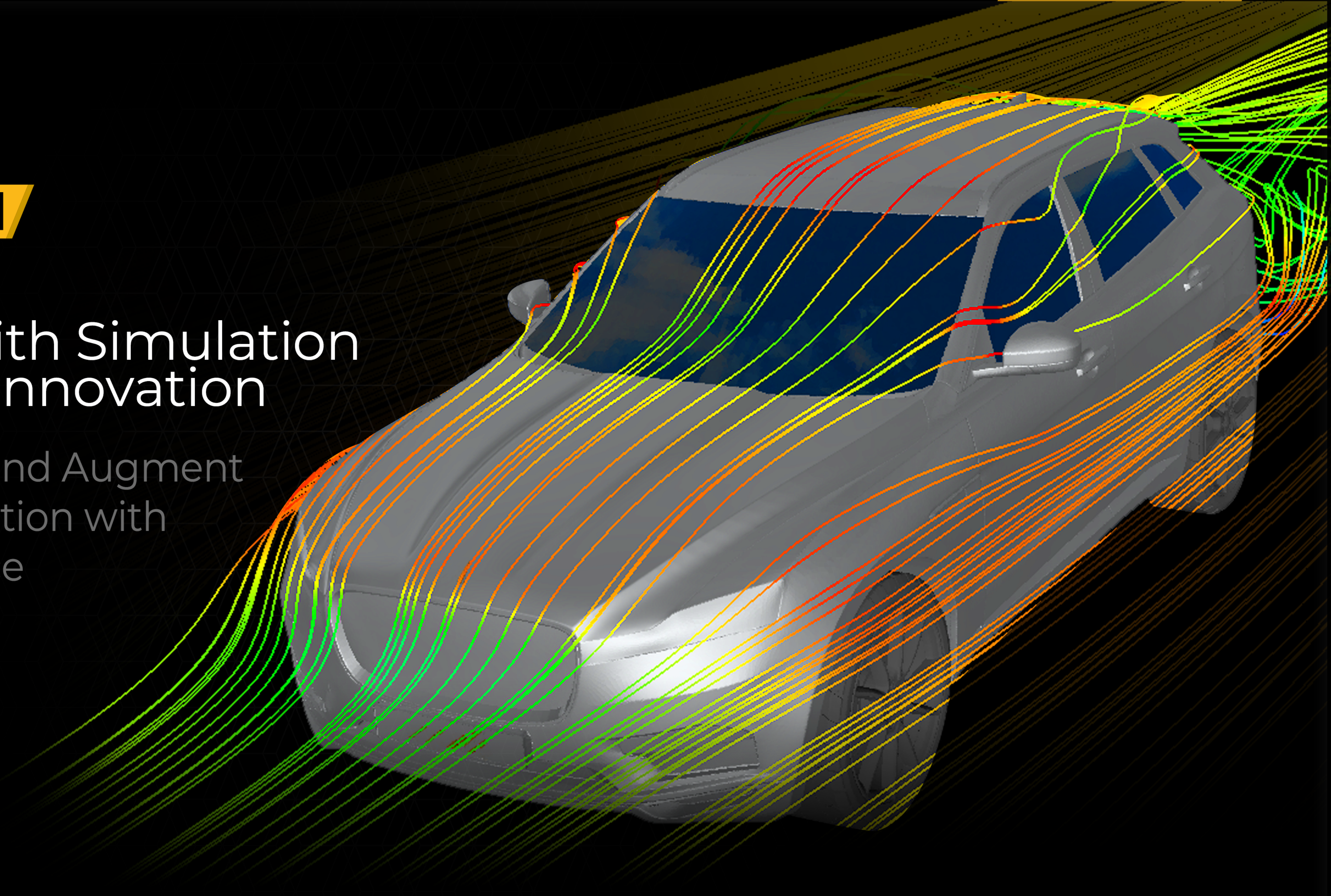
Ansys AI

Combine AI with Simulation for Next-level Innovation

How to Accelerate and Augment Engineering Simulation with Aritificial Intelligence



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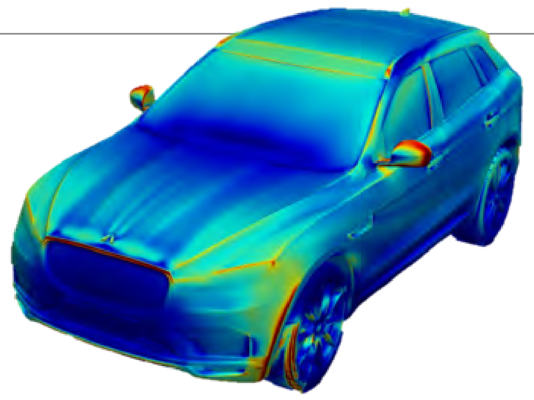
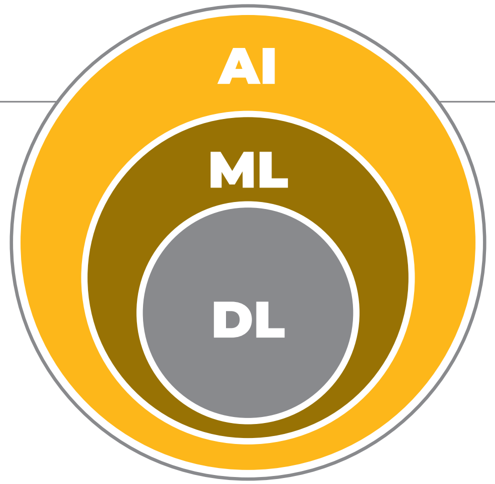


Engineering Simulation



Artificial Intelligence

More ITERATION / More EXPLORATION / More INNOVATION

Across industries, product development teams are constantly challenged to produce better designs at a faster pace to meet consumer demands. In the past, design and development were limited by the accuracy and speed of individual engineers running simulations by hand.

Today, artificial intelligence (AI) technologies present a unique opportunity to accelerate production and enhance simulation workflows. The potential expands even more when leveraging the nearly limitless compute power of cloud-native AI technology.

At the same time, while AI can enhance simulation, simulation can also enhance AI with optimized training and predictive accuracy. The two technologies are interconnected, maintaining a symbiotic relationship in which each counterpart benefits the other.

Enhance Simulation with the Power of AI

- **Faster:** AI analyzes past simulations to quickly identify complex patterns while incorporating new information to examine correlations and relationships within data.

KNOW THE TERMS:

Artificial Intelligence (AI): a computer-based system or set of algorithms that can imitate human behavior to process tasks. Despite its name, AI is based on real — not artificial — data.

AI Training: the process of feeding large amounts of data to an AI model to train it to perform and complete tasks. Simulation significantly improves AI training by providing a comprehensive pool of data, speed, and predictive accuracy.

Algorithms: procedures or instructions that enable computers or machines to analyze data, perform tasks, and make decisions.

Machine learning (ML): a subset of AI; a computational method that uses data and algorithms to train AI.

Deep Learning (DL): a form of ML in which a computer or machine teaches itself without human intervention using neural networks.

Neural Networks (NN): deterministic models that mimic and are inspired by the interconnected network of neurons in the human brain.

ACCELERATE SIMULATION UP TO 100X FASTER

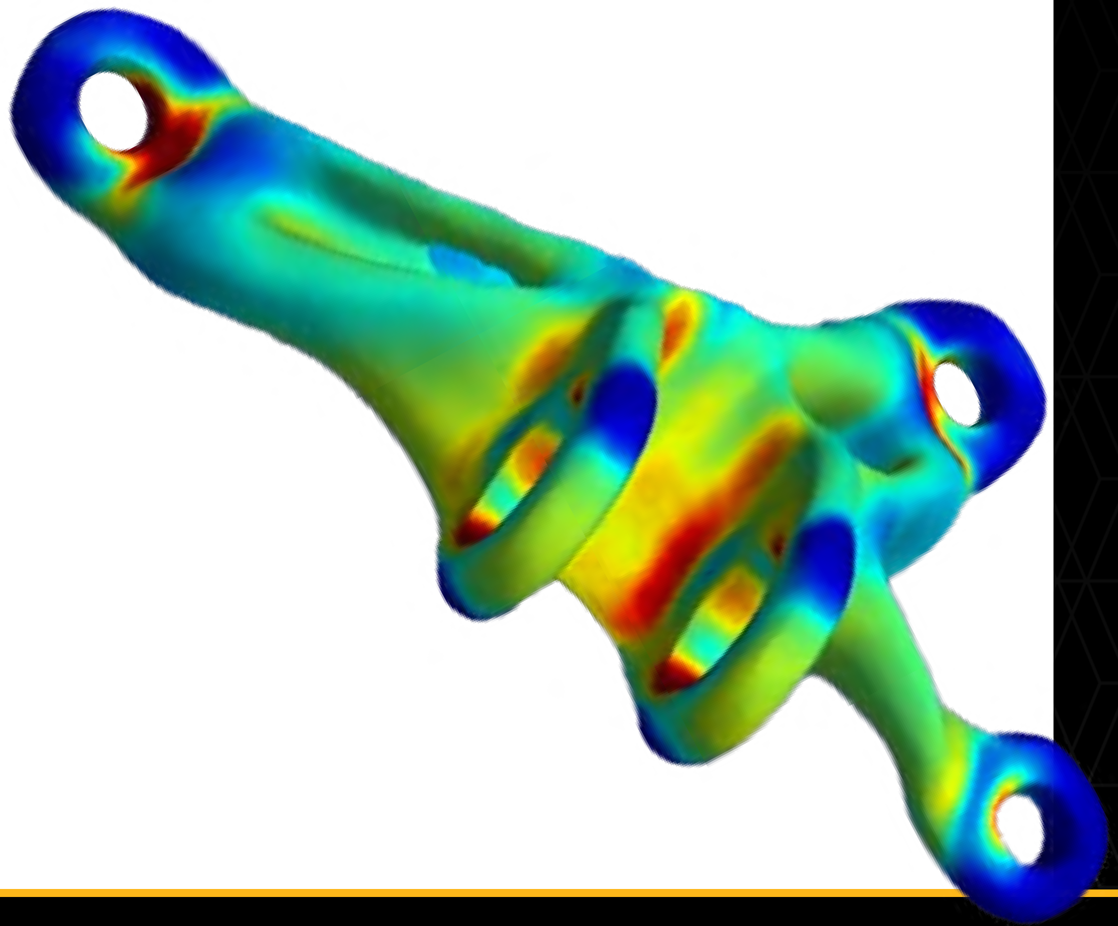
- **Easier to Use:** AI democratizes the use of simulation by making it more accessible to nonexperts through user-friendly web-based applications.
- **More Comprehensive:** AI enables the integration of multiple models to provide thorough representations of complex systems.

Enrich AI Training with the Predictive Accuracy of Simulation

- **Predictive Accuracy:** Physics-based solving methods and full-fidelity simulations provide high levels of predictive accuracy to validate and optimize designs, which increases the value and accuracy of AI training data.
- **Scope:** Multiphysics simulation covers a wide range of engineering disciplines across all industries and enables a near-limitless number of variables to test and validate, improving analysis for deeper design insight. This enables a more diverse dataset for AI training.
- **Speed:** Simulation-based virtual testing is much faster and more reliable than physical testing, saving significant time during the data collection needed for AI training.

Ansys AI: The Future of AI and Simulation Has Arrived

At Ansys, we are revolutionizing engineering simulation with the power of AI. Expanded AI integration across our portfolio and customer community includes the Ansys SimAI™ platform, a cloud-native, physics-neutral software-as-a-service (SaaS) application that combines Ansys simulation with the speed of generative AI; Ansys AI+™ product capabilities, which extend AI features within Ansys products to enhance core functionalities; and the AnsysGPT™ multilingual and conversational virtual assistant.



/ KNOW THE TERMS:

Generative AI: AI that can generate new content, including text, images, and other data, by learning from previously generated data.

Large Language Model (LLM): a specific application of generative AI that enables natural language processing (NLP) and can decipher and understand nuances in language. This extends to capabilities, including summarization and translation. One of the most popular examples of an LLM is ChatGPT.

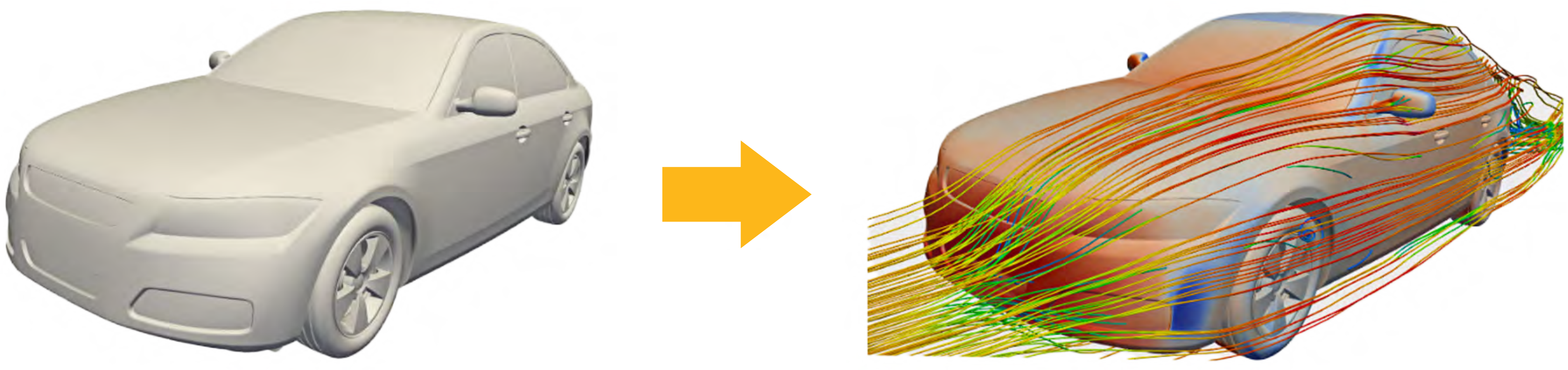
AI-Powered/AI-Augmented/AI-Enhanced Simulation: frequently used terms to describe simulation that has been optimized using AI.

Cloud-Native AI: AI platforms that run in the cloud, combining the power of AI with cloud computing to scale, accelerate, and optimize AI training and performance.

Software-as-a-Service (SaaS): a software delivery model that enables users to access cloud-based applications via subscription.

Get to Know the Ansys SimAI Software-as-a-Service Platform

By combining the power of artificial intelligence (AI) and multiphysics simulation, the Ansys SimAI platform enables organizations to reach even greater levels of innovation at a rapid pace. The SimAI solution is a physics-agnostic and cloud-native platform in which you can train an AI model using previously generated data from Ansys products or other sources and assess the performance of a new design within minutes. The software-as-a-service (SaaS) application combines the predictive accuracy of Ansys simulation with the speed of generative AI via the cloud — a combination that boosts model performance by 10-100X across all design phases for computation-heavy projects.

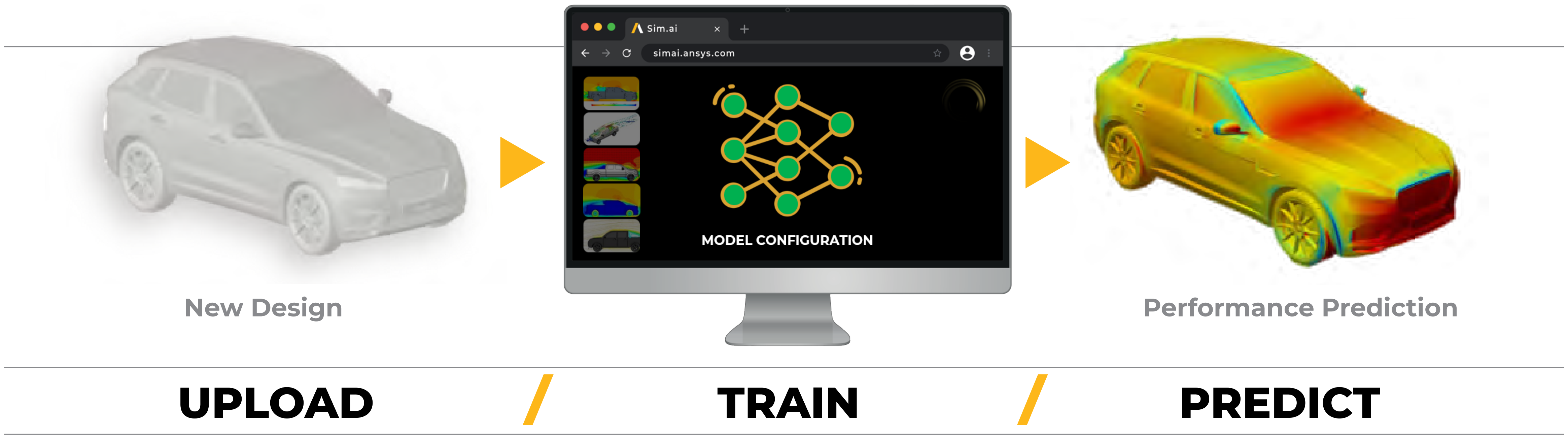


To assess automotive aerodynamics, engineers often incorporate computational fluid dynamics (CFD) simulation to analyze the flow field around a car.

Inform Machine Learning with Numerical Simulation

To appreciate the technology behind the SimAI solution, you must first understand the nature of numerical simulations and their complexities and purpose. Numerical simulations model the behavior of physical systems in various engineering domains without needing to conduct lab experiments. This enables engineers to calculate and iterate system-specific quantities more easily and efficiently.

Governing equations play a crucial role in the analysis of physical systems because they enable models that can be used to analyze and predict behaviors that are otherwise unobservable. By employing mathematical approximations, numerical simulations solvers apply these governing equations through computer algorithms.



Take a Physics-Agnostic Approach with the Ansys SimAI Solution

When employing ML techniques, the goal is to enable an algorithm to learn a task or general rule, given a set of examples. There are several ways to do this when integrating ML with numerical simulation.

Here are two categories of such methods:

1. **Physics-aware:** The most straightforward approach is to replace the bottleneck in standard simulation solvers with ML techniques that can output predictions faster, such as accelerating the inversion of a large linear system of equations. However, most of these methods remove the solver involved in the computation while keeping information about governing equations, e.g., by injecting penalization terms implied by the equations into the loss function (i.e., the amount of error in your training data). In other words, physics-aware methods focus on a particular physical task and get the job done, but they might sacrifice some accuracy.
2. **Physics-agnostic:** The other approach is for the ML algorithm to learn a latent representation of the physics directly from the solutions of numerical solvers. These methods are agnostic to the underlying equations and solvers. For instance, by using examples from previous computations, ML algorithms can learn a data-driven representation of a governing equation and use a new geometry and freestream condition as inputs — like the speed of a car — to deliver its flow field as the output. In this way, physics-agnostic methods offer both speed and predictive accuracy.

The SimAI application takes a physics-agnostic approach, accelerating your simulation workflow without compromising its predictive accuracy. Instead of relying on geometric parameters to define a design, the platform uses the shape of a design itself as the input. This facilitates broader design exploration even if the shape's structure is inconsistent across the training data.

Essentially, the SimAI workflow is engaged in three simple steps: upload data, train AI model, and predict. As mentioned, customers can train the AI model using previously generated data.

Discover Ansys SimAI Architecture

SimAI architecture is based on a fusion of different techniques that combine multiple deep learning neural networks. This type of architecture makes it possible to capture all the important scales of physics. SimAI's architecture is composed of a significant number of nonlinear layers, including multiple parameters and complex interactions between variables.

Instead of explicitly storing data points like pixel values in an image, the architecture uses an implicit neural representation to learn a continuous function that can generate these data points. This means that the SimAI solution can take a set of points obtained from previous computations and generalize well to new geometries and freestream conditions.

Model with Quick and Easy Geometry

In fact, one of the SimAI platform's strongest assets is its use of regularization techniques to prevent overfitting and improve generalization for new geometries. What does this mean? Basically, overfitting is when an AI model's predictions are too narrowly focused on its training data and included geometry, lacking any generalization or scope to learn or generalize new geometries. Regularization techniques are designed to reduce overfitting.

The SimAI solution uses regularization techniques, including local methods that are embedded directly in the structure of the model and lead to a more stable and expressive model. It's the reason the application can work with new geometries so quickly and easily.

Similarly, the application uses an adequate representation of 3D shapes to describe arbitrary or irregular meshes with complex geometrical variations that do not follow a specific distribution, e.g., unparameterized geometries.

To help quantify the uncertainty in the prediction, the SimAI platform uses a unique confidence score to calculate the distance from the nearest known geometry in a very high-dimensional space.

Explore AI at Ansys

While it's good to know the basics of SimAI technology, the best part about the platform is that you don't need to know any of this to use it. The SimAI solution is intuitive and designed for users without coding experience, AI/ML familiarity, or deep learning expertise.

To learn more, register for the webinar "Introducing Ansys SimAI: Cloud-native Generative AI for Simulation," and discover other Ansys AI innovations, including Ansys AI+ product technologies and the AnsysGPT virtual assistant at Ansys AI — AI-augmented Simulation Technology.

/ ANSYS AI+ TECHNOLOGIES

Ansys AI+ technologies enable customers to augment simulation with add-ons, offering more options and variety in accessing artificial intelligence (AI) capabilities across Ansys desktop products. Ansys AI+ technologies include:

- Ansys Granta MI AI+ module for greater insights into material-process-property relationships
- Ansys optiSLang AI+ module for sensitivity analysis, optimization, and robust design
- Ansys CFD AI+ module for turbulence modeling
- Ansys SynMatrix AI+ module to accelerate RF filter optimization
- Ansys Structures AI+ for faster thermal strain calculations and prediction of compute resources
- Ansys Missions AI+ to enhance Digital Mission Engineering products
- Ansys Electronics AI+ to forecast simulation needs

Simulate Securely with Ansys SimAI Technology

Ansys customers can trust that their SimAI data is secure from initial upload throughout model building and prediction runs. The SimAI platform is architected on AWS by keeping in account the security and architecture best practices from the AWS Well Architected (WA) Framework. The AWS WA Framework describes key concepts, design principles, and architectural best practices for designing and running workloads in the cloud. It is based on six pillars: operational excellence, security, reliability, performance efficiency, cost optimization, and sustainability.

Train AI Securely

To get started, simply select the files you wish to use and either upload them to the SimAI platform using a web application directly through your browser or by using a Python software development kit (PySimAI SDK) compatible with Python version 3.9 or higher. The PySimAI documentation is publicly available. Your data is securely stored in an encrypted data bucket in Amazon Simple Storage Service (S3) and transferred through an encryption tunnel protected by transport layer security (TLS) 1.3 — the most recent and strongest version of the TLS security protocol.

Once your data is uploaded, you can configure a model and initiate training with confidence that your data remains secure throughout all stages of the SimAI workflow. The SimAI architecture performing training and inference is hosted in the AWS Europe region (eu-west-1, Ireland), leveraging best security practices.

Know Your Infrastructure

The SimAI platform is multitenant with logical separation through tenant-based and user-based ownership. Likewise, simulations are run on tenant-exclusive, ephemeral-allocated instances and all read objects are copied, used, then destroyed.

As another layer of security, SimAI infrastructure is managed using an infrastructure as code (IAC) model on Kubernetes (k8s) clusters using Amazon Elastic Kubernetes Service (EKS). What does this mean? Put simply, k8s clusters are groups of nodes that run containerized applications. This enables multiple applications to run securely in a more efficient and scalable way. As a result, the benefits of the IAC model are maximized.

In addition, SimAI user accounts are managed through an industry-grade authentication and authorization service, which verifies access to the platform using a customer identity provider (IdP). Data transfer is only possible after authentication and authorization. Further, your storage, i.e., your Amazon S3 data bucket, is protected with AWS Key Management Service (KMS) encryption owned only by ephemeral compute instances, which use the advanced encryption standard (AES) 256. Access is also filtered and restricted by AWS Identity and Access Management (IAM) permissions. For more information, read our recent blog "Maximize Simulations with Secure, Cloud-native AI."

ANSYSGPT

AnsysGPT is a virtual assistant that garners engineering expertise across physics domains, provides 24/7 comprehensive technical support, and reduces response times.

Unlike general AI virtual assistants that use unsupported information, AnsysGPT is trained using Ansys data to generate tailored, applicable responses drawn from reliable Ansys resources including Ansys Innovation Courses, technical documentation, blog articles, and other vetted resources.

Ansys SimAI Software in Action

Regardless of your occupation or industry, there's a modern-day unifying truth: artificial intelligence (AI) has the potential to transform your workflow, if it hasn't already. Let's explore how the Ansys SimAI application optimizes design workflows from chips to ships, vehicles, and beyond.

Inform and Accelerate Ship Hull Design

As environmental concerns grow around the world, more manufacturers are being required to reduce carbon dioxide (CO2) emissions. Similar to the automotive and aerospace industries, the maritime industry is no exception. An example is the push from the International Maritime Organization (IMO) to reduce emissions from international shipping.

To achieve this, one approach is to improve ship resistance by optimizing hull form during design. This directly translates into energy efficiency and fuel savings. However, fast and efficient simulations are needed to evaluate several hull designs at once with so many different variables.

Apply the Ansys SimAI Solution to Hull Design

Employing the SimAI application, engineers created an AI model using 288 computational fluid dynamics (CFD) simulation results that included hull shape variations and operational conditions such as draft and boat speed.

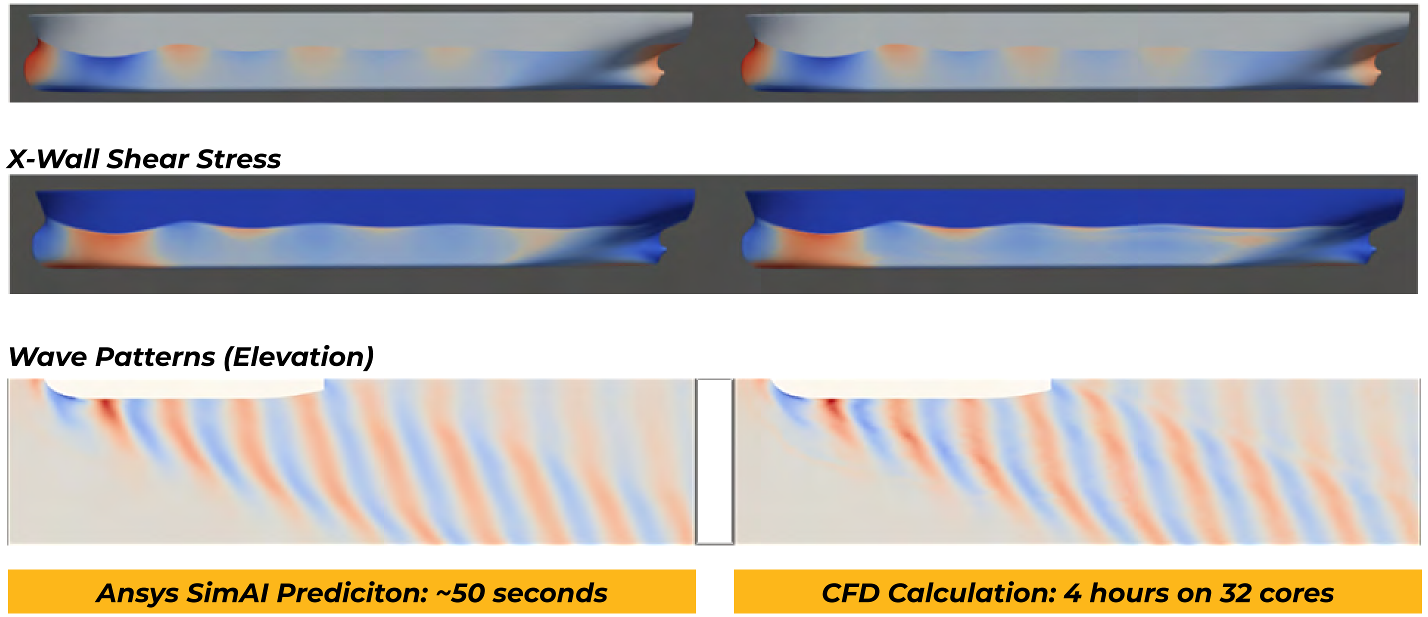
The simulations were split into three sets:

1. Training set: contained 244 simulations used to train the model.
2. Validation set: contained 20 simulations used to tune the model.
3. Testing set: contained 20 simulations used after the training phase to give an unbiased estimation of the model performances on unseen data.

In less than one minute, the application predicted new hull geometry. In addition, the SimAI resistance error was less than 5% compared to the CFD simulation results and the wave pattern prediction was fully accurate.

Main benefits of the SimAI solution in ship hull design include:

- Accelerated performance assessment of new hull designs in a few minutes instead of days.
- Informed decision-making in the early stages of design.
- Saved time for value-added tasks, including design exploration, which creates more time to innovate.



By combining traditional simulation methods like computational fluid dynamics (CFD) with the SimAI application, you can predict new geometry for ship hull design in less than a minute.

Benefit Beyond the Hull
Another advantage of the application is the reduction in preprocessing time needed to make a prediction because a mesh or solver setup is not required. This saves time — from minutes up to hours — depending on the process automation and design complexity.

Each SimAI prediction takes around 8 seconds, which unlocks new possibilities for faster and more efficient design iterations. For example, by incrementally shifting the longitudinal center of buoyancy (LCB) of the hull forward or backward, you can reduce wave amplitudes and consequently optimize ship resistance. And, circling back to sustainability initiatives, improving ship resistance through hull form optimization offers a large potential for fuel savings.

In this study, ship resistance was calculated for different positions of the LCB and minimum resistance was achieved in 10 minutes — a drastic reduction from the typical computation time and effort required to optimize hull form. Further, these results can be obtained by one engineer within one working day.

To learn more, check out the white paper "How to Improve Hull Designs with Ansys SimAI."

Improve Bumper Impact Performance with Optimized Crash Test

To meet shrinking automotive development timelines and ever-increasing safety regulations, computer-aided engineering (CAE) has become an integral part of the vehicle design process. Virtual analysis enables designers to reliably assess a vehicle's crash and safety performance while reducing costly physical testing.

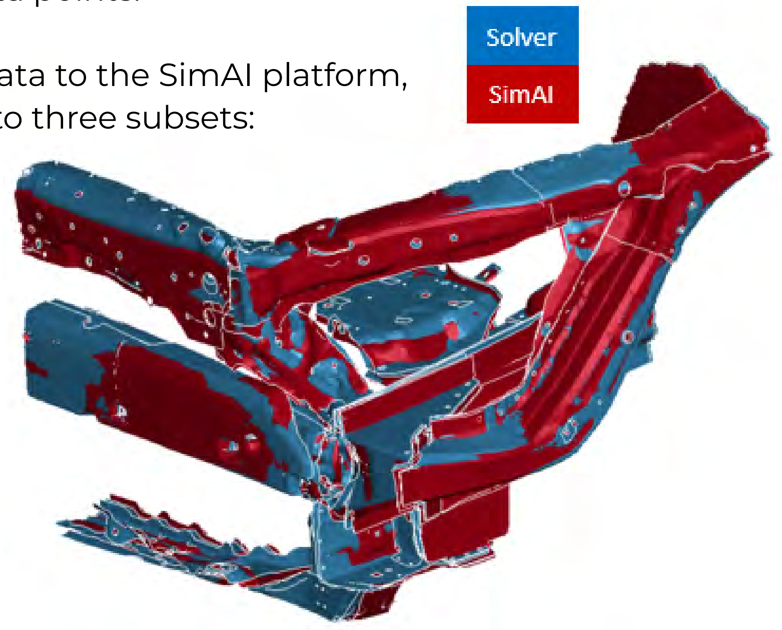
Ansys LS-DYNA® nonlinear dynamics structural simulation software is one tool that has become an industry standard for building high-fidelity crash models. However, the complexity of vehicle models has grown exponentially with details. Although this has improved confidence in CAE predictions and reduced the number of physical tests, it has made the models much larger and increased the need for greater compute resources.

SimAI software bridges the gap between theoretical models and real-world complexities. It learns from existing simulations and uses that knowledge to predict the full 3D response of a new design in minutes. Additionally, as a physics-agnostic application, it can be trained to work with fluids, structures, electromagnetics, and other physics domains.

Apply the Ansys SimAI Solution to Crash Tests
SimAI software has proven effective in predicting how fluids move, especially in constant motion simulated by CFD solvers. To show how the software can handle other physics, including structural applications, Ansys engineers used it to predict how a car bumper would behave in a high-speed head-on crash. A simplified vehicle model, or sled, was used to simulate the bumper impacting a rigid wall at 15.6 meters per second. The load case aimed to predict the deformed shape and rigid wall force for a given geometry. To accurately predict the transient response, Ansys engineers introduced design variations. Changing the thickness of seven parts within minimum and maximum boundaries generated 98 different designs with 21 states each — for example, a crushed state — for a total of 2,058 training data points.

Ansys engineers then uploaded the data to the SimAI platform, where it was automatically divided into three subsets:

1. A training set to train the model
2. A validation set to adjust or "tune" the model's underlying structure to improve its performance
3. A test set to determine how well the model could handle situations that it hadn't seen before



A comparison between Ansys SimAI software and solver predictions of a bumper's deformed shape at a given time show the SimAI model predictions to be reasonably accurate.

Reviewing the Results Shows Efficiency Gains

Most of the SimAI model predictions were within 10% of the crash solver's predictions (Figure 1). The graph shows how the rigid wall force changes throughout the crash. The solver's predictions for a design at different points in time are on the X axis, while the SimAI model predictions for the same design and time stamps are on the Y axis. This suggests that SimAI software is accurate without overfitting too much. It also highlights areas where SimAI training might need improvement. Another comparison of the SimAI software predictions to the crash solver predictions showed similar accuracy (Figure 2).

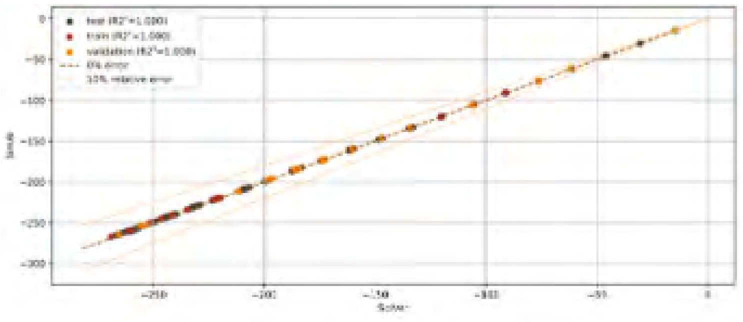


Figure 1. A trend plot for Ansys SimAI software shows overall crash prediction accuracy as compared to the traditional crash solver.

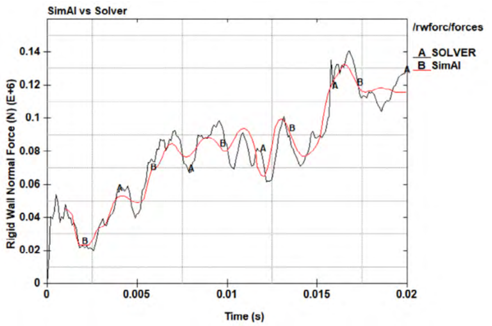


Figure 2. Comparison of rigid wall force predictions between the crash solver (A) and SimAI software (B).

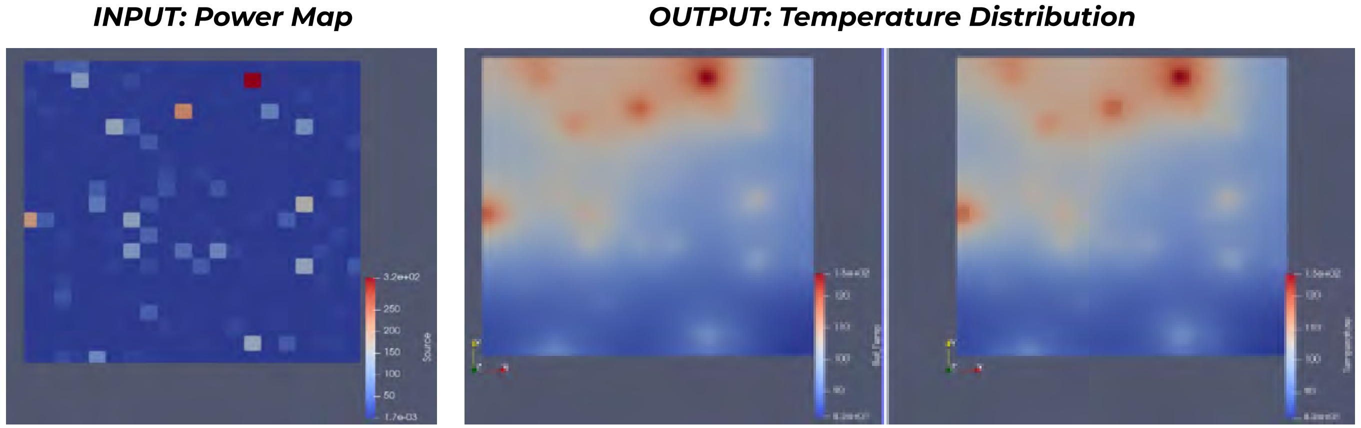
For more information, review the white paper "[Ansys SimAI Software Predicts Fully Transient Vehicle Crash Outcomes]()."

Accelerate Design Iteration for Chips, Jets, and SUVs

Faster design iteration is a goal shared by design and development teams in every industry from semiconductors and aerospace to automotive.

A recent semicondutor team was seeking a faster way to explore chip design. Their existing approach slowed them down due to a dependence on domain discretization and the number of elements required in chip modeling. It also offered limited scalability. Using Ansys Mechanical Parametric Design Language™ (MAPDL) and simulation results from Ansys Mechanical™ structural finite element analysis software, the team created an AI model in the SimAI platform based on 2,250 diverse chip thermal simulation datasets. The application predicted a temperature map for new input power maps within one minute, delivering a less than 0.5% temperature difference compared to MAPDL while accurately pinpointing critical locations.

An aerospace team experienced similar success producing jet engine bracket designs more quickly to meet structure requirements. Using Ansys Discovery™ 3D product simulation software and Ansys optiSLang® process integration and design optimization software, the team built an AI model using about 250 training samples, including topologically diverse bracket designs. With insight from past simulations, the SimAI application predicted a new shape and its physical behavior in less than a few seconds.



Ansys Mechanical: 30 minutes on 4 Cores

Ansys SimAI: Less than 1 minute

SimAI software is impacting the automotive industry, too. One team integrated the software to assess the aerodynamic performance of a sports utility vehicle (SUV) and reduce carbon emissions. Using approximately 50 CFD results from Ansys Fluent® fluid simulation software, the group created an AI model that included car exterior shape variations and topological changes, such as a rear mirror, ski rack, and spoiler. With the support of the SimAI platform, predictions for the new SUV geometry took less than one minute. In addition, the application's drag error compared to CFD was less than a 0.5% difference.

To learn more about the use cases in this section, read the blog: "From Chips to Ships: Optimize Design with the Ansys SimAI Platform."

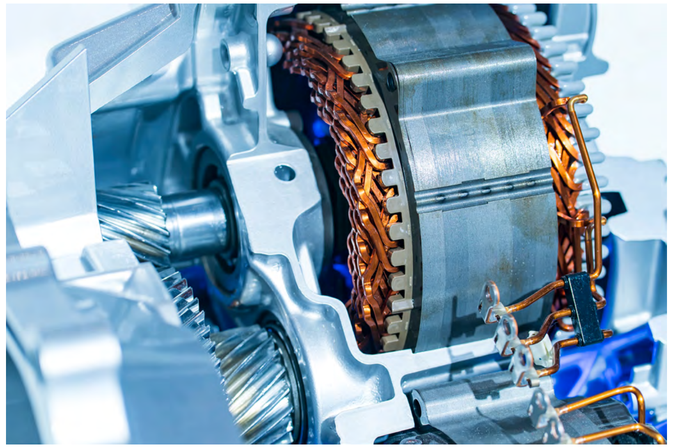
Structures

Wire Forming Process

CHALLENGE: Designing hairpin wires for electric motors requires a lengthy trial-and-error process to determine optimal parameters.

SOLUTION: Used Ansys Workbench™ simulation integration platform, LS-DYNA software, and optiSLang software to automate the simulation workflow, model the forming process, and create a database of simulation results to train the AI model in the SimAI platform.

BENEFIT: The application predicted an as-manufactured shape of a wire centerline in less than one minute with a shape difference of less than 5% compared to LS-DYNA software, reducing time and cost.

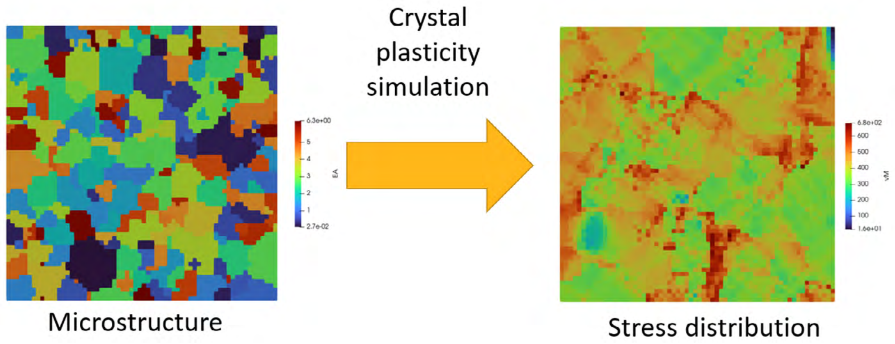


Crystal Plasticity Homogenization

CHALLENGE: Material properties for different microstructures are typically obtained from costly and time-consuming experimental setups. Alternatively, a crystal plasticity simulation can be performed.

SOLUTION: Mechanical simulation results of 50 microstructures at 10 different strain levels were generated to train an AI model using the SimAI application.

BENEFIT: EFIT The application predicted the mean stress-strain curve and the stress distribution in less than one minute, delivering a less than 3% stress difference compared to the Mechanical simulation results, reducing time and cost.



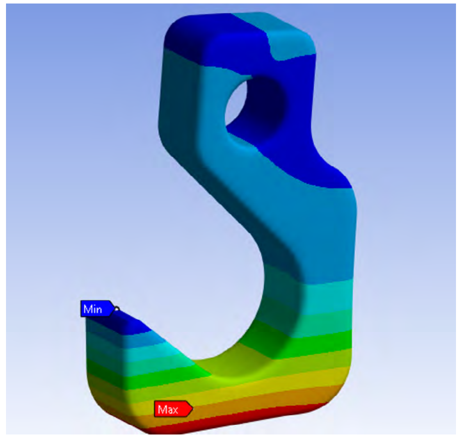
Ansys SimAI Software in Action: Additional Use Cases

Crane Hook Design

CHALLENGE: Crane hook design often involves multiple iterations to achieve desired performance and safety factors.

SOLUTION: Create an AI model in the SimAI application using 50 diverse hook design Mechanical simulations.

BENEFIT: The SimAI platform predicted stress and deformation results for new geometries within one minute with a stress difference of less than 1% compared to the Mechanical simulation results while accurately pinpointing critical locations.



Rubber Bush Force-stroke Curve Estimation

CHALLENGE: A rubber bush serves as a vibration isolator in automotive components like suspension systems and engine and gearbox mountings. Simulation analyses of rubber bush properties are time consuming and difficult due to hyperelastic material, large deformation, and nonlinear contact.

SOLUTION: Used about 10 evaluated designs from the Mechanical simulation results to generate a surrogate AI model in the SimAI platform.

BENEFIT: The application can predict within five minutes compared to Mechanical software, which takes 1.3 hours.

Ansys SimAI Software in Action: Additional Use Cases

Fluids

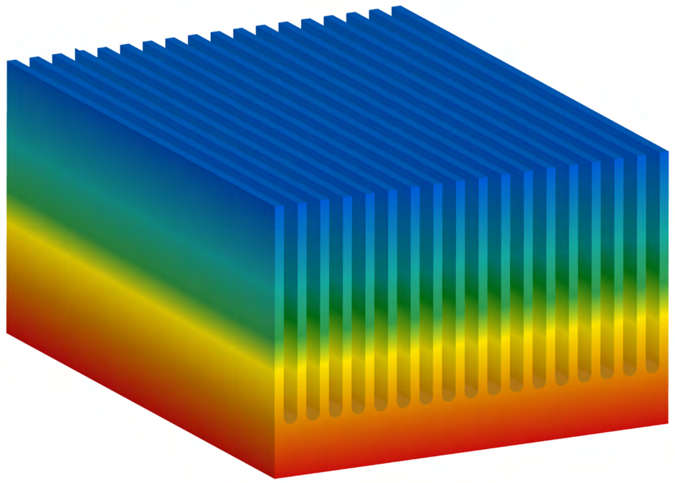
Battery Thermal Management Conceptual Design

CHALLENGE: In the global race for electric vehicles, a fast turnaround time is necessary to stand out from the competition and optimize cooling design for safety and performance.

SOLUTION: Approximately 10 CFD simulation results were used to create an AI model of a battery module in the SimAI application.

BENEFIT: The SimAI platform predicted eight new cooling designs in less than one minute.

Power Inverter Cooling



CHALLENGE: With increasing power densities, classical thermal designs are not enough. New cooling systems, including cold plates with nonconventional pin/fin designs, are needed to meet thermal requirements.

SOLUTION: About 30 Fluent CFD simulations were used to create an AI model of a forced convection cooling channel installed on top of a hot power inverter, with large topology changes in the design of the pins.

BENEFIT: The SimAI application predicted a new cooling channel in 30 seconds.

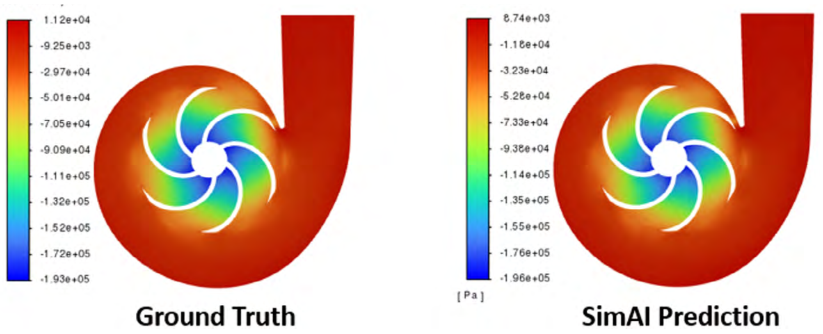
/ Ansys SimAI Software in Action: Additional Use Cases

/ Centrifugal Pump Design Exploration

CHALLENGE: Centrifugal pump design exploration involves many parameters, including the number of blades and leading and trailing edge angles at the hub and shroud.

SOLUTION: Approximately, 113 Fluent simulation results were used to create an AI model in the SimAI platform of the centrifugal pump, with topology changes in terms of number of impeller blades and leading and trailing edge angles at the hub and shroud.

BENEFIT: The SimAI application generated pressure and velocity field predictions in 30 seconds.

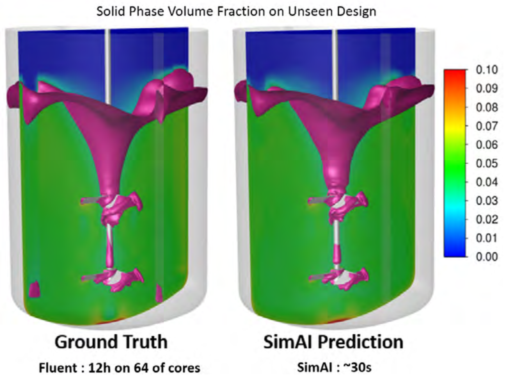


/ Solid Suspension in Stirred Tanks

CHALLENGE: During processing in stirred tanks, the distribution of the solid phase affects mixing scales, the availability of solids to chemical reactions, and the overall performance of the tank.

SOLUTION: Approximately 28 liquid-solid multiphase Fluent simulations were used to create an AI model in the platform of stirred tanks with topology changes, including the number of impellers, agitation rate, and the percentage of solid loading variations.

BENEFIT: The SimAI application predicted the solid volume fraction field in 30 seconds.



/ Shell and Tube Heat Exchanger

CHALLENGE: Designing an efficient yet economical heat exchanger in a timely manner

SOLUTION: Using Discovery software and the SimAI application, an AI model of a shell and tube heat exchanger with topology changes, including the number of tubes, baffles and their orientation, relative positioning, and inlet coolant velocity, was created based on 250 conjugate heat transfer (CHT) simulation results.

BENEFIT: The application predicted new heat exchanger geometry in less than one minute, reducing computational time by 99%.

Ansys SimAI Software in Action: Additional Use Cases

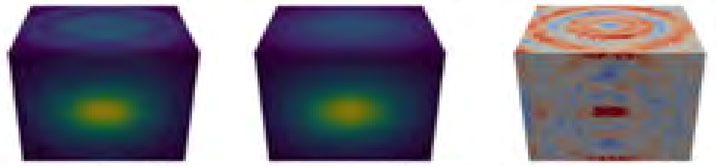
Electromagnetics and Optics

Permanent Magnets in Consumer Electronics

CHALLENGE: Sizing and selecting materials for various electromagnetic (EM) functions while reducing cost.

SOLUTION: Up to 100 simulations from Ansys Maxwell® electromechanical device analysis software were used to create AI models of different fidelities in the platform to predict magnetic field distribution and magnetic forces.

BENEFIT: The application evaluated each new design for one magnet in 20 seconds versus five minutes with Maxwell simulation.



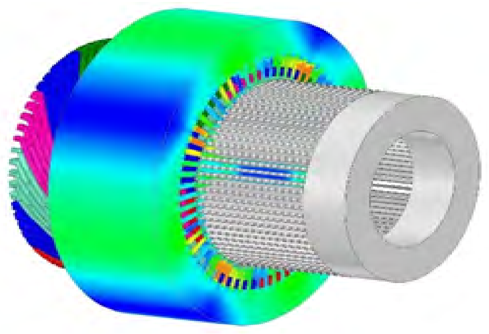
Magnitute of magnetic flux density on the container wall due to a cylindrical magnet

Predicting Traction Motor Performance for Electric Powertrains

CHALLENGE: Conducting rapid predictions of motor EM torque, efficiency, losses, and forces/stresses with design changes.

SOLUTION: Up to 100 Maxwell simulations were used to create AI models in the platform of different fidelities.

BENEFIT: Each new EM design was evaluated in minutes — 20X to 50X faster than conventional simulation techniques.

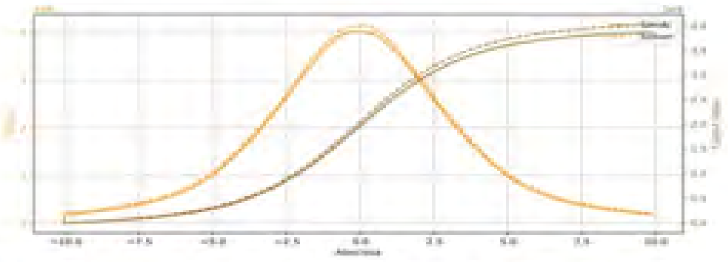


Optical Systems in Harsh Environments

CHALLENGE: Automotive and aerospace optical design need to consider diverse environmental conditions, including factors such as fog and haze.

SOLUTION: Using Ansys Speos® optical illumination design and simulation software and the SimAI application, 10 existing optical simulation datasets representing various environmental conditions with input variables such as fog density and haze levels were used to create an AI model.

BENEFIT: The application enabled the team to explore more operational environments in less time with an accurate illuminance field prediction and just a 2% error in the calculation of the max illuminance for an unseen new design.



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