

Regulations in Japanese Power Industry and Difficulty from « Blackness » of Machine Learning

SCD2

PS1- Q1-02

Are there any restrictions on applying “black box” machine learning based software for critical infrastructures like power industry? Is the application area of such software limited by decision-supporting systems or some decision-taking systems do exist?

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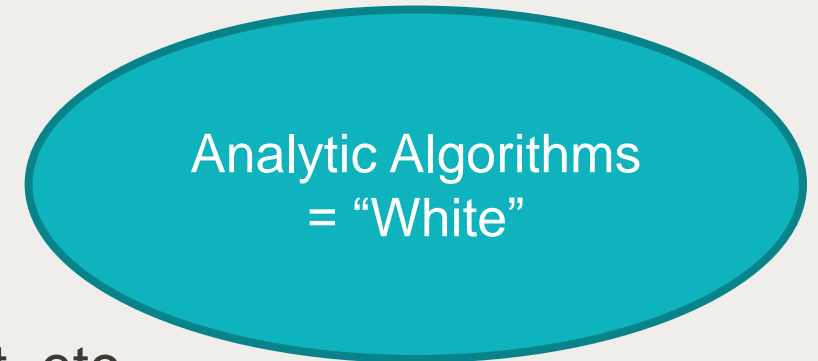
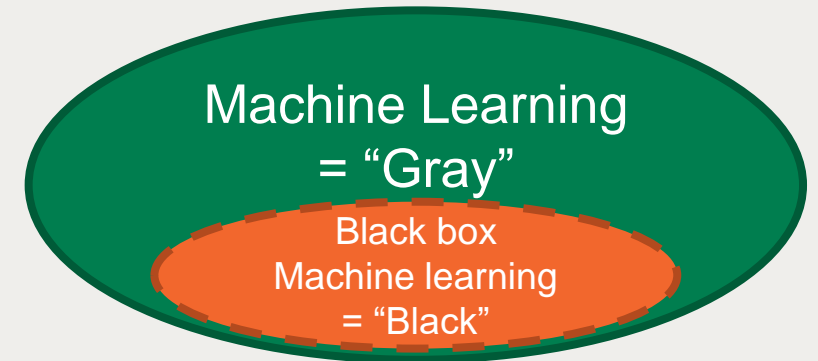
Regulations in Japanese Power Industry

- No laws or regulations to restrict “black box” machine learning specifically.
 - The only case is for self-driving cars.
- Based on “Voluntary operational safety”
 - conducted by self-set rule authorized by the government.
- Major companies share technical standards for common reference, which;
 - does not consider “black box” machine learning.
 - limit only to analytic algorithms in several areas.

“Black box” machine learning is not restricted by laws,
but limited by existing technical standards.

“Blackness” of Machine Learning

- Machine learning is based on statistical theories.
 - Some machine learning are “black box”.
 - No clear criteria of “black box”.
- Most machine learning has some uncertainty.
 - Whether “black box” or not.
 - Call it “black”.
- The “blackness” of each model depends on
 - algorithms, parameters, hyperparameters, data set, etc.



How to apply Machine Learning to Power Industry

- Machine learning is vulnerable in anomalies.
 - Can make unexpected outputs and **incidents**.
- Most analytic algorithms is robust against anomalies.
 - Based on the **physical theories**.
 - No “blackness”.
- Machine learning needs some **fail-safe system** to avoid incidents.
 - Can be a human or a program.

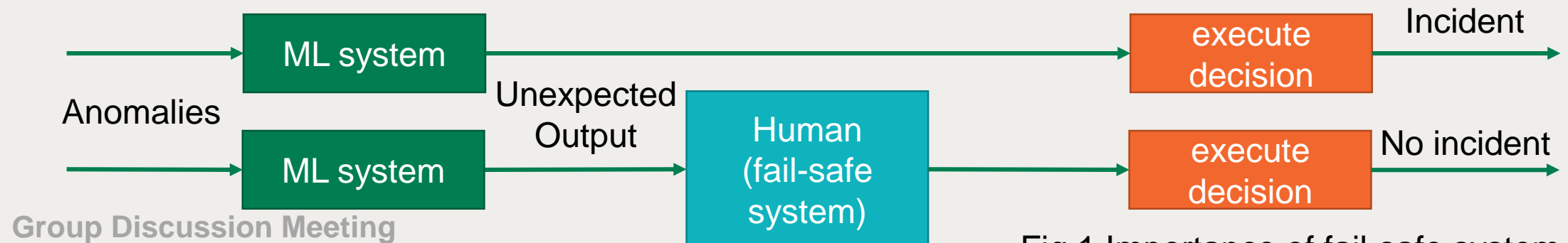


Fig.1 Importance of fail-safe system