# Article information:

Integrating supervised learning and applied computational multi-fluid dynamics - ScienceDirect
<https://www.sciencedirect.com/science/article/pii/S0301932222001987?via%3Dihub>

# Article summary:

1. This article proposes a workflow to automate post-processing of CFD data by using machine learning.

2. The strategy allows the simulation digital twin to be used for real-time process optimization.

3. Machine learning techniques are quantified in providing faster forecasts than traditional methods used in computational engineering.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article is generally trustworthy and reliable, as it provides a detailed overview of the proposed workflow for integrating supervised learning and applied computational multi-fluid dynamics. The authors provide a comprehensive description of the numerical methods employed for the base-case CFD simulations, as well as an outline of the methods used for producing data-driven models. Furthermore, they present four case studies to demonstrate how their proposed workflow can be applied in practice, and provide results from testing three different machine learning algorithms on a two-dimensional heated channel flow.

However, there are some potential biases that should be noted. Firstly, the authors do not explore any counterarguments or alternative approaches to their proposed workflow; instead they focus solely on promoting their own approach without considering other possible solutions or drawbacks that may arise from its implementation. Additionally, while they provide results from testing three different machine learning algorithms on a two-dimensional heated channel flow, they do not provide any evidence or analysis to support their claims that these algorithms are superior to traditional methods used in computational engineering. Finally, while the authors discuss potential risks associated with their proposed workflow, such as non-convex optimization problems and parametrization algorithms, they do not provide any details on how these risks can be mitigated or avoided when implementing their approach in practice.

# Topics for further research:

* Counterarguments to supervised learning and applied computational multi-fluid dynamics
* Traditional methods in computational engineering
* Non-convex optimization problems
* Parametrization algorithms
* Risk mitigation strategies for supervised learning
* Two-dimensional heated channel flow analysis

# Report location:

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