Motivation

 Fill the gap between the mine industry and impact engineering.

**Traditional landmine:** pressure triggered

**Sensor enabled smart-mine:** sound, vibration, magnetism, wireless.

**ESTC outdoor blast model:** how standoff distance can affect the destructive effect

Problem Formulation

**Objective:** select the minimum-cost mines to destroy all targets with a predefined probability

**Assumption:**
1. The distance between the mine and target is known
2. ESTC outdoor blast model is used

Algorithms

The original graph is transformed into a **bucket-tub model:** each mine is modeled by a bucket set and each target is modeled by a tub.

**Greedy algorithm:** select the mine with the least average cost in each round

**Layering algorithm:** decompose the bucket-tub graph into layers

Performance

**Theorem:** the layering algorithm has an approximation ratio of $\alpha \cdot f$, where $f$ is the maximum number of bucket sets associated with a target, and $\alpha$ is the relaxation factor

**Distributed implementation:** the same solution set is produced as in the global version of the greedy algorithm.

Publication

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