Apprenticeships & Theses

ArcelorMittal

TITLE: DESIGN OF MAX-FLOW SOLUTION TO OPTIMIZE THROUGHPUT

KEY WORDS OF ASSIGNMENT:

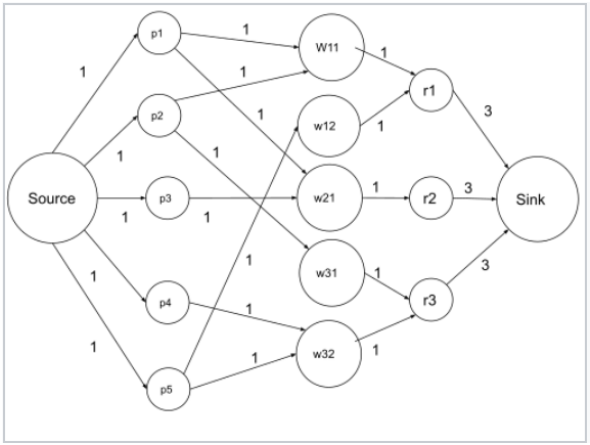
- ✓ Maximum flow problems
- ✓ Logistic optimization
- ✓ Graph Theory
- ✓ Implementation

SUMMER APPRENTICESHIP ☐ MASTER THESIS ■

CONTENT OF ASSIGNMENT (POSSIBLY ILLUSTRATED WITH PICTURES/DRAWINGS):

ArcelorMittal Gent is a steel production company which is situated alongside the canal Ghent-Terneuzen in the port of Ghent. It produces flat steel products, used amongst others in the automotive industry.

A steel production site contains multiple sources (steel shops) and sinks (shipment halls). These sources and sinks are linked via an intricate network of connections (railways, transfers, carriers, ovens, …) and buffers (treatment halls, shipment halls, production halls, …). This setup can be mapped to a graph. Given certain inputs on the sinks and capacities on the edges of the graph, we would like to assign flows to edges in order to maximize the throughput at the sinks over a period. We would like to select a algorithm, that can cope with the temporal dimension, implement it and test it with historical data. Such a tool can help us in assigning the flow of slabs and coils through the site in order to maximize resource efficiency and increase revenue.



OBJECTIVES:

- ➢ Model ArcelorMittal Gent site as a graph
- ➢ Evaluate aptness of existing solutions for max-flow problem in industrial setting
- ➢ Implement selected solution in modern programming language
- ➢ Analyze quality of solution using historical industrial data

EXPECTED COMPETENCES (KEY WORDS):

- ✓ Algorithm design
- ✓ Programming (Python, C#, Rust, Julia, F#, …)
- ✓ Data analysis
- ✓ Graph theory

NUMBER OF STUDENTS:

- ➢ 1 or 2

TARGET GROUP: BACHELOR/MASTER/ … & SPECIALIZATION(S):

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- Master of science in engineering (computer science, operations research, …)

LOCATION:

- Systems and Models ArcelorMittal Gent, John Kennedylaan 51, 9042 Gent

PROMOTORS:

- Industrial : Bellens Pieter, Freek Boeykens, Hendrik Jennen
- Academic : ……..

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