Background

As natural resources become scarce with increased consumption, responsible corporations acknowledge the need to reuse, repurpose and recycle their resources. Tata Steel has always embraced its role as a corporate citizen and remains committed to its responsibility towards the people and the planet. The establishment of the Steel Recycling Business (SRB) is a definitive step towards sustainable steel production.

The collection and aggregation of scrap for the recycling plant entail reverse logistics. Tata Steel receives scrap input via trucks, which is then transported to the yard. The scrap is moved using the orange peel and grab method for inspection, which is conducted manually by quality control personnel following a predefined checklist. All relevant data is recorded in an app in the form of images. Based on this data, an approximate yield percentage of materials is calculated, especially ferrous, non-ferrous, plastic, rusted items, spot rusted items, hazardous items, etc.. A report is then generated, and if a deviation is found between the calculated yield vs the yield reported by the supplier who sent us the scrap, penalties are applied a per-ton basis. This inspected feed is transported to the yard and processed in a shredder, where all scrap materials are shredded together. The shredded material is then separated into four types of Auto Shredded Residue (ASR): ferrous, non-ferrous, lightweight items, and dust/powders. Initial magnetic separation is used to distinguish ferrous from non-ferrous materials. The shredder processes approximately 1,000 tons of scrap per day.

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 categorizing materials such as steel, rusted components, coated materials, hazardous substances, rubber, plastic, and soil.
The ideal technology should accurately classify incoming scrap materials and generate detailed reports, including the percentage of ferrous components in the raw scrap stream.

Solutions of interest include:

- Vision Analytics (VA) and Artificial Intelligence (AI) systems
- Sensors for material identification
- Robotic systems for material handling
- Automated systems for identification and categorization of incoming scrap materials

Our must-have requirements are:

- Ready to implement solutions
- Easy to plugin with minimal changes to the existing setup
- 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 6-9

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.

Tools and Technologies

Partners will be allowed to do local customization of instruments. They can access our lab facilities.

Data

After NDA is signed we can share required data.

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

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Area Manager Program Management

Please contact the University of South Florida Technology Transfer office representative for submission – Karla Schramm at kschramm@usf.edu