Motivation

Gravity Separation Spirals (GSS) are vital to the mining industry for separating mineral-rich slurry into its different density components. The slurry is pumped to the top and, then the spiral slope naturally helps separate the slurry due to the different particle density. Spiral profile can be slightly varied for every customer, depending on the mineral they separate.

Traditional mould-based manufacturing has the following inherent drawbacks:
- Significant tooling costs
- Uneconomical mass customisation for different mineral types
- Worker exposure to hazardous materials

Research and Development Project

The research project is focused on developing a 3D printer to print GSS, which can avoid the drawbacks inherent to the traditional GSS manufacturing process. Another objective of this project is to embed sensors into the 3D-printed GSS for remotely monitor the operational conditions, fault diagnosis, and predictive maintenance. 3D printed sensors are being developed instead of embedding conventional sensors where possible since they are low-cost and can be integrated into the large build volume of the structural material without compromising the mechanical integrity of the object.

Benefits to the Industry

- Currently, spirals are shipped worldwide, thus shipping the printer instead of spirals will:
  - Reduce transportation cost
  - Reduce damage during transportation
  - Easily customisable for different minerals
  - Troubleshoot issues remotely and fault prediction
  - Provide feedback to operators onsite to change operational parameters to optimise the output

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