



Tech and AI Planning Ahead for Leaders

Manjeet Rege, PhD
Tony Peleska

About Manjeet

- PhD in Machine Learning
- 20 years in Data Science and AI space with more than 80 research publications.
- At University of St. Thomas:
 - Professor & Department Chair, Graduate Programs in Software & Data Science
 - Director, Center for Applied Artificial Intelligence
- Recent book



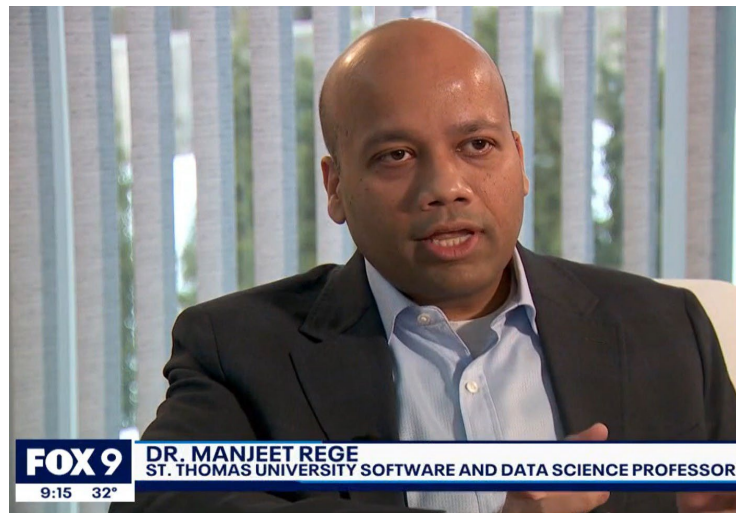
Handbook of Artificial Intelligence and Wearables

Applications and Case Studies

Edited by Hemachandran K, Manjeet Rege,
Zita Zoltay Paprika, K. V. Rajesh Kumar,
and Shahid Mohammad Ganie



Thought Leadership



SECTIONS | 🔍



All companies should have data, AI strategies

Collecting useful data sets can be done even if companies do not have a lot of money to spend.

By Manjeet Rege, Special to the Star Tribune | FEBRUARY 27, 2022 — 2:00PM

Q: How can small businesses make use of artificial intelligence?

A: I would argue that often, smaller companies may be better positioned to get started with AI.

Q: When I consult with many industry leaders of large corporations, I often hear them say, "We have decades of data sitting in our data warehouses." That statement is usually made with a strong assumption that the data is ready for feeding into an AI algorithm, which is usually not the case. These legacy data sets are mostly collected without ever having a data strategy, applying AI as an afterthought.

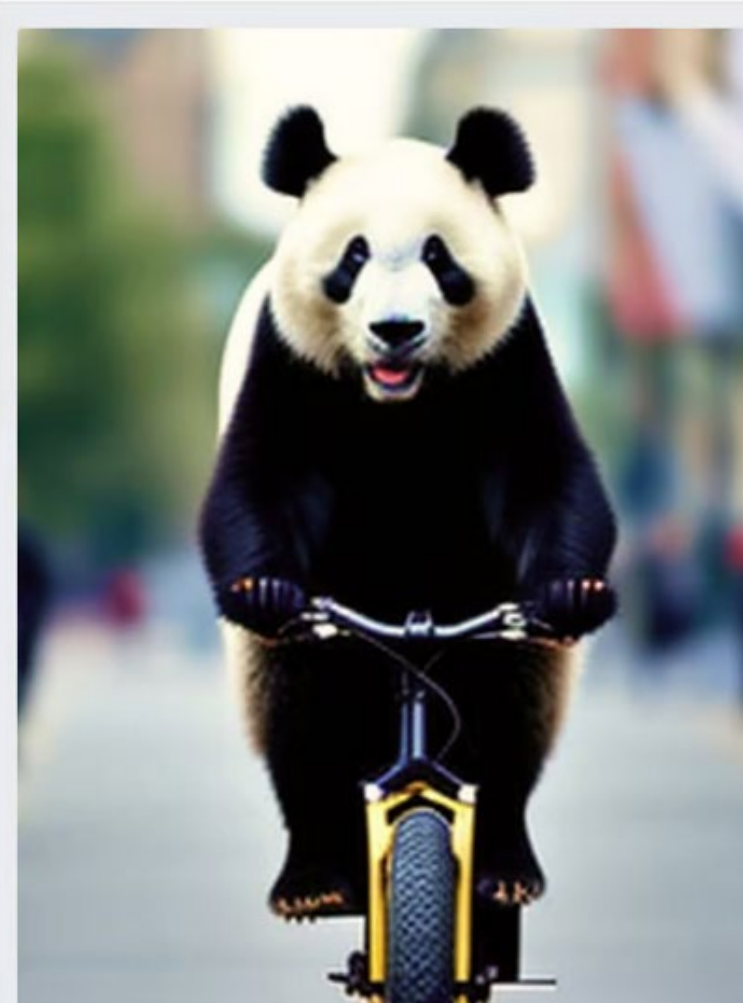
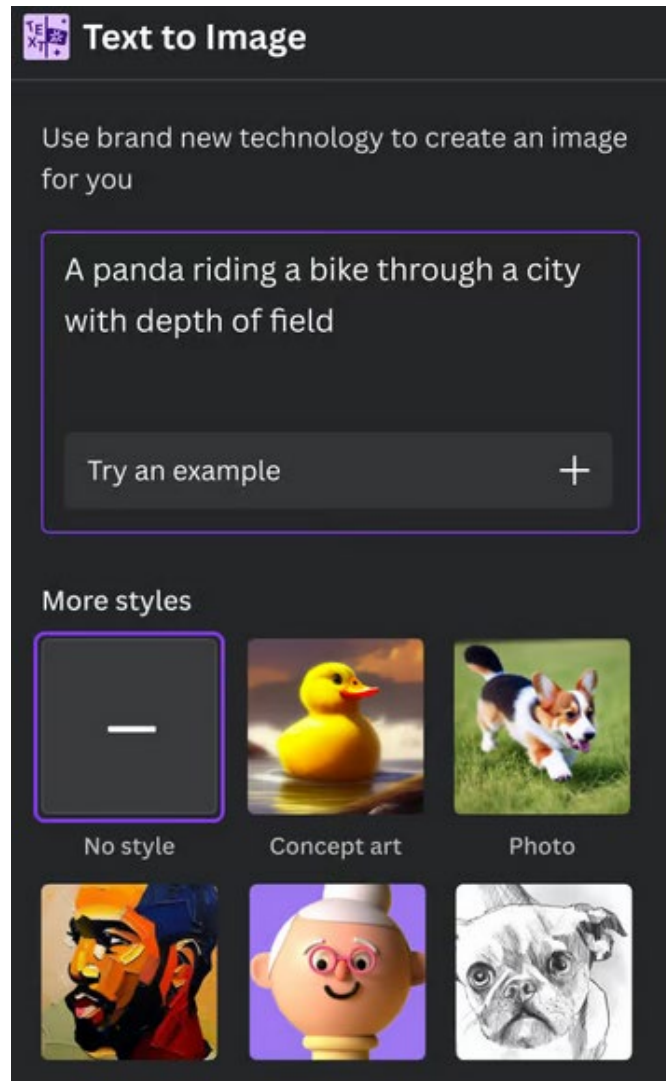
About Tony

- 20+ Years of HFA Leadership Experience – CIO at Minnesota Housing
- CIO and Head of Digital Transformation of KA
- Boards, Awards and Services
 - Fellow and Past Chair AIIM International
 - AutoDesk CXO Board and Construction Champion 2024
 - Past Chair New Vision Foundation
 - Evanta CIO Governing Body
 - Board Chair for InspireCIO
 - Steering Committee for the Chambe Commerce
- University of St. Thomas
 - Strategic Advisory Board for Graduate School of Software Engineering



The last two years have been about Generative AI

- Prompted by a short text, Gen AI models can produce images, code, text, audio, and video.



AI Generated Code

S

Write a program to create API endpoints to perform CRUD operations in todo list in Node.js



Sure! Here's an example of how you can create API endpoints to perform CRUD operations (Create, Read, Update, Delete) on a todo list using Node.js with Express framework and MongoDB as the database:

1. Install the required dependencies:
 - Express: `npm install express`
 - Mongoose: `npm install mongoose`
2. Create a `server.js` file and add the following code:

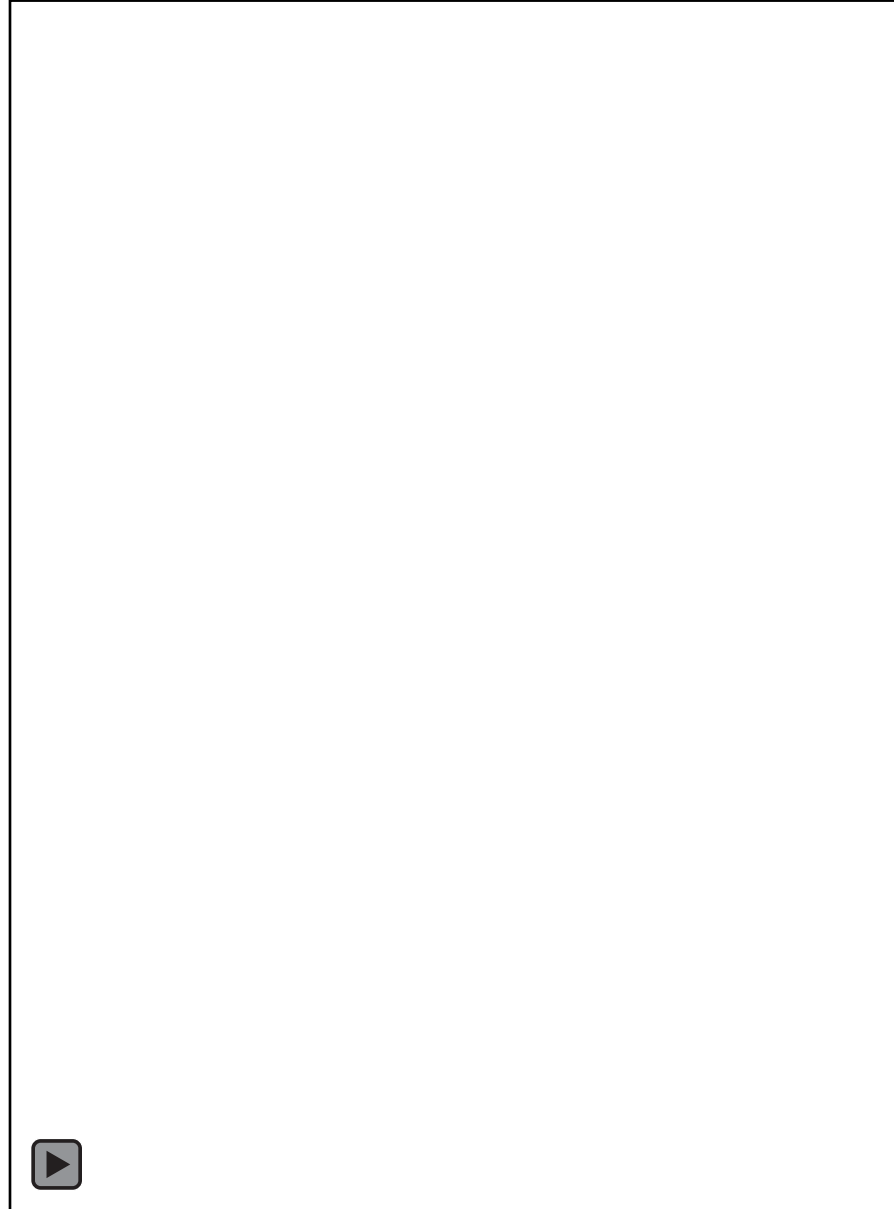
javascript

Copy code

```
const express = require('express');
const mongoose = require('mongoose');

// Connect to MongoDB
mongoose.connect('mongodb://localhost/todo_list', {
  useNewUrlParser: true,
  useUnifiedTopology: true,
})
.then(() => {
  console.log('Connected to MongoDB');
```

AI Generated Video



Miss AI Beauty Pageant

WAICA

In Partnership With
fanvue.

Miss AI 2024 Winners

The
AI C
Awa

Celebrating crea
part of the first e
\$20k.

Entry Now Closed



1st Place: Kenza Layli
Location: Morocco



2nd Place: Lalina
Location: France



3rd Place: Olivia C
Location: Portugal



Generative AI and Industry buzz

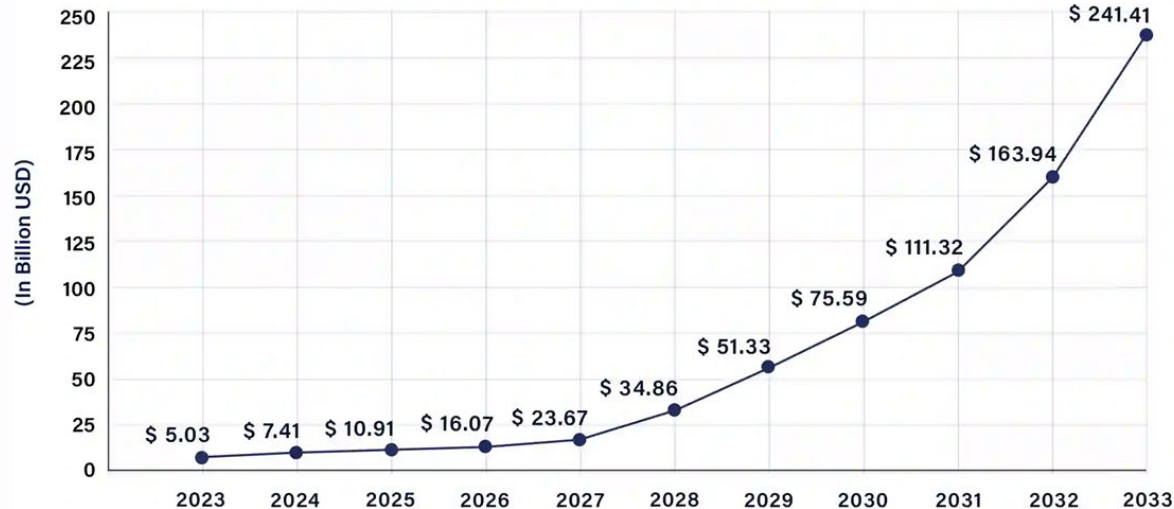
PRECEDENCE
RESEARCH

GENERATIVE AI MARKET SIZE 2023 TO 2033 (USD BILLION)



PRECEDENCE
RESEARCH

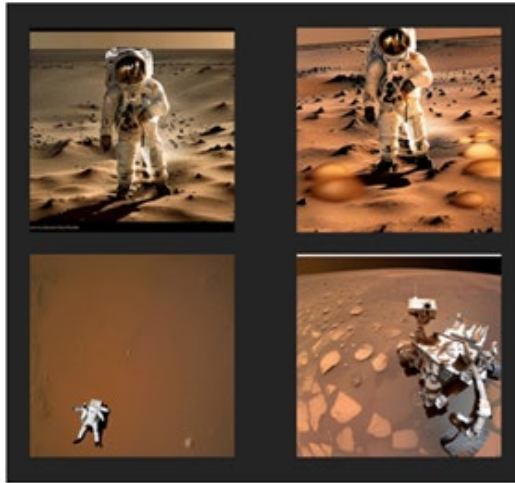
U.S. Generative AI Market Size 2023 to 2033



Source: <https://www.precedenceresearch.com/generative-ai-market>

- According to McKinsey, Gen AI could add \$2.6-\$4.4 trillion annually to the global economy.
- Goldman Sachs estimates it could raise global GDP by 7% in the next decade.
- A study by OpenAI and UPenn estimates that it could impact 10% of the tasks carried out daily by over 80% of workers in the United States.

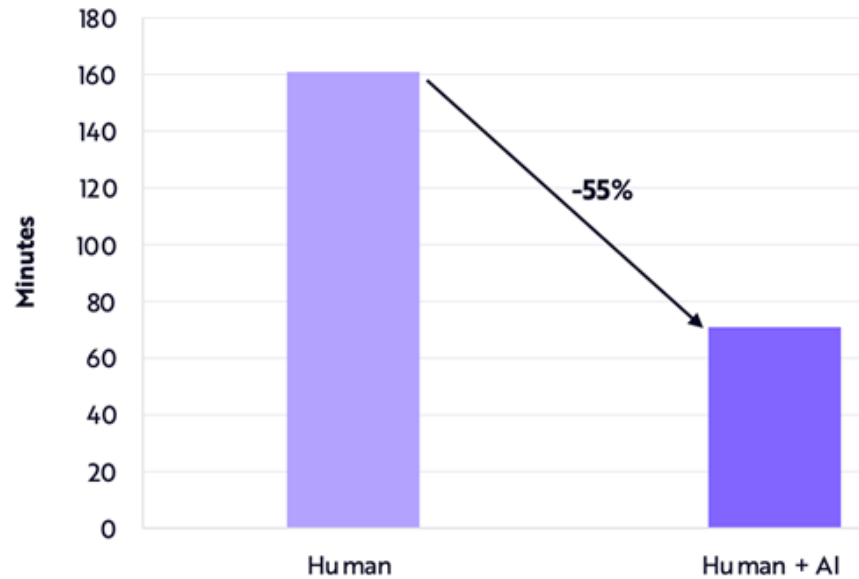
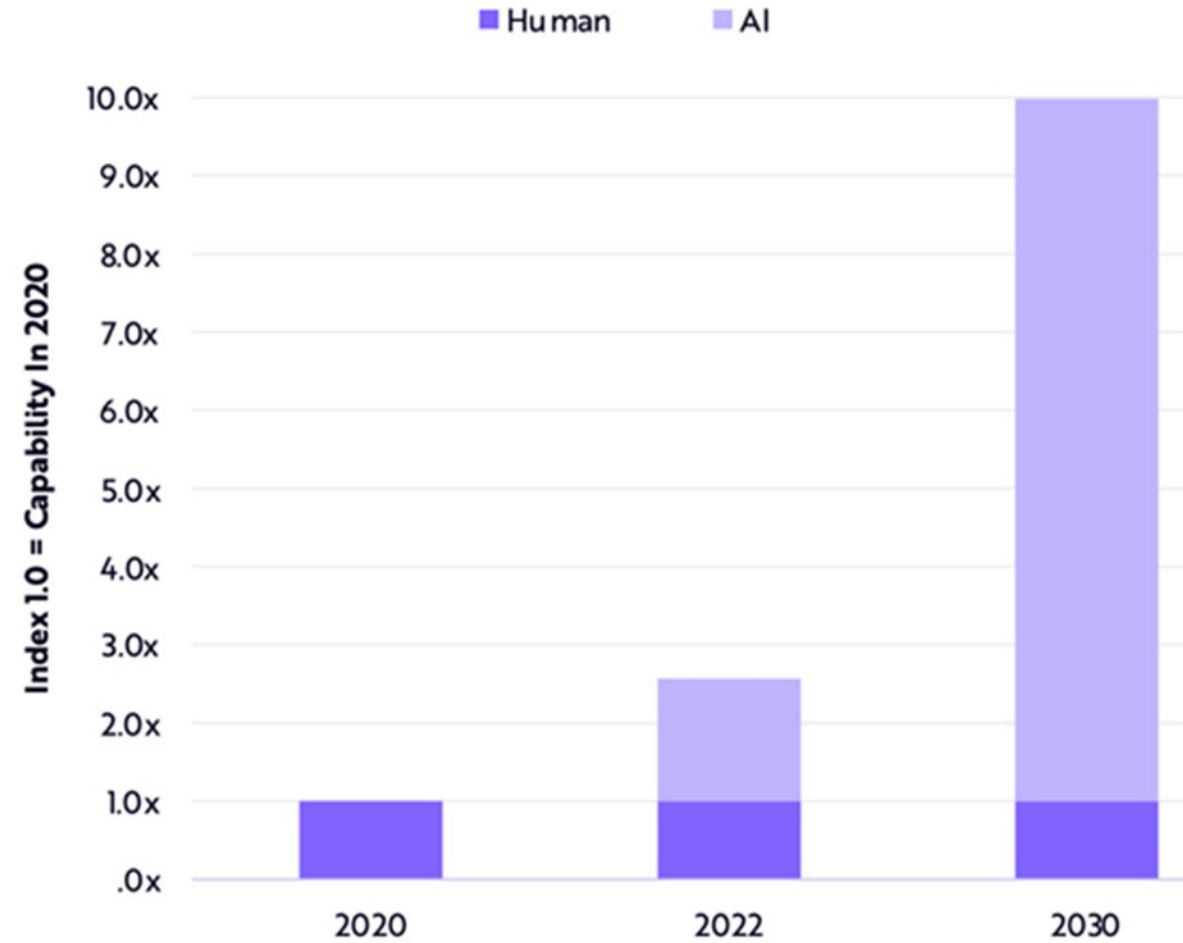
Reduced Cost + Reduced time = More Productivity



<u>Human</u>	
Cost	\$150
Time	5 Hours
<u>Generative AI</u>	
Cost	\$0.08
Time	< 1 Minute

Graphic Design cost and time

Output of Human + AI: Coding Tasks



Time to Complete Coding Tasks

Consultants using ChatGPT-4 outperform those not using ChatGPT-4 in every way

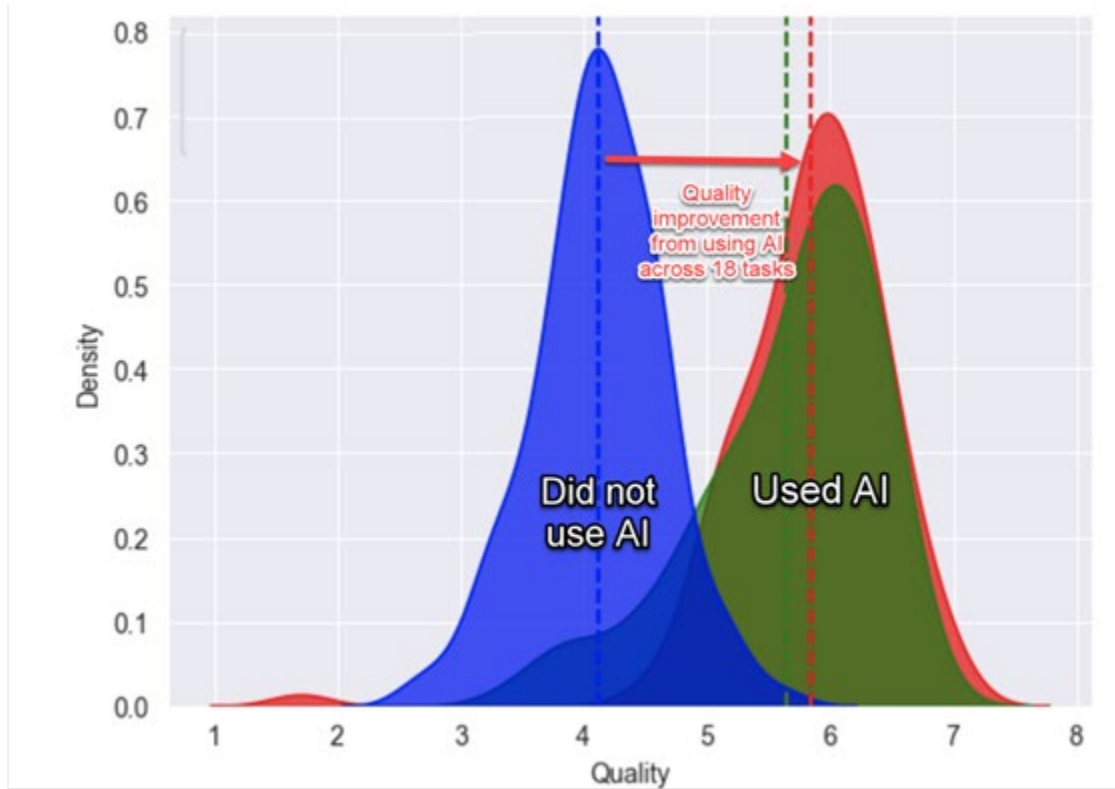
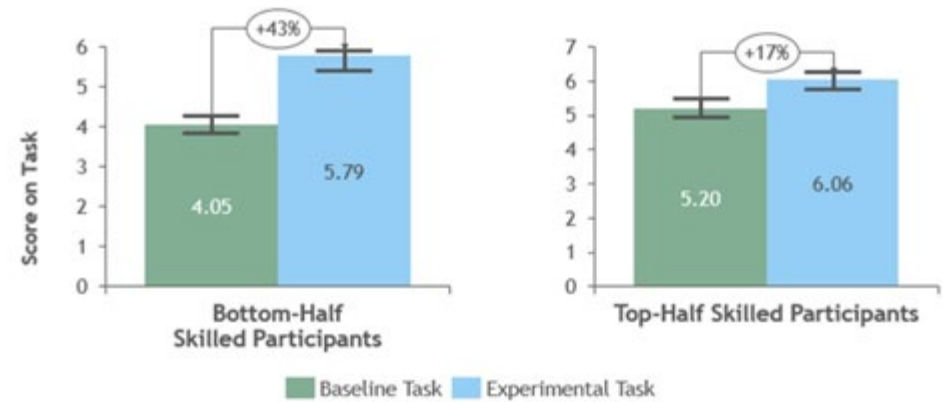


Figure 5: Bottom-Half Skills and Top-Half Skills - Inside the Frontier



Consultants with the lowest scores at the start of the study saw the biggest jump in performance when allowed to use AI

- Those using AI finished 12.2% more work tasks.
- They also completed tasks 25.1% faster.
- Those who used AI also produced 40% higher quality results than those who didn't.

Generative AI and Industry Reality



- What is it really and what does it mean to your organization
- Shiny New Object Syndrome
- Where do you start and what should you think about
- Measuring and Understand Risk
 - Guidelines
 - Policy
 - Organizational Risk Management
- Start somewhere – Your staff already are!

Identifying Use Cases for Generative AI

- Most jobs consists of a number of tasks.
- AI may not replace jobs. It also automates specific tasks of a job.

e.g. Customer Service:

Tasks	Generative AI potential
Respond to incoming telephone inquiries from clients.	Low
Respond to inquiries from customers via chat	High
Check on the status of customer orders	High
Maintain logs of customer communications.	High
Evaluate the Validity of Client Grievances	Low

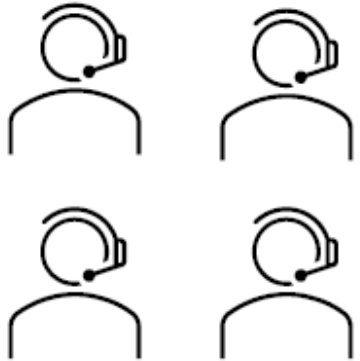
Identifying Use Cases for Generative AI

e.g. Software Engineer

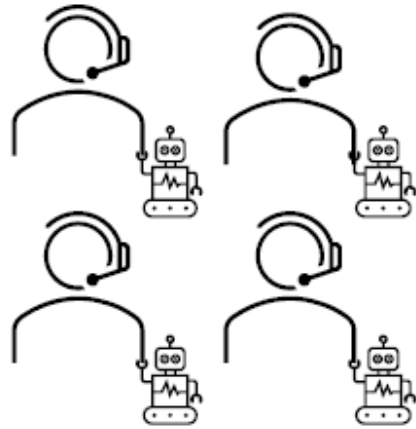
Tasks	Generative AI potential
Coding	Medium
Produce documentation	High
Address user support inquiries	Medium
Assess code rewritten by others	Low
Collect project requirements	Low

Start with a Chat Function? – Chatbots for Customer Service

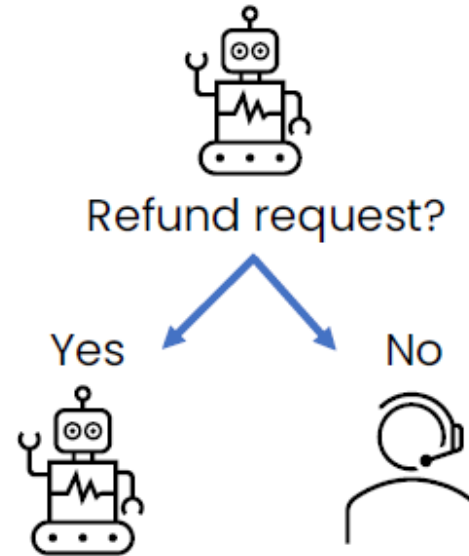
Humans only



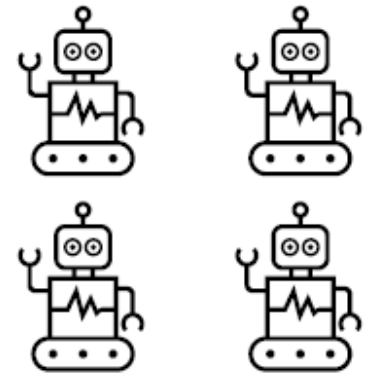
Bots support humans
(human-in-the-loop)



Bot triages for humans



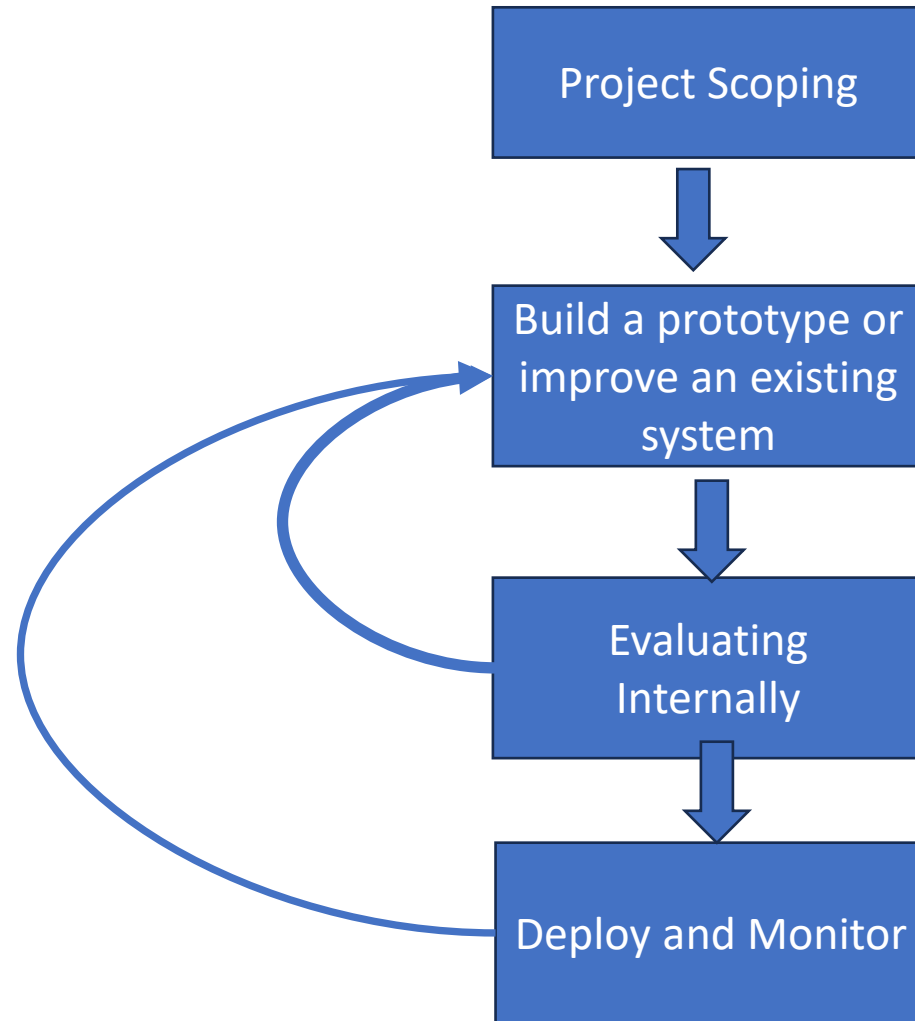
Chatbots only



Best practices for deploying chatbots

- Implement an in-house chatbot system:
 - Engage employees in evaluating the chatbot's interactions
 - Prevent errors in a customer-facing context
- Start with human-in-the-loop to monitor for errors.
- Permit the bot to interact with customers only once it is verified as secure.

Generative AI Project Lifecycle



Opportunity for Generative AI can be Augmentation or Automation

- Augmentation
 - Assist humans in completing a task
 - e.g. Propose a draft reply for a customer service representative to review and refine.
- Automation
 - Completely automating a task using AI
 - e.g. Transcribe audio interactions with customers. Perform sentiment analysis and provide a summary of interactions where the sentiment was negative.
- Start with Augmentation and slowly move towards more and more Automation.

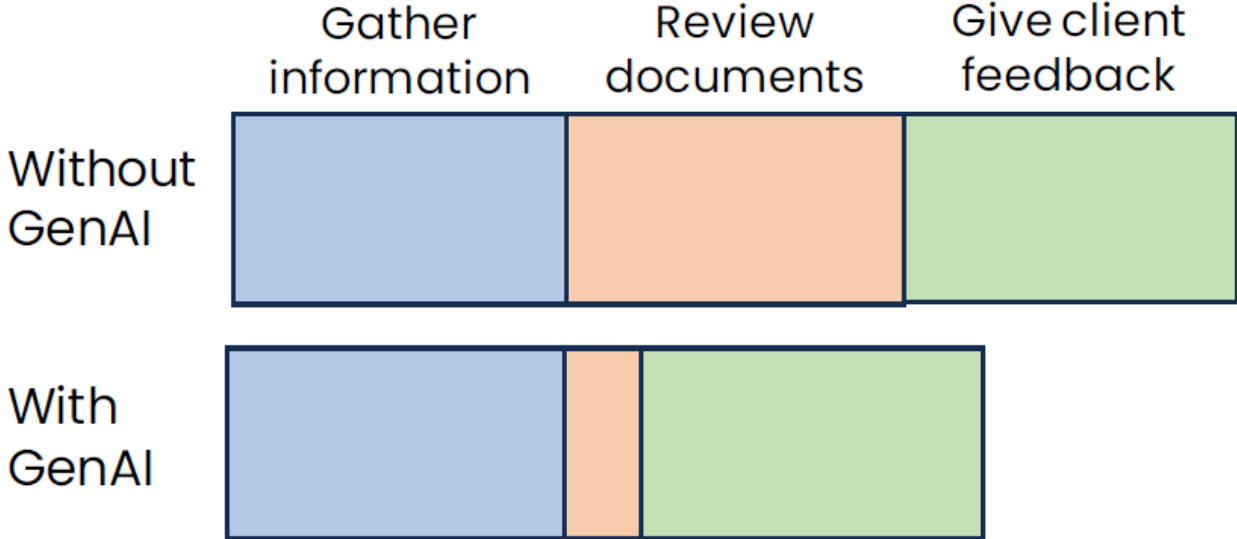
Determining AI potential

- The potential for augmenting/automating a task depends on two things:
 - Technical feasibility: Can we do it with AI?
 - Can a summer intern with enough instructions do the task?
 - AI engineer can also assess the feasibility.
 - Business value: What is the ROI on automating with Generative AI?
 - How much time do we spend on doing the task currently?
 - Would doing the task faster, cheaper help?

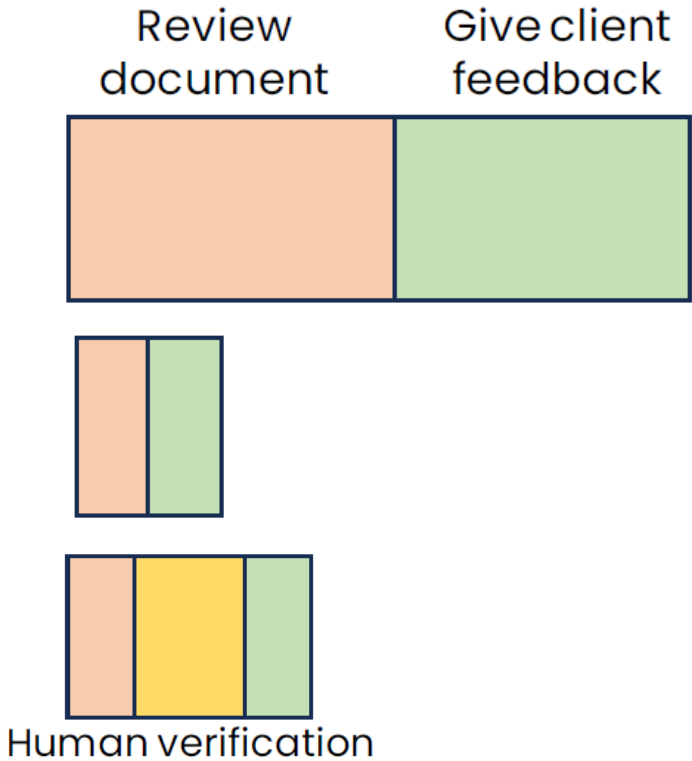
Improving Efficiency

- Example: Legal documentation review

Complex legal document



Simple legal document



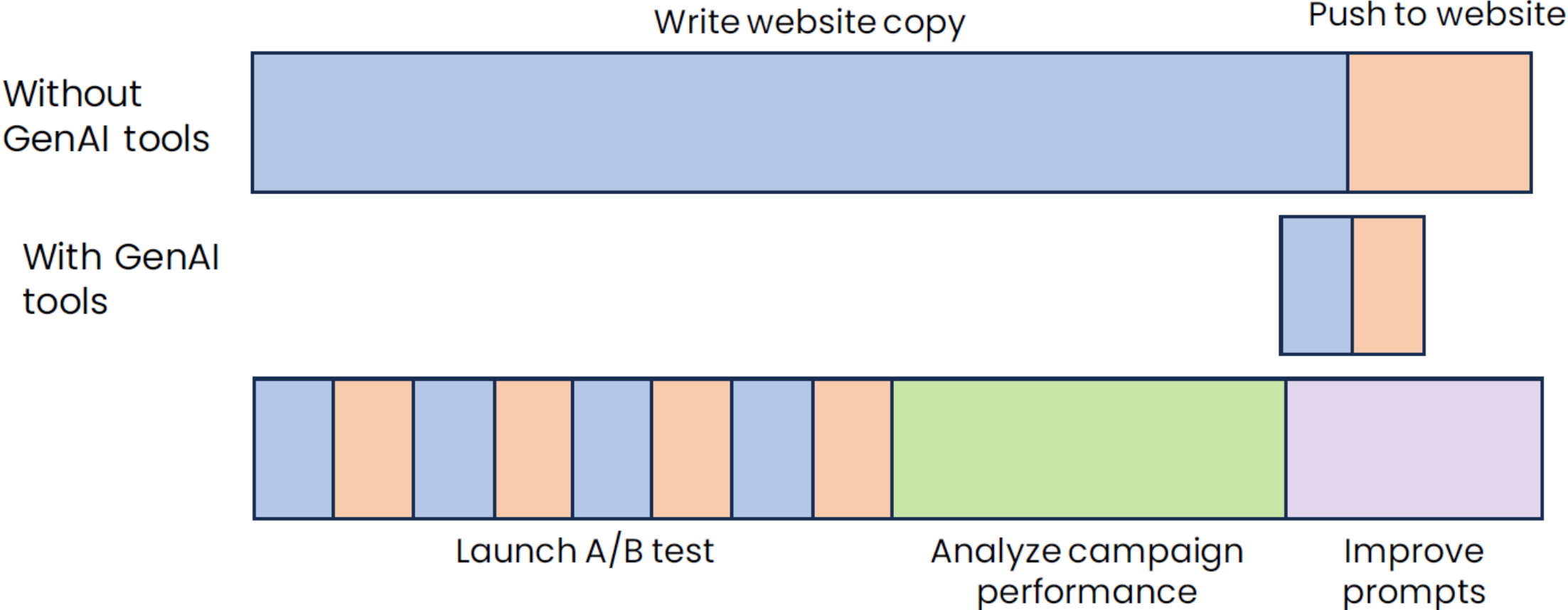
KA Use Case – Legal Doc Review

- Legal Review and Standardization of Contracts
- 100 - 500 Page Contracts
- Time Consuming and Inefficient
- RFP for Toolsets
- <https://www.documentcrunch.com/>



Improving Efficiency

- Example: Marketing automation



KA Use Case – RFP Response

- Responding to over 250 RFP Annually
- Creating Pamphlets for Books
- Time Consuming and Inefficient
- Standardization, Win Rate, Customer Insight, Repeatable
- <https://www.joist.ai>

The logo for JOIST-AI is displayed in white, bold, uppercase letters on a solid purple rectangular background. The text is centered horizontally and vertically within the rectangle.

JOIST-AI

KA Use Case – Design Build Tool

- Responding to Customers Visualization Needs
- Building a Building in Minutes on GeoCoded Site
- Eliminate Architect Time and Costs
- Standardization, Win Rate, Customer Insight, Repeatable
- <https://www.testfit.io>



Structuring AI teams

- Getting started with a small team:
 - Two-person team: **Software Engineer + Machine Learning Engineer**
 - Other configurations are possible too.
- Larger teams may have additional roles:
 - Data Engineer
 - Data Scientist
 - Machine Learning Researcher

Structuring Team at KA

- Defining Roles and Responsibilities
- Educating the Entire Team on A.I., Generative A.I., Machine Learning, and Natural Language Processing
- Educating the Organization on Same Information
 - Hosting 30 Minute Sessions
 - Going to Team Meetings
 - Board Presentations
 - Senior Leader Deep Dives
- Hiring a Director of A.I.
 - Team of People Supporting

What AI can or cannot do?

Can do



Cannot do



stop



hitchhiker



waving

Adversarial Attacks on AI



Hummingbird

Minor perturbation



Hammer



Hare

Minor perturbation



Desk

Deep Fakes



AI Bias

- Man : Woman as Father : ? Mother
- Man : Woman as King : ? Queen
- Man : Computer Programmer as Woman: ? Homemaker

AI Bias

- Hiring tool that discriminated against women.
- Facial Recognition working better for light-skinned than dark-skinned individuals.
- Bank loan or Credit approvals.

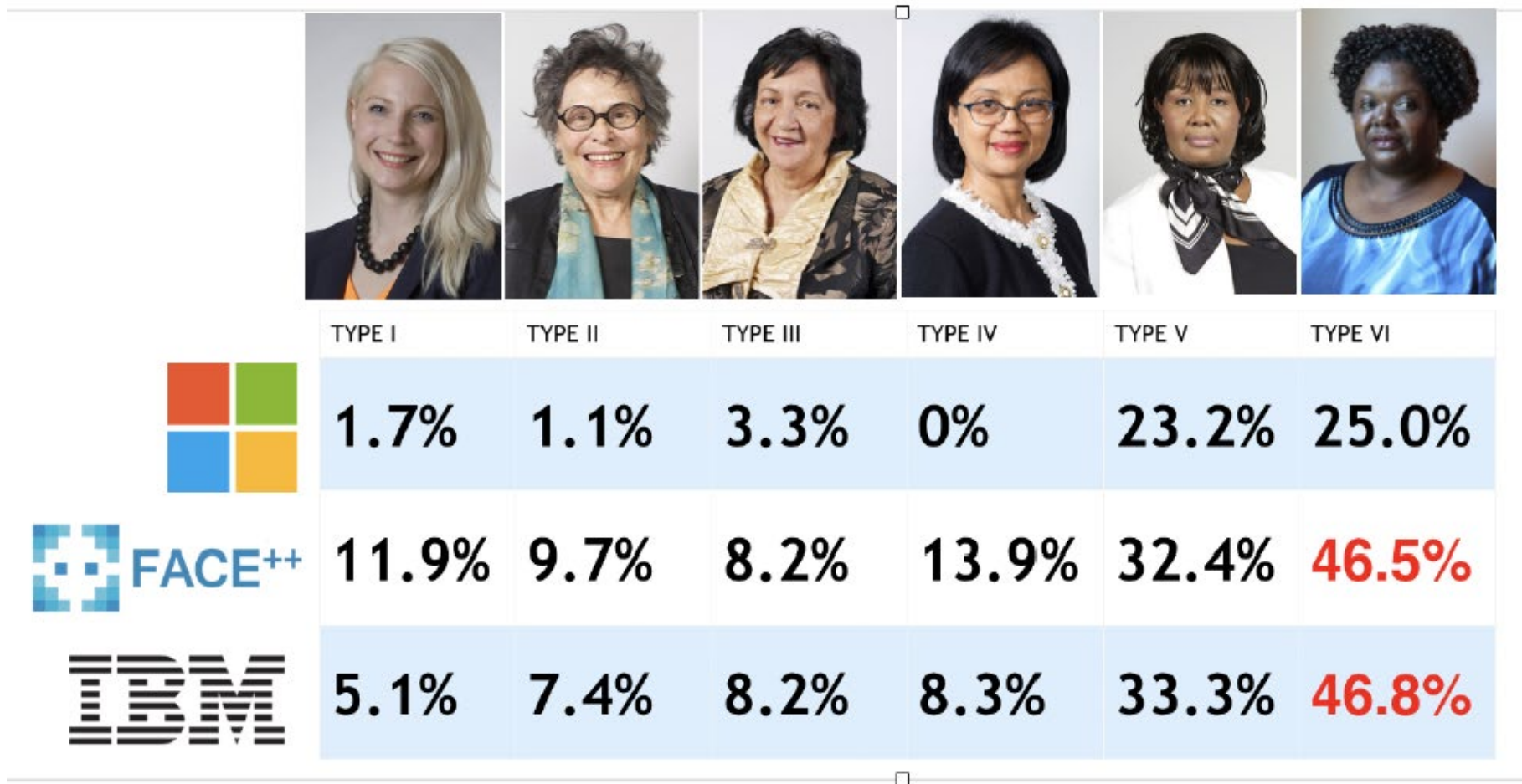


Apple Card is accused of gender bias. Here's how that can happen

By Evelina Nedlund, [CNN Business](#)

Error Rates in Computer Vision Systems

- By Female by Skin Type



Buolamwini & Gebru FAT* 2018, Slides from Joy Buolamwini

amazon

Microsoft

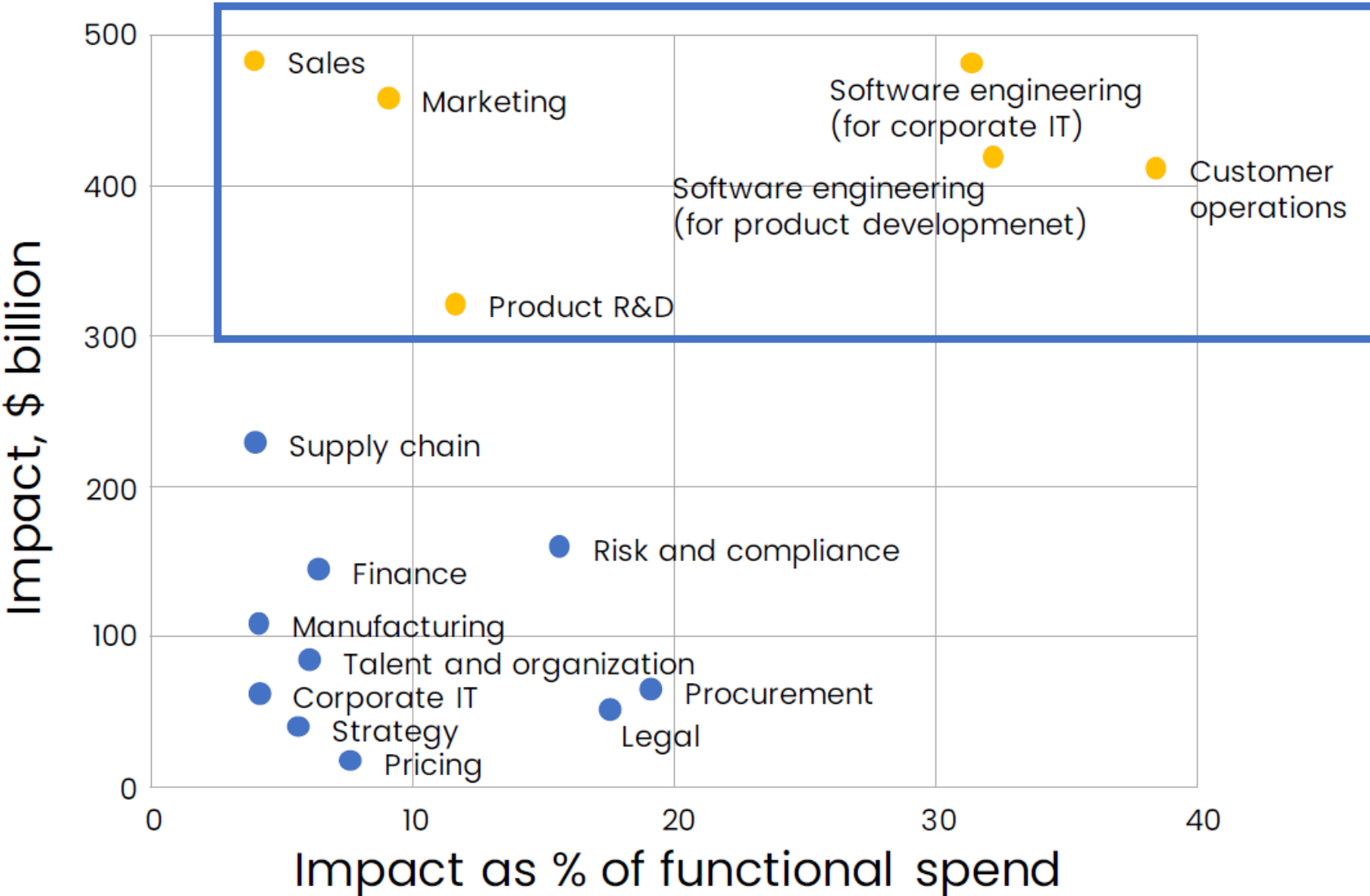
IBM

Face++ 旷视

Google



Analysis by functional role



These business areas together represent 75% of total annual impact of generative AI

Occupations and Task Exposure to Automation via Generative AI

Office and Administrative Support	46%
Legal	44%
Architecture and Engineering	37%
Life, Physical, and Social Science	36%
Business and Financial Operations	35%
Community and Social Service	33%
Management	32%
Sales and Related	31%
Computer and Mathematical	29%
Farming, Fishing, and Forestry	28%
Protective Service	28%
Healthcare Practitioners and Technical	28%
Educational Instruction and Library	27%
Healthcare Support	26%
Arts, Design, Entertainment, Sports, and Media	26%

Gender Breakdown of 15 Occupations Most Exposed to Automation from Generative AI

Occupation	Total	Women	Men
Management occupations	20.20M	40.5%	59.5%
Office and administrative support occupations	16.10M	71.9%	28.1%
Sales and related occupations	14.32M	49.4%	50.6%
Healthcare practitioners and technical occupations	9.81M	75.7%	24.3%
Education, training, and library occupations	9.22M	73.3%	26.7%
Business and financial operations occupations	9.15M	54.5%	45.5%
Computer and mathematical occupations	6.17M	26.7%	73.3%
Healthcare support occupations	4.93M	84.6%	15.4%
Architecture and engineering occupations	3.46M	16.1%	83.9%
Arts, design, entertainment, sports, and media occupations	3.44M	48.8%	51.2%
Protective service occupations	3.06M	23.2%	76.8%
Community and social services	2.95M	67.2%	32.8%
Legal occupations	1.86M	52.6%	47.4%
Life, physical, and social science occupations	1.84M	48.2%	51.8%
Farming, fishing, and forestry occupations	.98M	26.2%	73.8%
Total	107.49M	58.87M	48.62M
Total of all jobs	158.29M	74.08M	84.21M
Total of jobs impacted / total jobs	68%	79%	58%

"Will Generative AI Disproportionately Affect the Jobs of Women?"

<https://kenaninstitute.unc.edu/kenan-insight/will-generative-ai-disproportionately-affect-the-jobs-of-women/>

Amazon study finds AI skills could boost worker salaries by up to 35%

- The wide-ranging study from AWS surveyed 3,297 employees and 1,340 organizations across the US.
- Over 90% of surveyed employers predicted that they will use AI-related solutions in their organizations by 2028.
- In addition to IT (92%), 85% of employers believe that sales and marketing will be the biggest beneficiaries of AI.
- 42% of employers are actively looking for people with AI qualifications but 75% of employers are having trouble finding qualified candidates



Artificial General Intelligence & Existential Risk

- We are still far away from achieving AGI.
- The extent of AI's potential to pose an extinction risk is greatly exaggerated.
 - Fear about AI becoming powerful than a single person and being unable to control it?
 - Many things that we may not be able to fully control are very valuable. E.g. airplanes
- Realistic challenges we face: Climate change, Next pandemic, etc.
 - AI could be part of the solution.

Artificial Intelligence Policy and Governance

- It is happening now, if not with you...it is happening to you.
- There is a need for your agency or organization to act, just like information security, you will have to react and you could lose time and money
- Your peers and competition are already jumping in, if they aren't they really are not your competition
- Don't be fearful, be inquisitive and a student
 - Learn everything you can...get educated
- Start small
 - Poll your organization see what is the best place to start
- Know how you are going to tackle the risks
 - HR, Legal, IT, Information Security
 - Guidelines
 - Policy