



The Potential Role of AI in Transforming Digital Prepress and Workflows for Print Production

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Abstract

- Examines the role of artificial intelligence in refining ideation processes and digital prepress workflows.
- AI's potential to boost creativity and efficiency within digital operations.
- Provide some examples of how AI's automation capabilities can streamline project workflows, leading to more effective responses to digital design challenges and problem-solving scenarios.
- Cover practical AI applications incorporated into existing practices to enhance the quality of outputs and shorten the time-to-market.
- Broaden the dialogue on AI's role in educational innovation, for implementable AI strategies for their digital media and design teaching frameworks.

The AI/Big Data Revolution, Andy Paparozzi,
Chief Economist, Print United Alliance,
Oct 16, 2024.

The logo for PRINTING UNITED ALLIANCE features the words "PRINTING UNITED" in a large, bold, white sans-serif font, with "ALLIANCE" in a smaller, bold, white sans-serif font below it. To the right of the text is a circular graphic composed of several overlapping, semi-transparent colored segments in shades of blue, yellow, and red. The background of the logo is black with a yellow and blue curved shape on the left side.

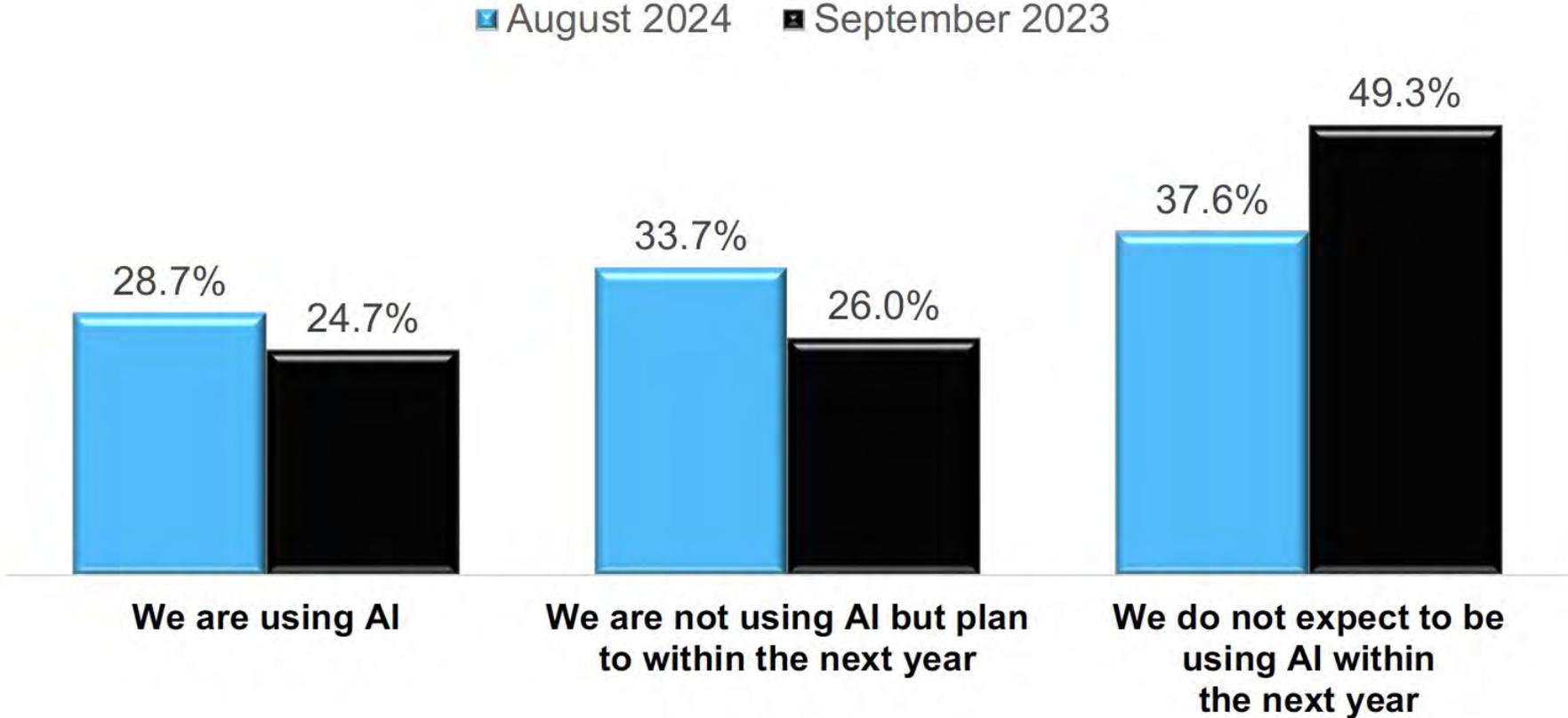
PRINTING UNITED
ALLIANCE

The AI/Big Data Revolution

Andy Paparozzi
Chief Economist
PRINTING United Alliance
October 16, 2024

Interest in AI Is Growing

Q: Which is true for your company? Data are for 124 participants in the midyear 2024 PRINTING United Alliance State of the Industry Survey. AI use includes applications embedded in equipment and software purchased from an OEM.



Companywide Use of AI Planned

Q: How are you currently using AI and how do you plan to within the next year? Data are for 124 participants in the midyear 2024 PRINTING United Alliance State of the Industry Survey.

Currently Using AI

Function	Percent
Content creation	29.0%
Marketing	16.1%
Sales	15.3%
Cybersecurity	13.7%
Operations	12.9%
Customer analytics	12.9%
Market analytics	12.9%
Hiring	8.1%
Employee development	6.5%
Evaluate company performance	5.6%
Customer service	2.4%
Risk management	2.4%

Using or Planning to Within One Year

Function	Percent
Operations	50.8%
Content creation	49.2%
Sales	42.7%
Marketing	40.3%
Customer analytics	40.3%
Cybersecurity	38.7%
Market analytics	38.7%
Hiring	31.5%
Evaluate company performance	31.5%
Customer service	28.2%
Employee development	25.8%
Risk management	23.4%



Historical Impacts on Society from Technological Innovation

Historical Impacts on Society from Technological Innovation



Historical Impacts on Society from Technological Innovation



Game Changer



As of 2023, Canva has over 150 million users worldwide, making it a significant player in the visual communication landscape.

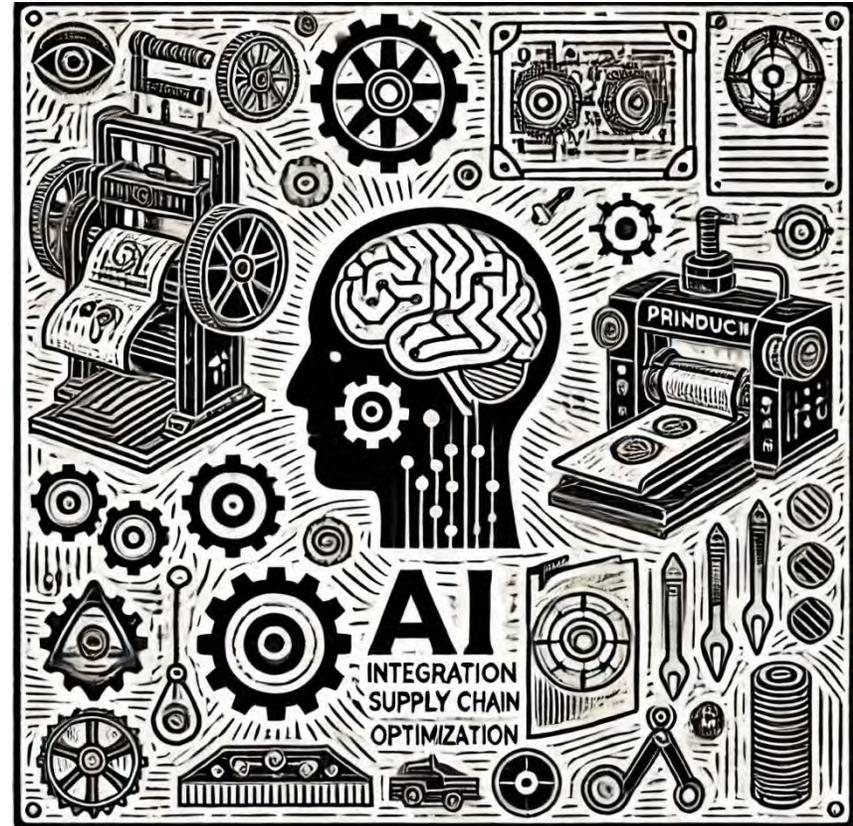
Based in Sydney, Australia. It was founded in 2012.

Canva acquired Affinity, a company that makes professional-grade design software.

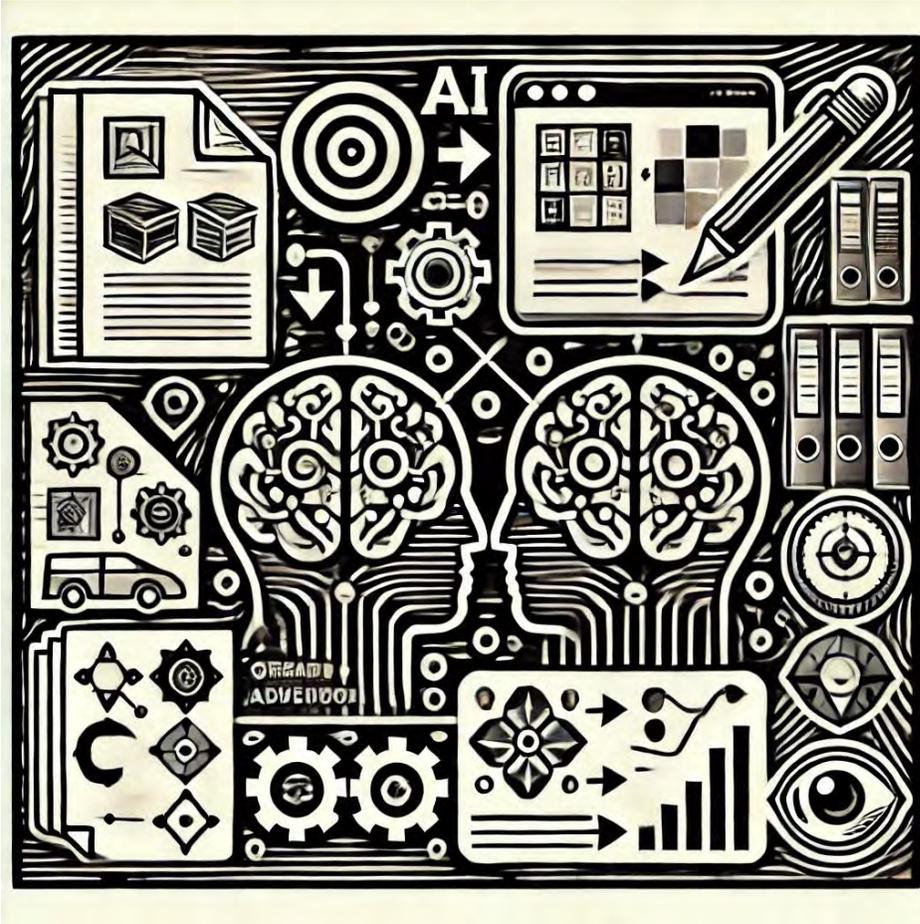
Integrating OpenAI's AI technology into Canva makes design more accessible and efficient for individuals and businesses.

AI Integration into Print Production

- **Creative and Prepress Applications**
- **Production Planning and Control (PPC)**
- **Quality Management (QM)**
- **Maintenance Management (MM)**
- **Supply Chain Optimization**
- **Automated Book Layout and Text Processing**
- **AI in Digital Printing and Press Optimization**



AI: Creative and Prepress Applications

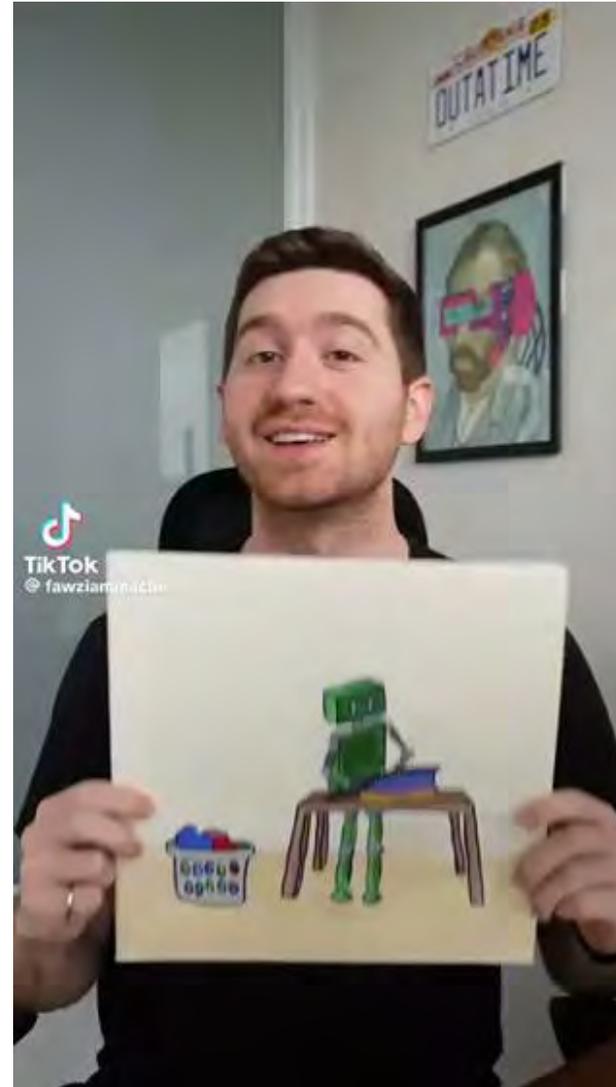


Transforming the creative and prepress processes by automating file preparation, layout adjustments, and image enhancement.

Pre-flighting tools check for errors in print files, ensuring they meet production standards.

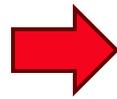
Generative adversarial networks (GANs) create new print patterns and improve design efficiency in textile printing.

How it works

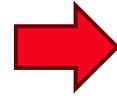


AI Client: Work-Flow Example

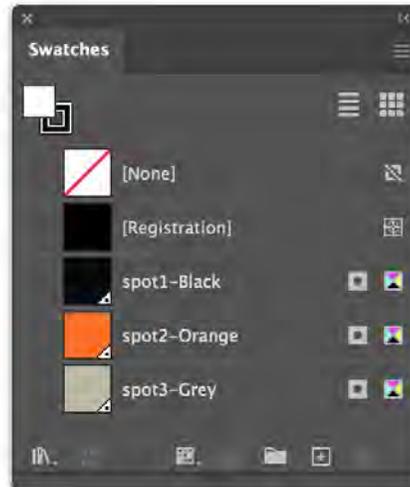
Original Image and
AI Enhanced (RGB)



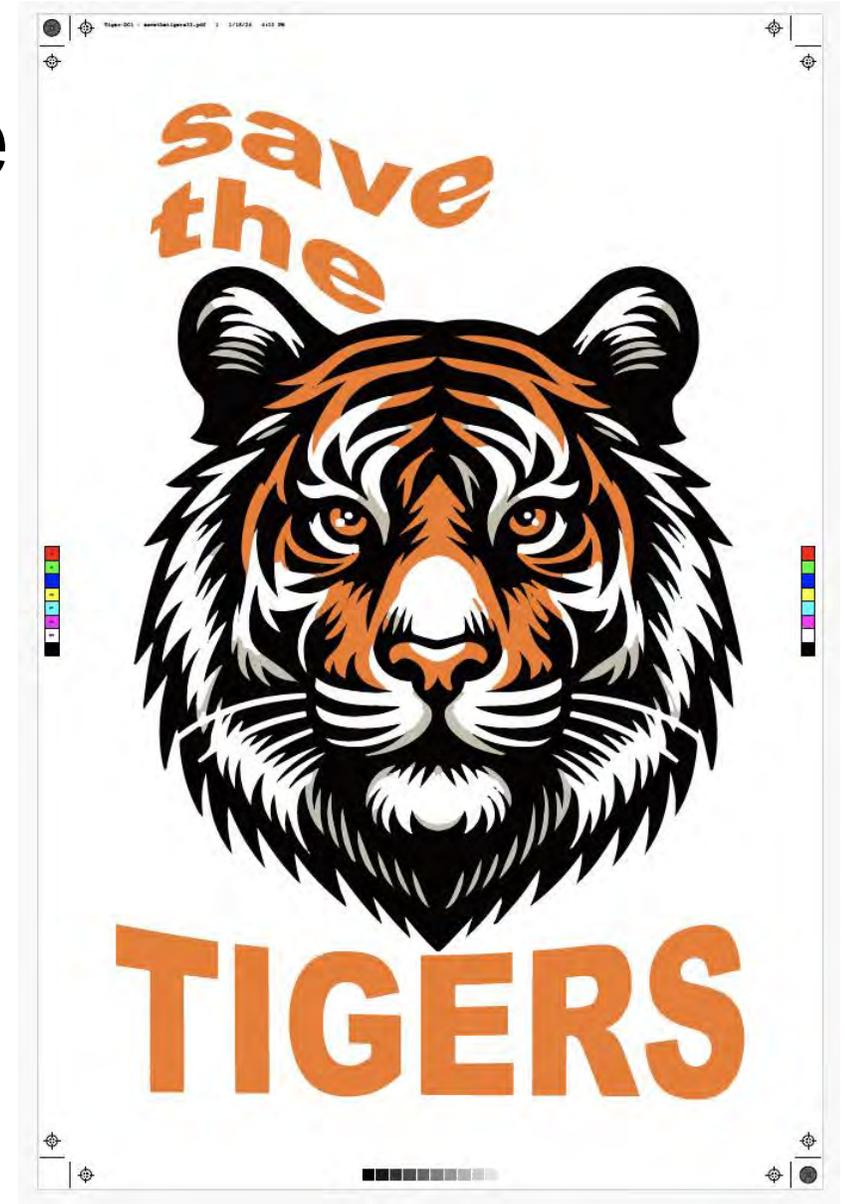
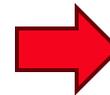
AI-Generated
Image (RGB)



Spot Colors and
Trapping (CMYK)



Layout and document setup



AI Image Enhancement

nightmareai/real-esrgan: Real-ESRGAN (Enhanced Super Resolution - Generative Adversarial Networks) with optional face correction and adjustable upscale (2X-10X)



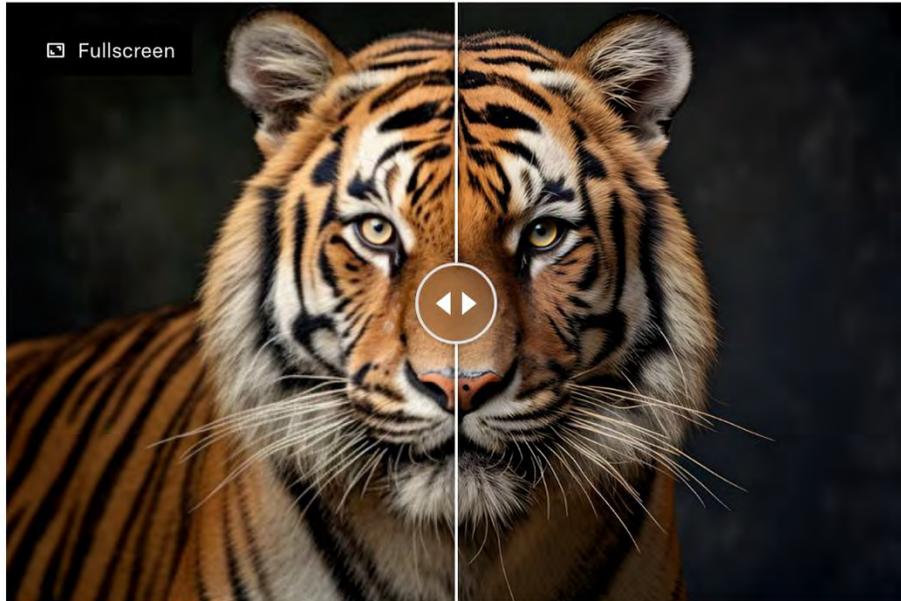
image* file

Drop a file or click to upload

tiger.png

Reset

Run (cmd+enter)



Generated in
3.9 seconds

Tweak it

Share

Download

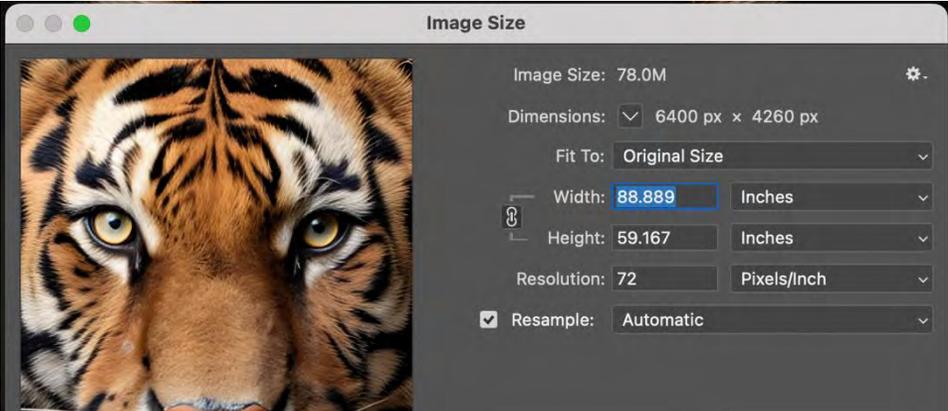
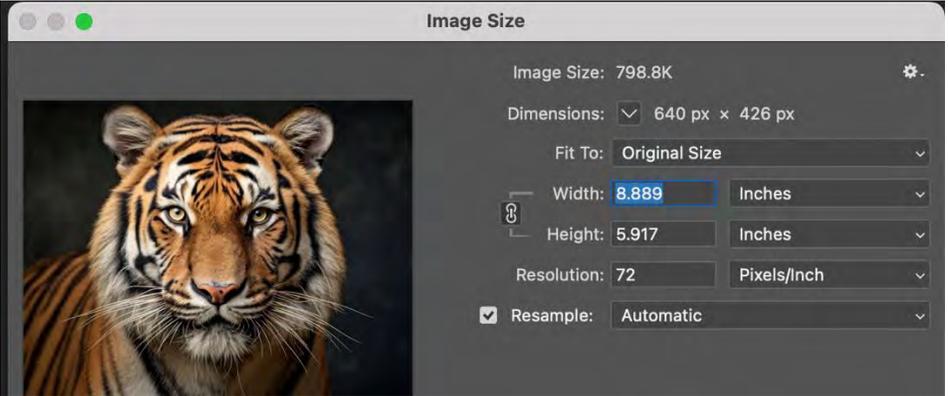
Report

Hide logs

running without face enhancement

AI Image Enhancement

Enhanced Super Resolution - Generative Adversarial Networks



AI Client

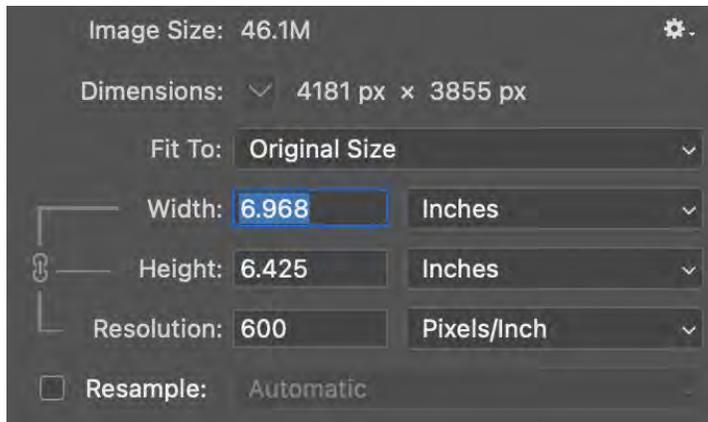


1. Analyze: *The image is a close-up portrait of a tiger, showcasing its vivid orange fur with black stripes and white markings. The tiger's gaze is direct and penetrating, with clear, sharp eyes. Its fur appears soft and well-groomed, with distinct whiskers. The backdrop is dark and blurred, focusing attention on the tiger's face. The overall quality of the photograph is high, with fine details visible, indicating it was likely taken with a professional camera.*

2. Create a 3-spot color clip art of the image.



-  #F28705
-  #000000
-  #FFFFFF



3. Can you provide the hexadecimal color palette information?

Based on the clip art image of the tiger:

1. Orange for the tiger's fur: #F28705 (a bright, vivid orange)
2. Black for the stripes and details: #000000 (pure black)
3. **White for the eyes and whiskers: #FFFFFF (pure white)**

AI Client: WorkFlow

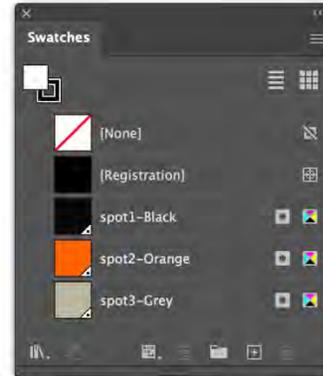
Original > AI enhanced



AI-generated clipart
And RGB pallet



Illustrator traced and
spot color trapped



11"x17" Illustrator typeset layout to PDF with all printer marks to 12"x18"
InDesign document. Printed and Trimmed



AI Enhanced Workflow: Project TAGA Student Recruitment

Original
RGB



AI Converted
Style
RGB



AI Enhanced
"Friendlier"
RGB



AI Enhanced
Brand Colors
RGB



➔ RGB to CMYK Converted, Photoshop. Add brand paw— Illustrator is used for text and layout. ➔



AI-generated image features a vibrant and dynamic sunset with rich gradients and intense contrasting colors. The dominant colors I can observe are as follows:



Generate a color palette with the hexadecimal codes.



#762914

#E4C276

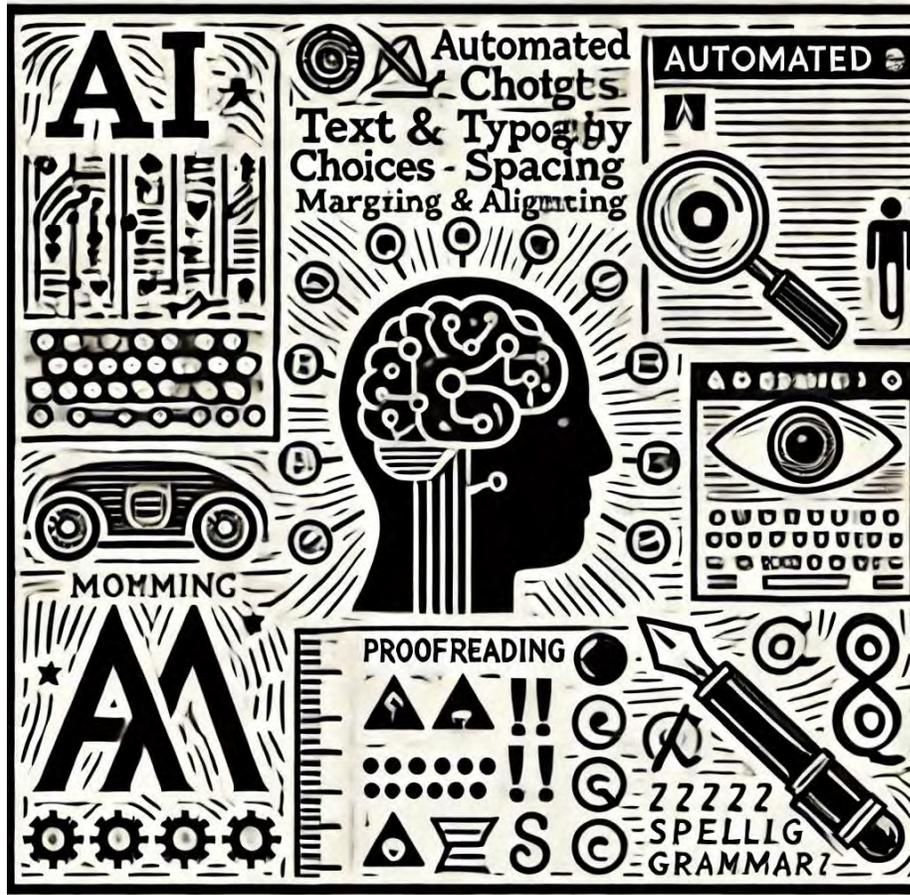
#0D0E0E

#293F43

#CB7125

#6F7E6D

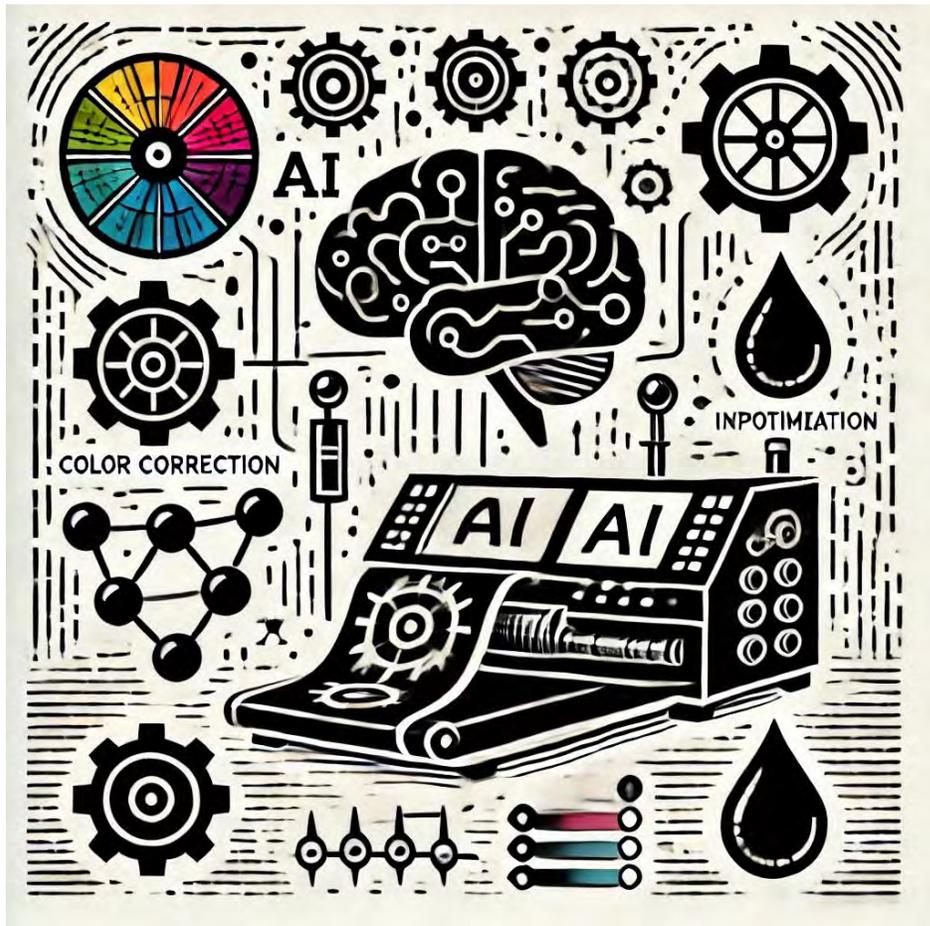
AI Integrated in Automated Book Layout and Text Processing



AI assists in book layout and typesetting by automating the arrangement of text and images based on predefined styles.

Solutions like **Enfocus**, **PitStop Pro**, and **Eye-C Proof Runner** use AI-driven automated inspection to detect discrepancies.

AI in Digital Printing and Press Optimization



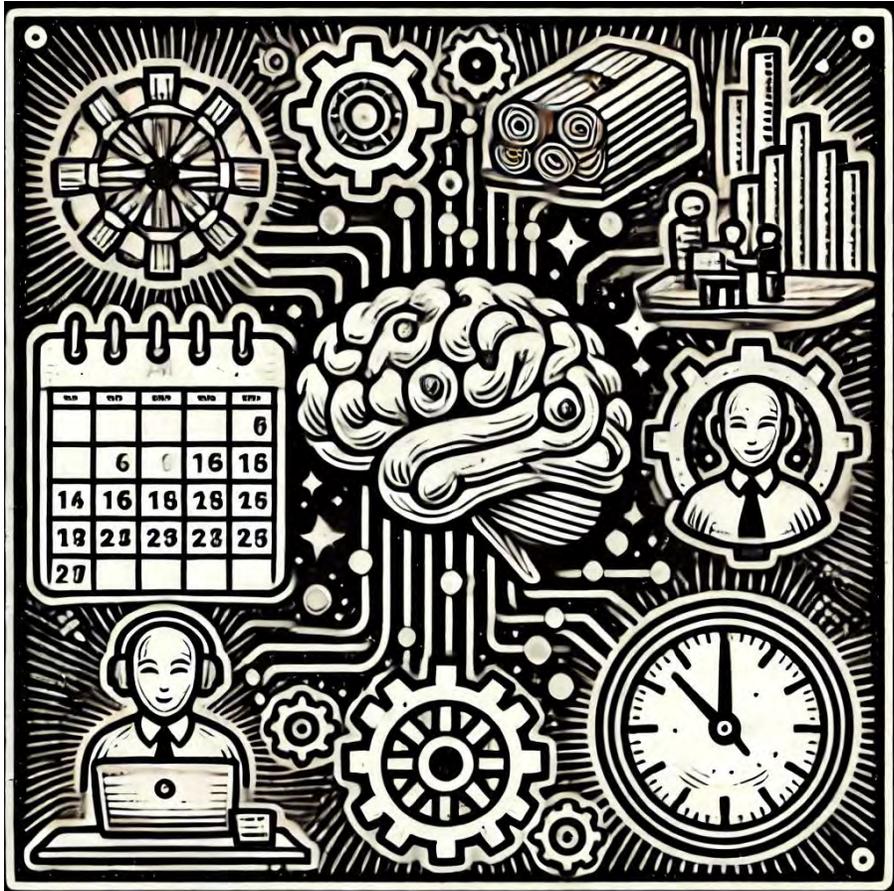
Global Graphics Software has patented an AI system that automates rasterization for digital presses.

Heidelberg AI Training Programs:

Heidelberg, a significant printing technology company, offers **AI-driven training courses** for press operators.

Xerox offers AI integration training for **PredictPrint Media Manager**, which uses AI to match print job settings automatically.

AI Integrated Production Planning and Control (PPC)



AI is being used to **automate print production workflows**, reducing the need for highly skilled press operators. AI-driven systems can:

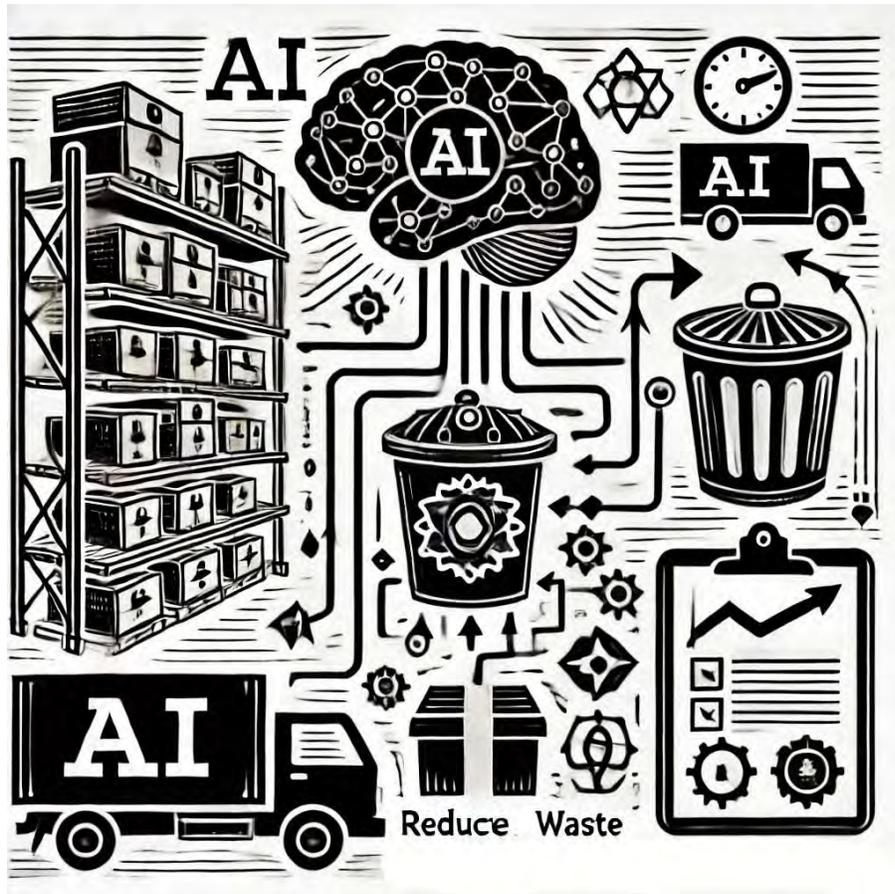
- **Control ink supply and paper alignment** in real-time.
- **Detect and correct printing defects** without human intervention.
- **Optimize job scheduling and production speed**, leading to reduced labor dependency.

AI Integrated into Quality Management



- Companies such as **HP** and **Ricoh** have implemented AI-driven inspection technologies that adjust print head performance, detect misprints, and correct errors automatically, which reduces reliance on human expertise.
- Convolutional Neural Networks (CNNs) are commonly used for defect detection and pattern recognition.
- ConvNets are designed to process visual data, such as images and videos.

AI Integrated Supply Chain Optimization



AI Training for Print Supply Chain and Logistics

EFI AI for Print Supply Chain Management

- Focuses on AI-driven inventory forecasting, order tracking, and waste reduction.
- Helps print businesses streamline supply chain operations with predictive analytics.

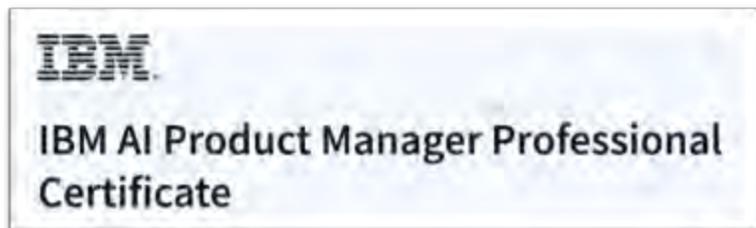
IBM AI for Logistics Training

- Covers machine learning applications in print logistics to reduce costs and improve production scheduling.

Five Free AI Certifications

1. IBM Introduction to Artificial Intelligence

- Hosted by Coursera Plus, 10-course series, 8 hours
- Enroll for free, but there is a subscription to Coursera

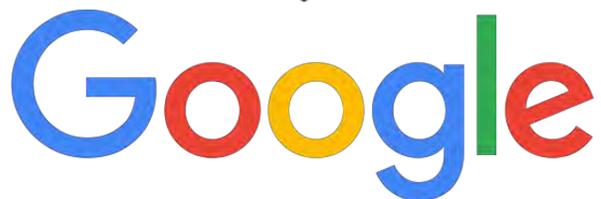
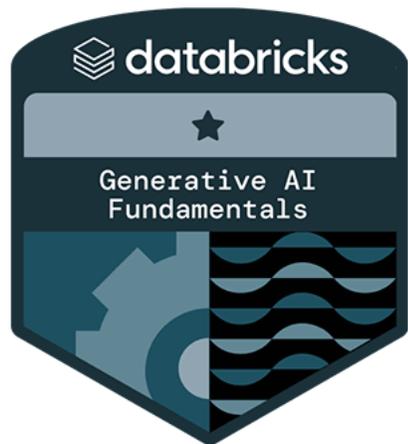


2. Career Essentials in Generative AI by Microsoft and LinkedIn

- 6 courses – 6 hours of content
- Receive course certificate that can be posted to LinkedIn



Five Free AI Certifications (continued)



3. Generative AI Fundamentals by Databricks™
 - Build foundational knowledge of generative AI, large language models
 - 4 short videos, receive a certificate for your resume
4. Introduction to Generative AI sponsored by Google Cloud
 - Computer Vision, Machine Learning, and Artificial Intelligence – Coursera subscription
5. Introduction to Image Generation sponsored by Google Cloud
 - Computer Vision, Machine Learning, and Artificial Intelligence – Coursera subscription

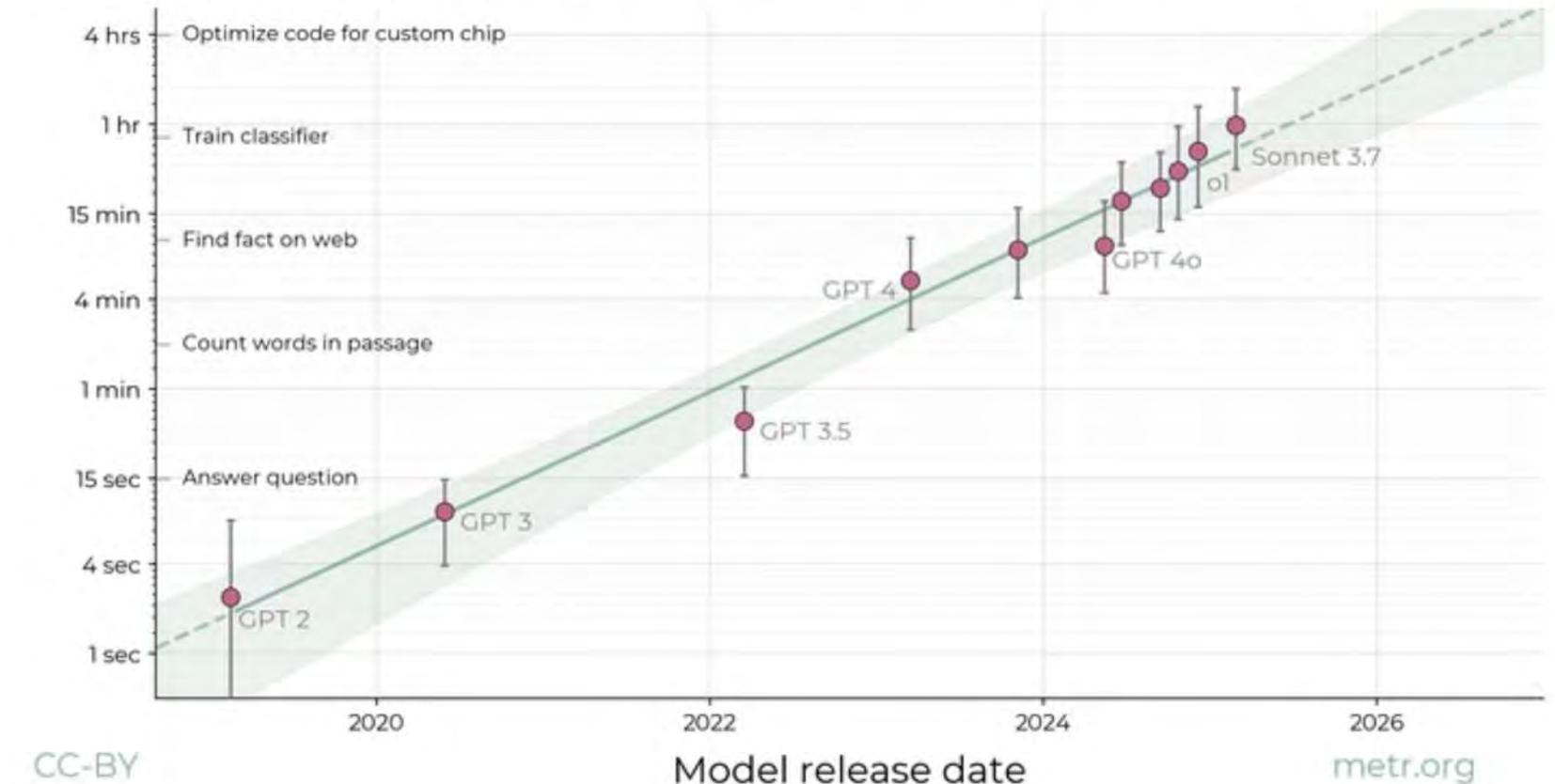
Conclusions: Measuring AI's Ability to Complete Long Tasks

The time that AI can do tasks doubles every seven months.

The best current models—such as Claude 3.7 Sonnet—can perform tasks that take even a human expert hours to complete but can only reliably complete functions up to a few minutes long.

If this trend continues, AI systems could potentially be capable of tackling projects that currently take humans weeks or even months by the end of the decade.

The length of tasks AIs can do is doubling every 7 months



Thank you.

Questions

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