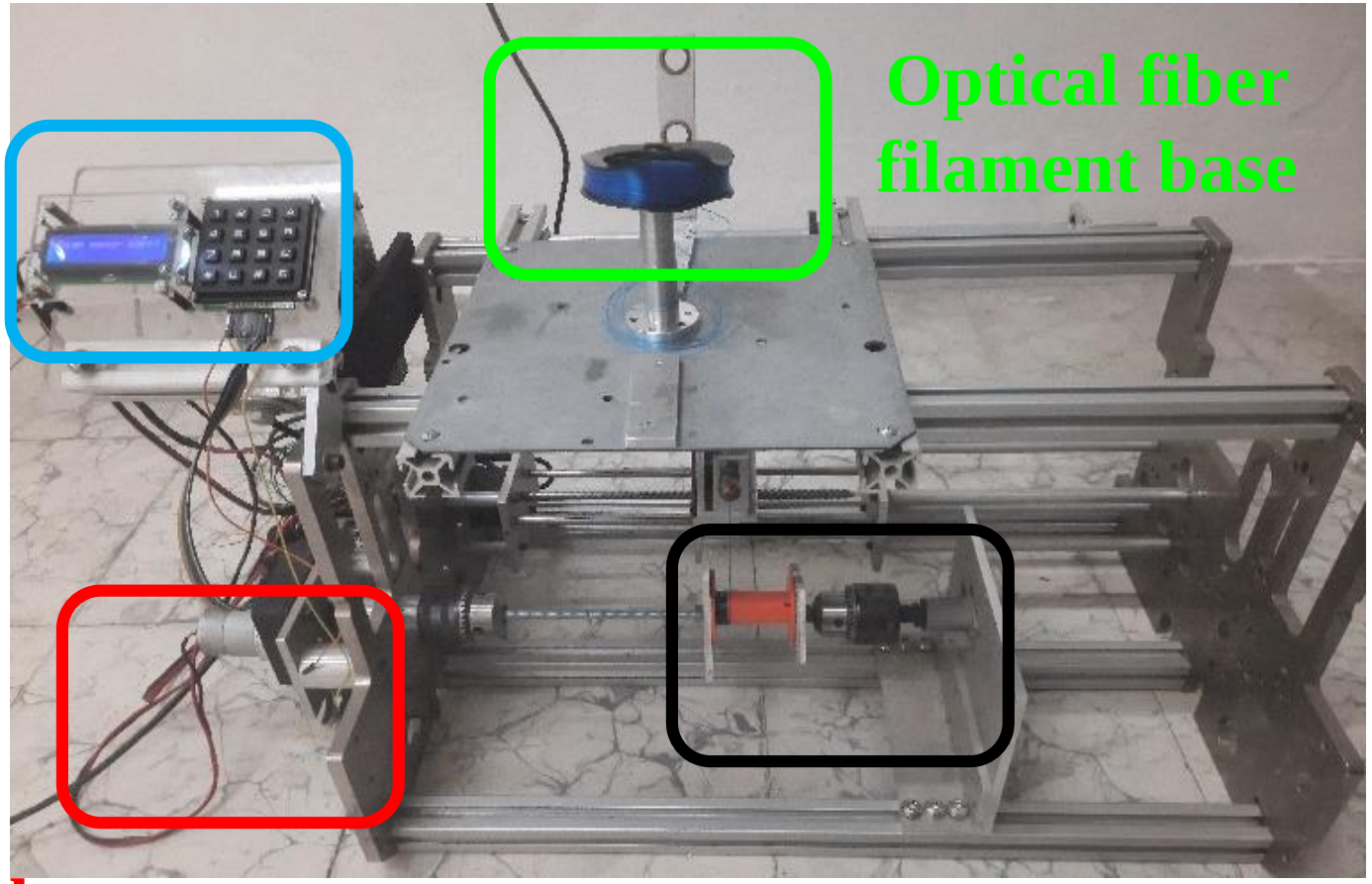
Developed system





Results

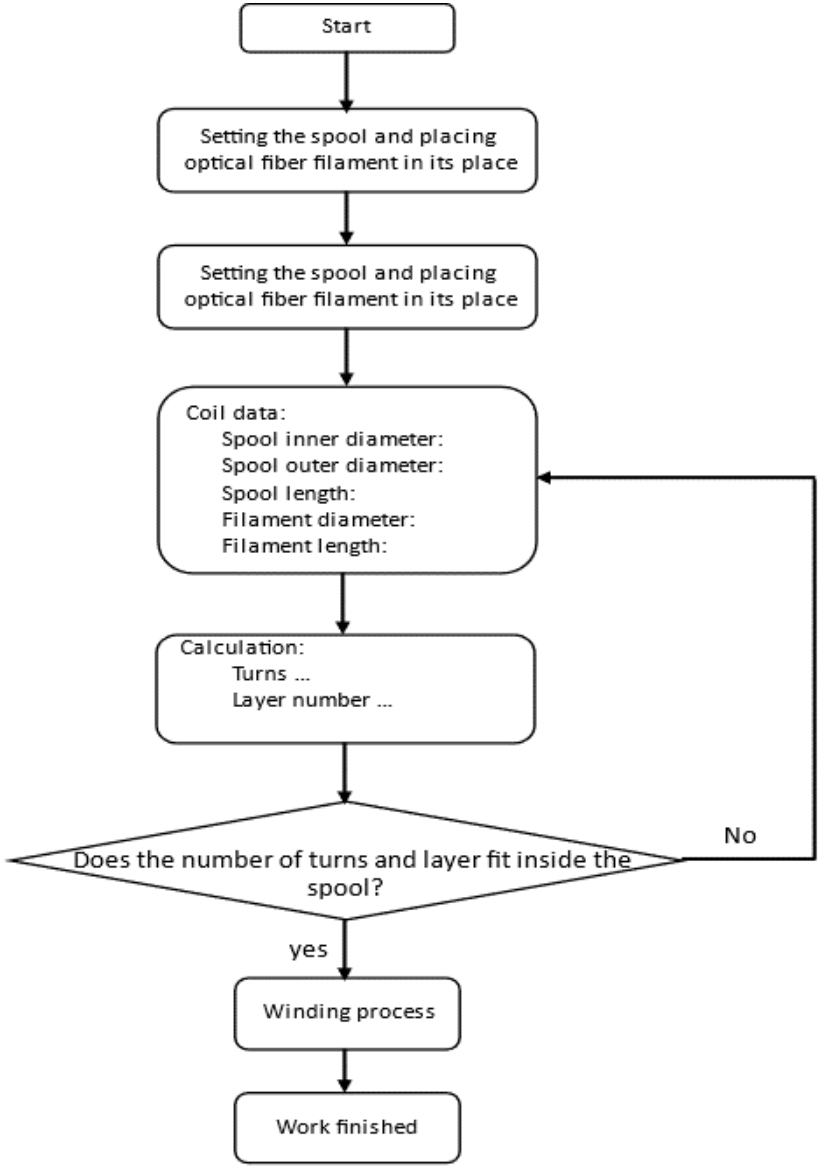
System stages



Results

The moment when the system takes its time to calculate the number of layer and turs, allows the user to see if the winding can be conformed and the error is also calculated and validated with a specific length optical fiber filament, with a 100 meters filament. The extra material wounded around the spool was the 0.05 percent which was closed to the error estimated with the equation programmed in the microprocessor.

Annexes


Start
Setting the spool and placing optical fiber filament in its place
Setting the spool and placing optical fiber filament in its place
Coil data:
Spool inner diameter:
Spool outer diameter:
Spool length:
Filament diameter:
Filament length:
Calculation:
Turns ...
Layer number ...
Does the number of turns and layer fit inside the spool?
No
yes
Winding process
Work finished

Conclusions

The system shows:

- A low winding error
- The use of fast development boards and the suitable mechanic platform allow a quick equipment construction, without a big budget.

Due to the modularity of the system, there are several future projects and opportunity areas:

- Intelligent control algorithm
- Copper wire winding for transformer design using different gauge and vision control.

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