

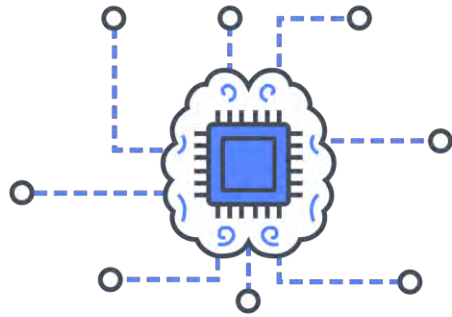
Artificial Intelligence in Aerospace

September 28st, 2023

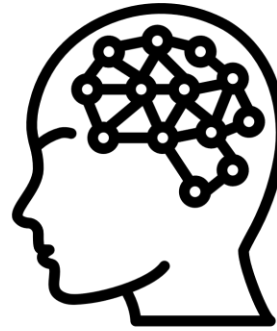


ENGINEERING YOUR SUCCESS.

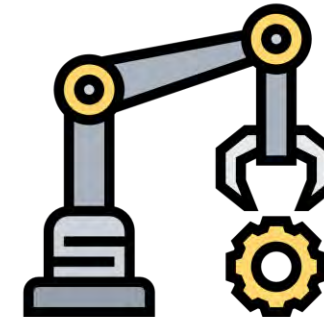
Types of AI



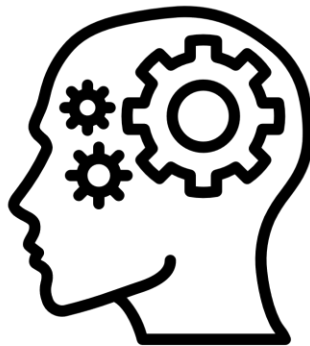
Machine Learning



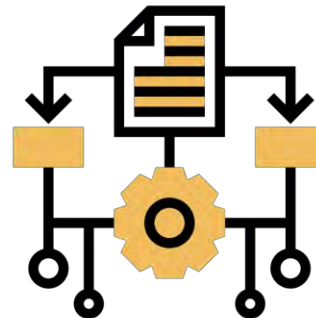
Neural Networks



Robotics



Expert Systems



Fuzzy Logic



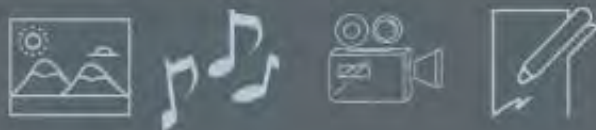
Natural Language Processing



Generative AI is a type of artificial intelligence (AI) that uses machine learning algorithms to create new and original content like images, videos, text, and audio.

1 Forming a Database

A neural network, consisting of various information or media files like images, text, data, sounds, etc., forms the basis of artificial intelligence.



2 Inputting a Prompt

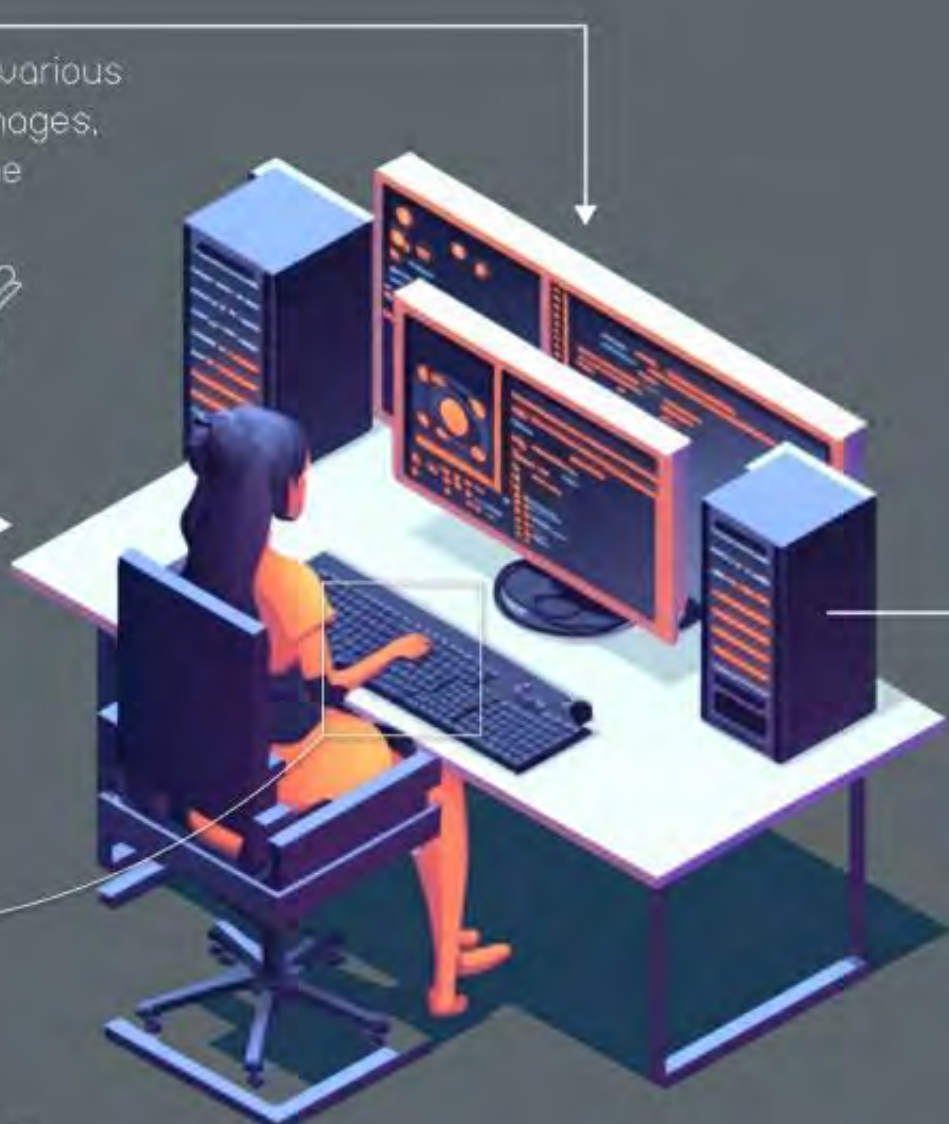
The user provides the AI with a description or sample of the desired content...



Prompts can be any user-submitted material, like words, numbers, or photos.

3 Generating Content

...and the AI uses its neural network to generate new examples that are similar to the ones it has trained from.



Industry Activity



- In 2023 - **6 aerospace conferences** will have a focus on intelligent or automated systems
- The American Institute of Aeronautics and Astronautics has called for papers about machine learning to showcase the many ways AI can impact the industry
- SAE G-34 Committee – Artificial Intelligence in Aviation
 - Committee focus is the implementation and certification aspects relate to AI technologies
 - Over 500+ members of the committee

AI use cases for Aerospace



- **Predictive Maintenance**
- Machinery Inspection
- **Part Authenticity**
- **Product Design**
- **Automated Quality Control**
- Data Security
- Supply Chain Optimization
- Flight performance and Crisis Management
- **Auto-Pilot**

Predictive Analytics Adoption

Air India Firms Up Order for 250 Airbus Aircraft, Selects New Services

2 minute read | Airbus | June, 21 2023

“And in its transformation and digitalisation journey, Air India will be the launch customer for Airbus’ Skywise Core X3, the latest and most advanced aviation analytics platform.”

26 April 2022

Services

SAS Scandinavian Airlines chooses Digital Alliance’s Skywise Predictive Maintenance solution for its A320 Family fleet

“...the first solution from the Digital Alliance combining predictive maintenance algorithms from Airbus as OEM, Delta TechOps as an MRO and operational expert and GE Digital as software expert. It encompasses a wide scope of components for aircraft and engines produced by various manufacturers.”

“AVIATAR digital solutions for Boeing 787, 737-800 & 737-8 aircraft enable TUI’s MOC (Maintenance Operations Control) engineers to monitor and predict the technical condition of the airline’s fleet.”

14 June 2023

Services

Vueling chooses Skywise Predictive Maintenance solution powered by the Digital Alliance

“This is the first Skywise solution powered by the Digital Alliance, combining predictive maintenance algorithms from Airbus as OEM, Delta TechOps as an MRO and operational expert and GE Digital as software expert. It encompasses a wide scope of components for aircraft and engines produced by various manufacturers. It is a reliable, proven predictive maintenance system with more than 200 predictive algorithms covering hundreds of parts.”

11 April 2023

TUI Airline chooses AVIATAR’s Health Management solutions

AIRCRAFT | AIRCRAFT | CARGO | CARGO NEWS | COMPONENTS | MRO MANAGEMENT | MRO NEWS

AFI KLM E&M to provide engine and component support for CMA CGM AIR CARGO’s expanded fleet



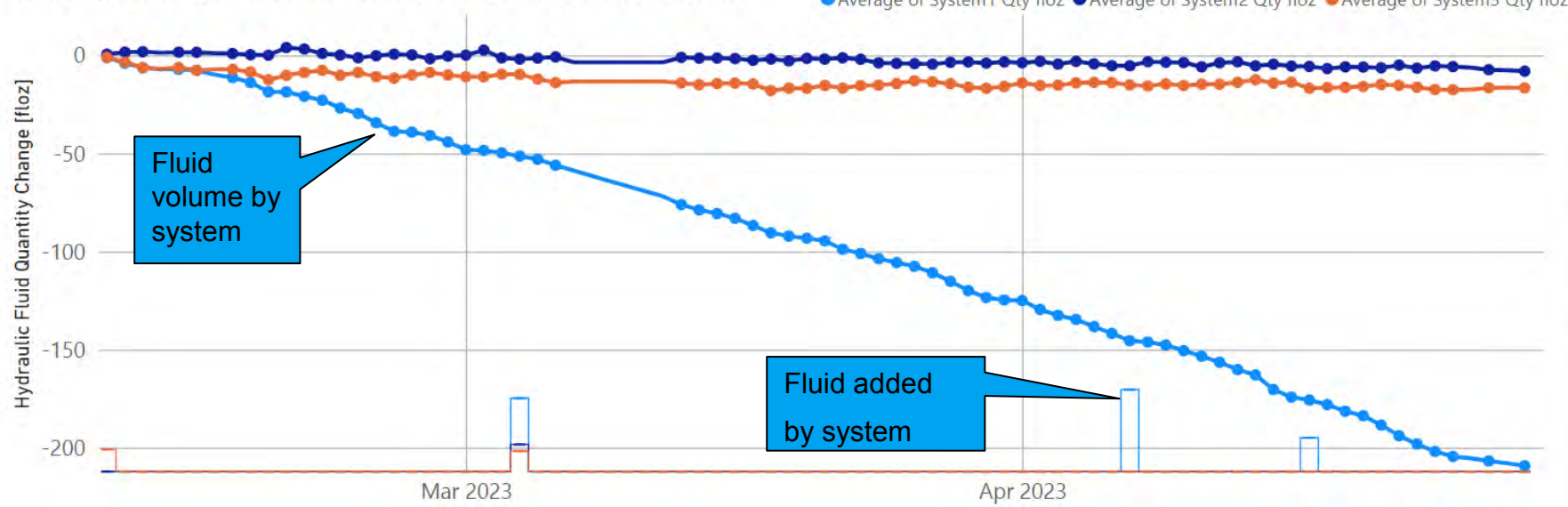
Craig Waters
June 21, 2023

“The two 777 Freighters will benefit from advanced monitoring and analysis through AFI KLM E&M’s exclusive predictive maintenance solutions, namely PROGNOS® for Engine and PROGNOS® for APU.”

Parker Builds Predictive models for



Daily Average of Hydraulic Fluid Quantity Change (Temperature Adjusted)



- Tail #s
- N104HQ
 - N106HQ
 - N109HQ
 - N110HQ
 - N113HQ
 - N115HQ
 - N116HQ
 - N118HQ
 - N123HQ
 - N126HQ
 - N132HQ
 - N134HQ
 - N138HQ

*Fleet of 220 A/C monitored daily.

*Hydraulic leak Alerts sent to airline

Tail #	Sys #	Total Leaked Vol. 90 days [floz]	1st Detected [days ago]	Max Leak Rate [floz/day]	Last Available Flt. Data
N401YX	3	328.70	75	67.30	April 26, 2023
N865RW	2	301.20	7	80.60	April 30, 2023
N645RW	2	291.90	48	21.80	April 25, 2023
N109HQ	2	230.20	53	15.80	April 25, 2023
N640RW	1	209.30	58	7.50	April 29, 2023
N410YX	1	186.90	57	56.10	April 23, 2023
N870RW	2	185.70	56	6.70	April 21, 2023
N110HQ	2	179.90	72	59.90	April 30, 2023
N646RW	1	172.30	50	14.80	April 30, 2023
N239JQ	1	161.20	41	29.60	April 26, 2023
N446YX	1	158.80	64	9.60	April 27, 2023
N646RW	2	146.40	20	18.10	April 30, 2023
N742YX	2	145.50	82	33.60	May 1, 2023
N134HQ	2	139.90	23	9.30	April 2, 2023

List sorted by most leakage

Today's Unique Tail #s	Today's System Count
68	84
Today's New Tail #s	Today's New Sys. Count
2	3
Tail #s Removed from Yesterday	Sys. Removed from Yesterday
0	1

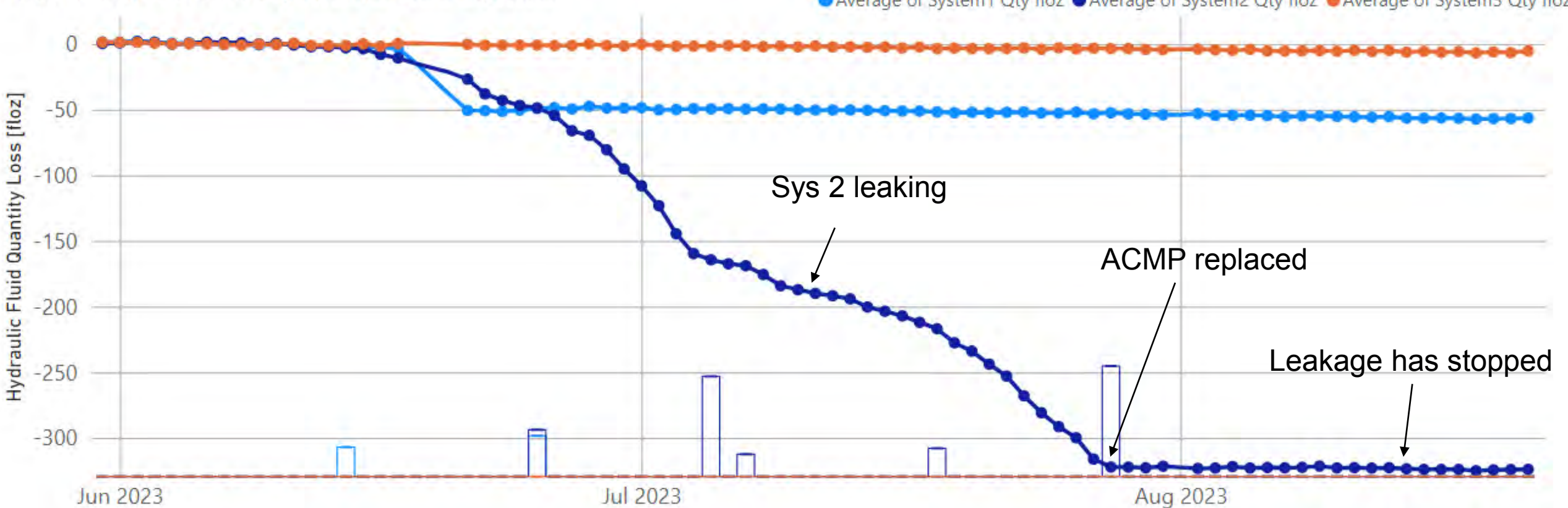
Daily Count of Leaky tail numbers by systems & tails

Last Refreshed (Eastern Time)
5/4/2023 4:07:06 AM

Parker Builds Predictive models for



Total Fluid Loss over 90 Days (Temperature Adjusted)



From Parker's Dashboard Republic identified a hydraulic leakage issue and issued a job card to their maintenance team. The job card was completed and the maintenance team replaced a leaking ACMP in system 2. The dashboard shows the leakage stopped.

NASA Turns to AI to Design Mission Hardware

McClelland pioneered the design of specialized, one-off parts using commercially available AI software at NASA's Goddard Space Flight producing hardware he has dubbed "evolved structures."

These evolved structures **save up to two-thirds of the weight** compared to traditional components

"We found **it actually lowers risk.** After these stress analyses, we find the parts generated by the algorithm don't have the stress concentrations that you have with human designs. **The stress factors are almost ten times lower than parts produced by an expert human.**"

"You can perform the design, analysis and fabrication of a prototype part, and **have it in hand in as little as one week,**"



Ryan McClelland displays a structural mount for the Survey and Time-domain Astrophysical Research Explorer (STAR-X) mission.
Credits: Henry Dennis

Part Authenticity – AI vision system – Alitheon

[AI Breakthrough](#), a leading market intelligence organization that recognizes the top companies, technologies and products announced that [Alitheon](#)'s FeaturePrint®, the **machine-vision based solution for authentication and traceability of physical items**, has been selected as **winner of the "Best Optical AI Solution"**

FeaturePrint "sees" and **converts the minute surface details of each physical item into a unique mathematical identity** for that individual item, the one out of the many, thus like a human's fingerprint, identifies it specifically.

"Congratulations to Alitheon – its **FeaturePrint optical AI technology securely links the physical and digital worlds**. FeaturePrinting allows high confidence distinguishing of individual items out of millions of similar and so-called 'identical' objects.

[Alitheon Named 'Best Optical AI Solution' in 2023 - BENZINGA](#)

Virgin Australia Finds Second Bogus Jet Part With a Fake Certificate

By [Angus Whitley](#)

September 18, 2023 at 1:10 AM CDT

Bloomberg

Fake spare parts were supplied to fix top-selling jet engine

Aug. 31, 2023 at 6:43 pm

The Seattle Times

Airlines, engine makers race to track down bogus spare parts

Sep. 9, 2023 at 7:00 am | Updated Sep. 9, 2023 at 7:00 am

The Seattle Times

"According to an [FAA](#) estimate, about **520,000 counterfeit** or unapproved parts are currently making it into planes annually, which is about **2%** of the overall 26 million active parts."

Boeing invest \$450mm in *wisk*



World's first **self flying**, all electric air taxi eVETOL. In 6th Generation Oct 2022

Boeing now fully owns this offering (JV was formed in 2019. Originally formed in 2010 by Google's Larry Page

Plans to be in service by 2030, but aiming for 2028.



Southwest Embraces AI For Improved Maintenance Operations

[Henry Canaday](#) August 14, 2023



Problem:

- MRO data file of discrepancies and corrective actions
- Technicians unable to get beyond 2 digit ATA code
- Second team to correct and complete technician filings

Solution:

- **SWA deployed a large language model**
- The tool takes technician entries completes them, generates correct detailed descriptions, the fix and the 4-6 digit ATA codes AND required corrective actions

Results:

- 6 years of SWA maintenance history has been auto-corrected
- Reliability engineers can now easily see trends, defects, repairs by ATA code and type of problem encountered





THANK YOU

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