



Tata Steel

Identification and sorting of ferrous and non-ferrous scrap after magnetic separation

Waste management

Background

Tata Steel, a global leader in steel production, is committed to sustainability through advanced scrap recycling processes. Recycling reduces the demand for virgin materials, minimizes environmental impact, and supports a circular economy. The primary goal is to produce high-purity processed ferrous scrap, which serves as a critical feedstock for steel production and must meet stringent quality standards for operations in downstream processes like blast furnaces. Currently, suppliers deliver truckloads of diverse scrap materials, including ferrous and non-ferrous metals, plastics, rubbers, soil, rusted components, and hazardous substances. Upon arrival, the scrap is inspected manually by quality personnel following a detailed checklist. The inspection data is recorded in an app, including images of the materials, which are analyzed to estimate the yield percentages of ferrous, non-ferrous, and other components. After inspection, the scrap is fed into shredders that process approximately 1,000 tons of material daily. The shredded material is then separated into four types of Auto Shredded Residue (ASR): ferrous, non-ferrous, light weight items and dust/powders. Following shredding, a magnetic separation process is employed to sort ferrous and non-ferrous materials. However, approximately 5% of ferrous materials inadvertently end up in the non-ferrous scrap lines, necessitating manual sorting, which is both labor-intensive and prone to inefficiencies.

What we're looking for

We are looking for innovative solutions to optimize the identification, sorting, and quality control of scrap materials in the steel recycling process. This includes enhancing the efficiency of ferrous and non-ferrous scrap separation post-magnetic sorting. To optimize this process, an automated solution is required to identify and sort ferrous scrap from non-ferrous materials effectively. Automation in this area will not only improve accuracy but also reduce dependency on manual labor, ensuring a more streamlined operation.

Solutions of interest include:

- Automated systems for identification and categorization of incoming scrap materials
- Automated sorting systems to sort ferrous from non-ferrous materials

Our must-have requirements are:

- Easy to plugin with minimal changes to the existing setup
- Ready to implement solutions
- Easy to maintain

Our nice-to-have's are:

- Scalable solutions

What's out of scope:

- Replacement of existing setup
- Technologies that interfere with the operability and productivity of the existing equipment

Acceptable technology readiness levels (TRL): Levels 5-9

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you

Eligible partnership models:

Supply/purchase
Licensing
Co-development

Benefits:

- **Services Agreement**
Tata Steel would fund the implementation, with the amount of funding to be discussed after the techno-commercial finalization of the proposal, subject to a tentative budget of up to \$100,000.
- **Expertise**
Partner will be assigned a representative from Tata Steel. They will assist the partner during the project as required.
- **Data**
After NDA is signed we can share required data.
- **Tools and Technologies**
Partners will be allowed to do local customization of instruments. They can access our lab facilities.
- **Facilities and Services**
Partner will be invited to concerned plant or facility for survey and on site understanding of the challenge (video call may also be explored). Required help will be given from Tata Steel to the selected partner.

Reviewers

Shikha Suman

Area Manager Program Management

Please contact the University of South Florida Technology Transfer office representative for submission –
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