AI and Business Transformation

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ABSTRACT

It seems that without warning, Artificial Intelligence (AI) suddenly burst onto the scene in the last few years. There is not a single day that passes without any news about chatbots, deepfake, or AI generated plagiarism. In 2023, during a U.S. Senate Judiciary Committee hearing about regulating AI, Senator Richard Blumenthal of Connecticut described the reaction of his constituents to recent advances in AI. “The word that has been used repeatedly is scary.” On the other hand, the advancement of AI is helping to improve our daily lives. It is also quickly accelerating business transformation. From optimizing processes to crafting personalized customer interactions, AI is fundamentally altering how businesses can function, compete, and, giving them an edge over their competitors. This article is focused on AI for small businesses, and hopefully help the reader to decide whether to adopt AI. It will introduce the reader to the basic concepts and terminologies of AI. Some of the common AI tools used in business transformation will also be discussed.

Introduction

AI, the final frontier …

During the last few years, news and discussions of Artificial Intelligence (AI) have been popping up everywhere over the airwaves and the internet. There is a sudden explosion in the number of books written on AI such as Machine Learning, Deep Learning and Deep Fake.

AI and robots have been around us many years in pop culture such as Star Wars and Star Trek. Superintelligent droids and computers are depicted in Science Fictions to help solve problems, navigate starships and even as human companions. Then there is Skynet in the Terminator movies. Oh yes, the evil Skynet, an artificial "General" superintelligence neural network who gain self-awareness and destroy human civilization [2].

So, is AI our enemy or friend? Will AI take away our jobs or will AI open up new opportunities and transform the way we do business? Whichever way one looks at it, AI has introduced a paradigm shift in how technology is perceived and integrated into our daily lives [20]. Stepping into the 21st century, especially during the Covid pandemic, the convergence of the physical and digital worlds is fundamentally altering our lifestyles and how we conduct business. Data science and AI are leading this transformation, disrupting industries, creating new business models, and redefining customer expectations. AI is slowly ingraining itself into every facet of our lives, unbeknownst to us, from healthcare to financial services, manufacturing to education [1]. Bill Gates, founder of Microsoft, declared that the age of AI has begun and we are witnessing the fourth industrial revolution [5].

One question a lot of people in the business community will undoubtedly ask is: "Is it worth my time and resources to invest in AI? If we look back at the collapsing of the Dot.com (or infamously called the Dot bomb) bubble back in the 90s, we might wonder if this is one of those tech hype that will just disappear in a few years.

History of AI

Actually, the concept of AI has been around civilizations for a long time, Greek myths of Hephaestus, the blacksmith who manufactured automated servants, and the idea of the "Golem" in Jewish folklore, bring to life the old-fashioned fascination with creating artificial life

Fast forward to the 20th century, Alan Turing, a British mathematician and computer scientist, published a paper called "Computing Machinery and Intelligence" about the concept of machine learning, suggesting that machines could be designed to replicate human learning patterns. He also introduced the "Turing Test" for determining whether a computer can be said to possess artificial intelligence if it can mimic human responses under specific conditions.

The inception of AI as a formal academic discipline in 1956 marked the beginning of what is often termed the "golden age" of AI (1956-1974). This period saw an influx of government and private funding, resulting in significant strides in AI research. In 1956, John McCarthy of Dartmouth College coined the term Artificial Intelligence during the DSPRAI (*Dartmouth Summer Research Project on Artificial Intelligence) conference.* [1].

AI Bust and Boom

From 1957 to 1974, AI flourished. AI programs such as Newell and Simon's "*General Problem Solver and Logic Theorist" [4],* and Joseph Weizenbaum's *ELIZA* showed promise toward the goals of problem solving and the interpretation of spoken language respectively. This period saw an influx of government and private funding, resulting in significant strides in AI research. Other AI programs, like Samuel's checkers' program, and John McCarthy's Lisp language, held the promise of machines that could mimic human intelligence.

During the 1970s, the progress slowed as the AI research community realized the complexity of problems in language understanding, learning, and commonsense reasoning. These issues, coupled with the failure to meet the overly ambitious expectations set by the AI community, led to "disillusionment" and the onset of the first "*AI winter*", when almost nobody talked about it. Breaching the initial fog of AI revealed a mountain of obstacles. The biggest was the lack of computational power to do anything substantial: computers simply couldn't store enough information or process it fast enough.

Following this was a period of resurgence in the 1980s, often called the "*second summer*" of AI. This era was marked by the advent of "*expert systems*." These expert systems, pioneered by Edward Feigenbaum , mimicked the decision making process of a human expert. The program would ask an expert in a field how to respond in a given situation, and once this was learned for virtually every situation, non-experts could receive advice from that program. Expert systems were widely used in industries. The Japanese government heavily funded expert systems and other AI related endeavors as part of their *Fifth Generation Computer Project* (FGCP). From 1982-1990, they invested $400 million dollars with the goals of revolutionizing computer processing, implementing logic programming, and improving artificial intelligence. Unfortunately, most of the ambitious goals were not met. However, it could be argued that the indirect effects of the FGCP inspired a talented young generation of engineers and scientists. Regardless, funding of the FGCP ceased, and AI plunged into its "*second winter*".

In 1997, reigning world chess champion and grand master Gary Kasparov was defeated by IBM's *Deep Blue*, a chess playing computer program. This highly publicized match was the first time a reigning world

chess champion loss to a computer and served as a huge step towards an artificially intelligent decision-making program. In the same year, speech recognition software, developed by Dragon Systems, was implemented on *Windows*.

These events reignited interest in AI and public perceptions, which in turn spurred further research into developing algorithms that could learn and adapt rather than relying solely on brute-force computations.

However, these events still don't explain why AI development is suddenly accelerating. It turns out, the advent of computer storage and processing speed, together with the Internet, which enables the availability of digital data, have suddenly solved the problem that was holding AI back for 30 years.

The concluding years of the 20th century and the initial years of the 21st laid the cornerstone for contemporary AI, leading to further developments in machine learning, deep learning, and AI applications. Instead of brute force hardcoded programming like rule-based expert systems, machine learning algorithms could identify patterns and make predictions based on data. Search Engines, such as Google initiated by Larry Page and Sergey Brin, greatly transformed web search experience.

Big Data Era

We now live in the age of "*big data*", an age in which we have the capacity to collect huge sums of information too cumbersome for a person to process. The application of artificial intelligence in this regard has already been quite fruitful in several industries such as technology, banking, marketing, and entertainment.

Here are a few examples:

- Vectra, a threat detection company, uses Cognito, an AI-powered cyber-threat detection platform to assists financial institutions to automates threat detection, reveals hidden attackers specifically targeting banks, accelerates investigations after incidents and even identifies compromised information.
- Companies like Amazon and Netflix use AI to analyze user behavior and preferences, providing personalized recommendations that enhance user engagement and satisfaction.
- Online advertising. Platforms like Google AdWords and Facebook Ads use AI algorithms to target advertisements based on user data, enhancing the effectiveness of online advertising campaigns.

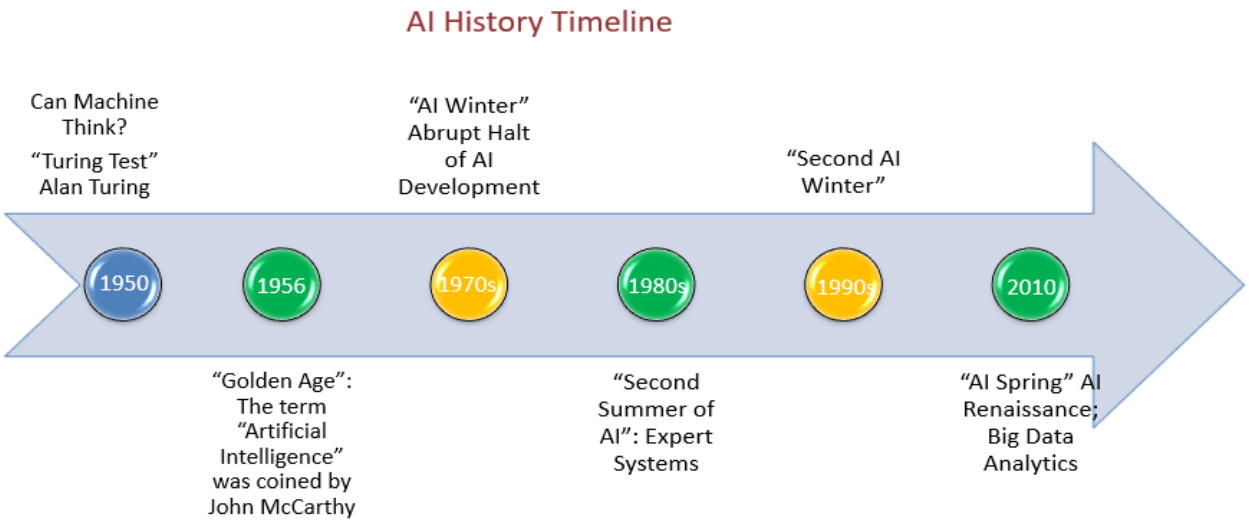

Figure 1 Timeline of AI's Bust & Boom

What comprised of Artificial Intelligence

To truly understand AI's present and future implications, it is essential to grasp its underlying mechanics and structures. In the simplest term, Artificial Intelligence is the capability of a machine or computer device to emulate human intelligence (cognitive process), acquire from experiences, adapt to the latest information and operate humans-like-activities. The goal of AI-assisted business transformation is to apply artificial intelligence technologies to draw inferences, add values, enhance productivity and accuracy. Businesses will distinguish themselves by how well they use it.

AI encompasses a broad set of disciples and methodologies such as Robotics, Expert Systems, Fuzzy Logic, Natural Language Processing (NLP), Computer Vision. But the most important advancements that drive the latest rapid surge **are Machine Learning, Deep Learning, Neural Networks and Generative AI**.

The history of these technologies parallel that of the history of computing. Great minds like Blaise Pascal (1652), Gottfried Wilhelm Leibniz (1679), Charles Babbage (1834) and Ada Lovelace (1842) laid the foundation of modern-day computers. In 1847, George Boole created the Boolean algebra of True/ False (or 0 and 1) that enables computers to function and make decisions. [8]

Machine Learning

What is Machine Learning?

The term "Machine Learning" is first used by Arthur Samuel (IBM) in 1959. The goal of ML was to create machines capable of learning from data so they can draw on that to perform other tasks (i.e. intelligence). Unfortunately, the lack of computer power and the ability of acquiring large data sets between 1960s and 1990s hindered its practicality. Mikey Shulman at MIT Sloan compared traditional way of programming computers, or "software 1.0" to baking, where a recipe calls for precise amounts of ingredients and tells the baker to mix for an exact amount of time. Traditional programming similarly requires creating detailed instructions for the computer to follow. But in some cases, writing a program for the machine to follow is time-consuming or impossible, such as training a computer to recognize pictures of different people. While humans can do this task easily, it's difficult to tell a computer how to do it. Machine learning takes the approach of letting computers learn to program themselves through experience [7].

Machine Learning is a computer program (algorithm) based on probabilistic statistics, or more specifically, *Computational Learning Theory*. Its goal is to have these algorithms learn for itself:

1. Researchers input a set of data such as numbers, photos or text and tagging them with labels.
2. A software (training model) is selected to process these training data and labels and attempt to extrapolate rules from the data and labels.
3. These rules are then fine-tuned to make predictions on data it has never seen before.
4. Some data is held out from the training data to be used as evaluation data to test how accurate the ML learning model is.

Since the amount of data is always finite, Machine Learning is always probabilistic. Instead of guaranteeing a result, upper and lower bounds are placed on the probability of an algorithm's success.

How do computer programs managed to learn?

There are three common methods used in Machine Learning:

1. ***Supervised Learning*:** Supervised Learning is mainly used to predict outcomes and recognizing patters (classification). In supervised learning, models are trained using labelled dataset.
   - Labelled training data are collected into three categories: training dataset, test dataset and validation dataset [9].
   - The training dataset is tagged with the correct answers. Through analyzing the attributes of each type of data, it acts as a "*supervisor*" that teaches the machine algorithms to predict the output correctly.
   - An algorithm (such as Classification or Linear Regression) is selected to executed on the training dataset, sometimes with the help of validation dataset. the supervisor will create a mapping function to map the input variable (x) with the output variable (y). For information on various algorithms, please consult https://www.ibm.com/topics/supervised-learning [8]
   - Once the training process is completed, the model is tested on the basis of test data to predict the output.

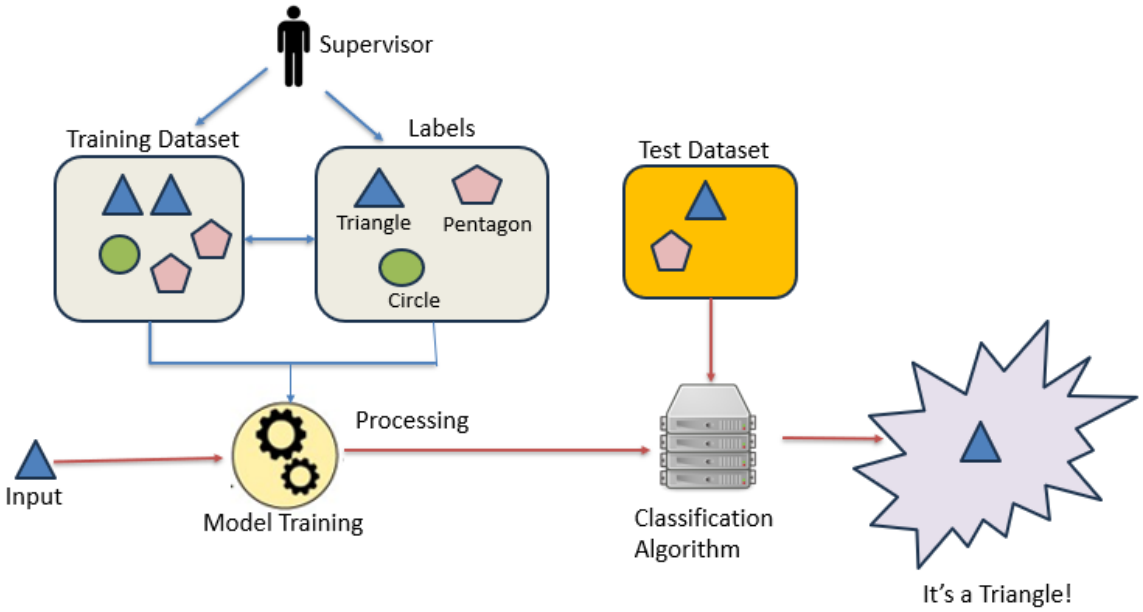

Figure 2 Supervised Machine Learning

2. ***Unsupervised Learning***: Unlike supervised learning, unsupervised learning uses unlabeled data. From that data, it discovers patterns that help solve for clustering or association problems. This is particularly useful when subject matter experts are unsure of common properties within a data set.
3. ***Semi-supervised learning*** occurs when only part of the given input data has been labeled. Unsupervised and semi supervised learning can be more appealing alternatives as it can be time-consuming and costly to rely on domain expertise to label data appropriately for supervised learning [9].

Summary of Machine Learning

Table 1 Summary of Machine Learning

	Model Type	Popular Algorithms	Application Examples
Supervised Learning	Strictly speaking, **Neural Networks** is a type of Supervised Learning. It can also be classified under Deep Learning (see below). Neural networks comprise layers of decision-making nodes: Each node is an *artificial neuron* (based on the concept of a human neuron) that makes computation decision to determine whether to pass data to one or more nodes	Neural Networks	Facial Recognition; Stock Market Prediction; social media analysis; signature verification and handwriting analysis
	Regression (no labels defined): algorithm learns to predict a continuous output value by describing the relationship between one or more independent variables and a dependent variable (a continuous outcome)	Bayesian Linear Regression, Linear Regression:	Sales or stock prices; financial analysis, outcomes prediction
	Classification (defined labels): the algorithm learns to predict a categorical output variable or class label by using input data to predict the likelihood of subsequent data falling into one of the predetermined categories (a discrete outcome such as yes and no)	Logistic Regression, Support vector machines (SVM):	Spam identification; Binary outcomes (credit card approval)
	Non-parametric ensemble Classification and/or **Regression model**	K-nearest neighbor	Recommendation engines, image recognition
		Random forest	Fraud detection; drug sensitivity prediction
		Decision Trees	Customer behavior, marketing decisions
Unsupervised Learning	**Clustering:** grouping unlabeled data into clusters based on their similarities. The goal of clustering is to identify patterns and relationships in the data	K-Means clustering: distance-based algorithm that tries to group the closest points to form a cluster	Customer Segmentation; identifying crime localities; insurance fraud detection

	Model Type	Popular Algorithms	Application Examples
	without any prior knowledge of the data's meaning.	Gaussian mixture models: for determining the probability each data point belongs to a given cluster	Financial investments; natural language analysis, image recognition
		Hierarchical clustering: for grouping similar objects or data points together based on their similarity.	Customer segmentation; city planning; bioinformatics
	Association Rule Learning: Used to discover associations by using a rule-based technique to find useful relations between parameters of a large data set.	Apriori: It is used to identify frequent itemsets in a dataset & generate an association-based rule based on the itemsets.	Buying Habit: E.g. discover that when a customer buys bread, they often end up buying butter & eggs as well.
		Eclat (Equivalence Class Transformation)– another mining technique like Aprori where you want to find associations between items such as frequently bought together. Usually faster than Apriori	Market analysis and shopping habits analysis
		Decision Tree: construct decision trees, where each branch represents a decision based on features, ultimately leading to a prediction or classification.	solve classification problems and categorize objects. They can also be used for regression problems or as a method to predict continuous outcomes from unforeseen data. E.g. financial decisions.

What is Deep Learning

In the movie Indiana Jones and the Dial of Destiney, for almost 25 minutes, the 80 years old Harrison Ford was de-aged into a 40 years old Indiana Jones. Among other tools such as CGI. This “Face swap” technology use deep learning algorithms to create 3D models by analyzing facial expressions in previous Harrison Ford’s movies.

Deep learning, a subset of machine learning, is modeled on the human brain's structure, or more specifically, the human neuron, by using artificial multilayered neural networks - hence, the descriptor "deep” [22]. Deep learning models are used in deciphering complex data sets and creating patterns with the help of sophisticated algorithms. Examples of applications leveraging Deep Learning includes Speech Recognition, Image Recognition, Game playing, Self-driving Cars, Social Media, and Music Streaming Services user behavior. In the last few years, deep Learning models have neared or even exceeded human-level performance. The growth of Deep Learning has enabled organizations to offer smart and predictive solutions to customers. It enables a smooth and synchronous connection between data science and AI.

There is a variety of frameworks developed around Deep Learning to make it more accessible and feasible; it includes TensorFlow, Keras, PyTorch, Theano, DL4J, Caffe, and many more. These frameworks have increased the application of Deep Learning and allowed for easy integration of Machine Learning and AI functionality [11].

It is beyond the scope of this paper to discuss how Deep Learning works. But since it is often regarded as the most powerful technique of machine learning, let’s look at one of the most important technologies that powers several deep learning algorithms: Artificial Neural Network. The most common algorithms used in Neural Networks are:

- ***CNN (Convolutional Neural Networks):*** for solving problems involving spatial data, such as images.
- ***RNN (Recurrent Neural Networks):*** for analyzing temporal and sequential data, such as sentences or videos.

To help you gain some insights into this very important area of AI, we will look at CNN in the section below.

Convolutional Neural Networks

Have you ever wondered how facial recognition works on social media, or how object detection helps in building *self-driving cars*, or how disease detection is done using visual imagery in healthcare? It's all possible thanks to convolutional neural networks (CNN), which basically means an orderly procedure where two sources of information are intertwined. In mathematical terms, it represents the combination of two functions to produce a third function, where the result represents the "overlap" between two functions by "sliding" one function over the other [23].

A deep dive of the algorithm is beyond the scope of the present discussion. But the most basic concept of a neural network in Deep Learning is a Perceptron, modelled after the human neuron, and introduced by Frank Rosenblatt in 1957 [25]. We are going to discuss the one type of neural network mentioned above, the Convolutional Neural Network that illustrates how it identifies an image as a bird [12]:

1. The original image is transformed into a *Feature Map* using a feature detector. Each of these items - the input image, the feature detector (or filter), and the feature map are metrices or arrays. This process is repeated multiple times on different parts of the image. The result is a *convolutional map* which reduces the size of the image and focuses on specific features.
2. The convolved map is applied to a *ReLU (Rectify Linear Unit)* function to generate a *rectified feature map.*
3. The above steps are repeated multiple times, resulting in multiple convolutions and ReLU layers for locating the features. ReLU is sometimes referred to as the *Activation Layer*. ReLU performs an element-wise operation and sets all the negative pixels to 0. The reason why the rectifier function is typically used as the activation function in a convolutional neural network is to increase the *nonlinearity* of the data set. You can think of this as the desire for an image to be as close to gray-and-white as possible. By removing negative values from the neurons' input signals, the rectifier function is effectively removing black pixels from the image and replacing them with gray pixels.
4. Different pooling layers with various filters are used to identify specific parts of the image such as corners, body, feathers, beak etc. – the purpose of this "max" pooling is to teach the convolutional neural network to detect features in an image such as recognizing a face whether it is smiling or growing. The resulting "*Pooled Feature Matrix*" is reduced in dimensionality.
5. The above steps, namely, the convolutional layers, the ReLU layers and max pooling are part of the *Hidden Layers*.
6. The next step is called *flattening*; the pooled feature maps are flattened by converting all the resultant 2-D arrays from pooled feature maps into a single long continuous linear vector.
7. The flattened vector is now fed as input to the fully connected layer to classify the image.

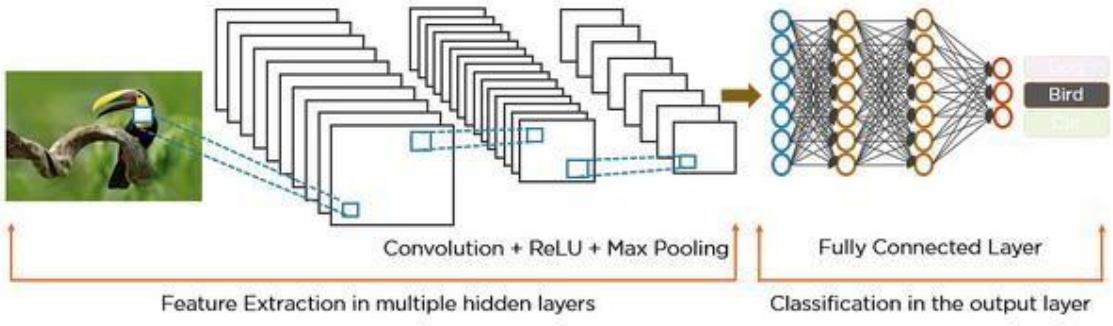

Figure 3 CNN Workflow [Picture Credit: Avijeet Biswal, Simplilearn [11]]

The following is a summary of how a (Convolutional) Neural Network works: [21]

1. Neurons: Each neural network is composed of neurons. These neurons are represented by a collection of linear functions, and a non-linear function known as the activation function (see ReLU above) is applied to them.
2. Input layer: Each neuron in the input layer corresponds to one of the input features. For instance, in an image classification task where the input is a 28 x 28-pixel image, the input layer would have 784 neurons (one for each pixel).
3. Hidden Layer: The layers between the input and the output layer. Each neuron in this layer is summed by the result of the neurons in the previous layers and multiplied by the ***ReLU non-linear function***. It is called the Hidden layer because like human vision, it covertly processes objects; we don't consciously notice the mental processing that is involved in analyzing an object. The more layers are added, the better the capacity to analyze complex patterns (Deep Learning).
4. **Output Layer:** The number of neurons in the output layer corresponds to the number of output classes. For example, in a classification task with digits from 0 to 9, the output layer would have 10 neurons.

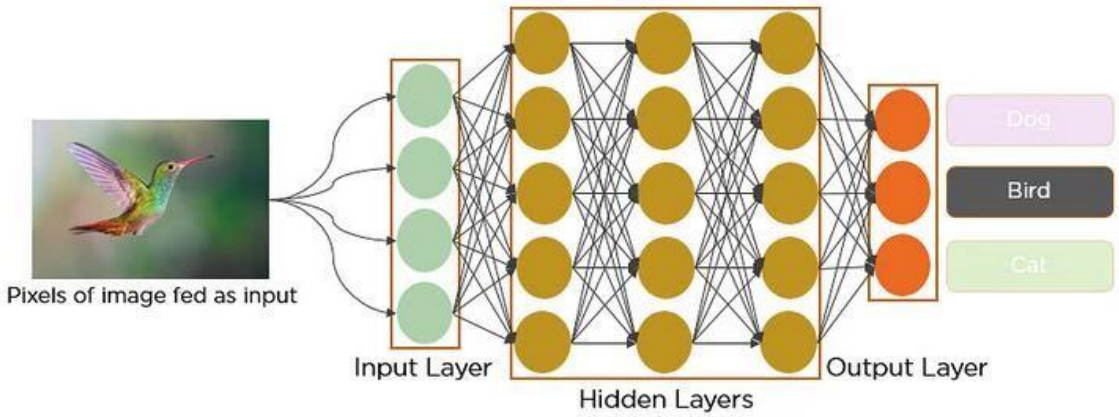

Figure 4 How CNN identify an image [Picture Credit: Avijeet Biswal, Simplilearn [11]]

Workplace Transformation

The rapid evolution of AI presents businesses with both opportunities and challenges [1]. In order to leverage the AI's ability to enhance productivity and efficiency, Businesses need to understand the different facets of AI integration.

Gaining competitive edge with AI

There are three major areas that AI Transformation can help businesses stand out against competitors:

1. ***Task Automation***: One way AI can enhance productivity is through task automation. AI-powered solutions can automate repetitive and mundane tasks, freeing up valuable time for employees to focus on more complex, creative, and strategic work. AI can also automate data entry and processing tasks, enabling employees to devote time to data analysis and decision-making [1].
2. ***Marketing and Customer Services***: Customer service sees its evolution expedited with AI. AI-powered chatbots and virtual assistants such as Engageware and Glia for banking are at the frontline of customer service, answering routine inquiries round-the-clock. This liberates human agents to address complex issues. Simultaneously, machine learning algorithms can be used to examine data on customer interaction, pinpointing areas that need improvement.
3. ***Decision-Making***: By analyzing vast amounts of data, AI algorithms can identify patterns, trends, and insights. This data-driven decision support enables workers to make informed decisions more quickly and accurately, such as in financial forecasting, supply chain optimization, or customer segmentation.

AI transformation is not only about efficiency. It is also about transforming the business from fragmented operations into a highly integrated, customer-centric model. With the help of Machine Learning algorithms, businesses can leverage customer and sales data to gain insights into customer preferences and marketing trends. The result is a more robust and flexible operation, being able to dynamically adapt to ever-changing customer needs and desires, tailoring marketing messages and sparking engagement.

Effect of AI on Small Business

We talked about how AI can help businesses increase efficiency, streamlined operations and increase customer satisfaction. But what about small businesses or independent contractors, which don't usually have the resources to ramp up all these complex AI operations like large corporations? Without a large work force and resources, it is natural to be uncertain if the efforts being put in is worth it, or whether they can achieve the same results as large corporations. On the other hand, small business owners face daily challenges of wearing multiple hats: the visionary, the accountant, the marketer, the customer representative, the field worker. It is more than ever that leverage new technologies to improve their posture and gaining an edge is vital to survival.

Due to cloud computing, user-friendly platforms and increasing computing power of personal computers, the landscape has dramatically changed in the last few years. The playing field is now leveled in favor of small entrepreneurs. A recent IBM report states that 35% of businesses, not just large corporations, use AI significantly. Cloud-based solutions like chatbots, data analysis tools, and marketing automation platforms are readily available, offering pay-as-you-go flexibility [13]. According to the U.S. Chamber of Commerce, one in four small businesses have adopted AI. It is therefore important to point out that size doesn't matter. The differences between big and small AI users are the scope and size of the operation and the amount of data accumulated; Small businesses process less data than large corporations.

AI systems can not only enhance efficiency, save time, and improve decision-making across business operations, but they can also optimize resources, personalize customer experiences, and provide valuable insights on market trends [16]. So how can Small Businesses leverage AI to their advantage? The following are some guidelines to follow [14]:

- Using AI as a co-pilot to experiment alongside humans
- Seek effective strategies that suit your business by asking these questions:
    - What aspects of your business can be automated through AI?
    - How AI can augment your unique skills and expand your capabilities?
    - What elements of your business should remain under your personal control and have a human touch?

AI Strategies for Small Businesses:

Here are 4 areas where Small Businesses should focus on in leveraging AI:

Table 2 Small Business AI Strategies

Strategies	Example Work Products; Tasks	Benefits
Automation [15]	• Tasks automation and workflow streaming: perform repetitive tasks usually done by human • Defects tracking • Customer service – AI CRM (customer relationship management); chatbots Q&A • Marketing – email campaigns, managing social media post • Sales – appointment scheduling; prospects follow-ups; email engagements	• reduce waste and lower production cost • Reduce labor cost while increasing operational efficiency • Streamline inventory management • Increase customer reach outs on the right platforms at the right time.
Prediction:	• Analyze vast datasets, surveys, reports to anticipate sales and demands • Create customer profiles and predict and track customer behavior; • predictive maintenance	• Improve customer satisfaction • Keep up with changing market • Cut down on excess inventory
Precision improvement	• accurate identification of defects • targeting customer sectors; • enhance user experiences	• human error reduction • 24x7 availability • Unbiased decisions without human emotional influence
Talent Management	• Especially important for small businesses as every hire is critical to company's success • Scanning resumes; comparing applicants skills pertaining to the job description	• Improve hiring process • Talent retention by analyzing employee surveys and suggesting initiatives to boost employee morale

AI Tools for Small Businesses

The following is a sample of some of the popular AI tools available in the market today:

- ***ChatGPT:*** GPT stands for "Generative Pre-Trained Transformer". Imagine a super-charged Google search..., ChatGPT is an AI-powered chatbot that understands natural language input from users and can engage in meaningful two-way conversations. It's also able to provide detailed and informative responses based on those queries while maintaining context throughout the conversation. There are two versions of ChatGPT, the free version and the Plus version. They are available both from a Web Browser, iPhone, Android and as a desktop application called LiveChatAI, an AI chatbot that you can train to provide personalized support 24/7 that knows everything there is to know about your business.
- ***Mailmodo****: Mailmodo* is an email marketing solution enabling users to create and send app-like interactive emails to improve email conversions. It generates AI email templates which can save time and money.
- ***DALL-E:*** it allows users to easily create high-quality images without requiring advanced technical skills or expensive software. It can be used in a variety of ways, such as generating product images for e-commerce websites or creating illustrations for news articles and social media posts. The latest version is DALL-E3 which requires a subscription of ChatGPT Plus. However, it is also available for free in the *Bing Image Generator.* Just log in or create a Microsoft account and start creating pictures.
- ***Jasper AI***: An intelligent copywriter/ writing assistant that enables users to effortlessly generate high-quality written content without needing advanced writing skills or expensive tools. It has dynamic templates that, given some information provided by the user, will produce persuasive and well written documents. It can be employed in numerous ways, such as crafting blog posts, writing marketing copy, or creating social media content. It also has a chat feature called Jasper Chat that you can instantly ask it to generate emails or an essay. JasperChat is based on ChatGPT but is designed for business.
- ***Zia AI:*** Zia is an AI-powered sales assistant within the Zoho CRM product (Customer Relationship Management). It aids the sales teams by answering questions such as summarizing leads data, lead scoring, and sales forecasting etc. Zia can be integrated with a business's websites, social media pages and emails to answer customer's queries and provide support. Also, small business owners can schedule appointments, manage calendars and generate reports on business performance, sales trends and customer behavior. Another popular CRM product called Kava has also just announced Kava AI.
- ***Upmetrics3:*** Upmetrics is a cloud-based and AI-powered business planning solution for startups and small business owners. It simplifies the business planning process for new-age entrepreneurs. The Upmetrics subscription comes with access to the library of 400+ sample business plans and other features, making it easier to start and prepare the first draft of your plan. Since it's cloud-based, several people can collaborate on the plans remotely.
- ***Storydoc:*** Storydoc is an AI proposal software designed to help users create, manage, and automate professional proposals and PowerPoint presentations. The static slides can be turned into interactive web content. It can be used for pitch decks, sales decks, landing pages, reports, proposals, case studies, and more.

All these tools are either free or available with a free trial.

Generative AI

One topic we have not discussed much so far is "Generative AI". Generative AI (GenAI)starts out in chatbots. Now it branches into AI that deals with creativity and imagination. At its core, generative AI employs complex algorithms and models to produce new data that closely mimics the patterns and characteristics of the input it has been fed. Adobe's Generative Fill, for example, is an innovative tool in Photoshop that uses AI to create and modify images based on simple text prompts. [1].

It is a massive leap forward from the conventional Machine Learning. Is there a difference between GenAI and Machine Learning? The answer is Yes. the machine learning models we have discussed so far were considered *Predictive (AI)*. In other words, the model used to be able to make predictions, such as whether a soccer team may beat the other team in the final match of the tournament. GenAI, on the other hand, is based on *recurrent neural networks* that was mentioned above, similar to the human brain, capable of detecting trends and patterns in large data sets. Based on the analysis, the models produce new content that matches the user's query [21].

Simply stated, it is one step forward from Deep Learning. GenAI is the apex or cornerstone of Deep Learning, and is the utopia of Artificial Intelligence – the Thinking Machine. [16]

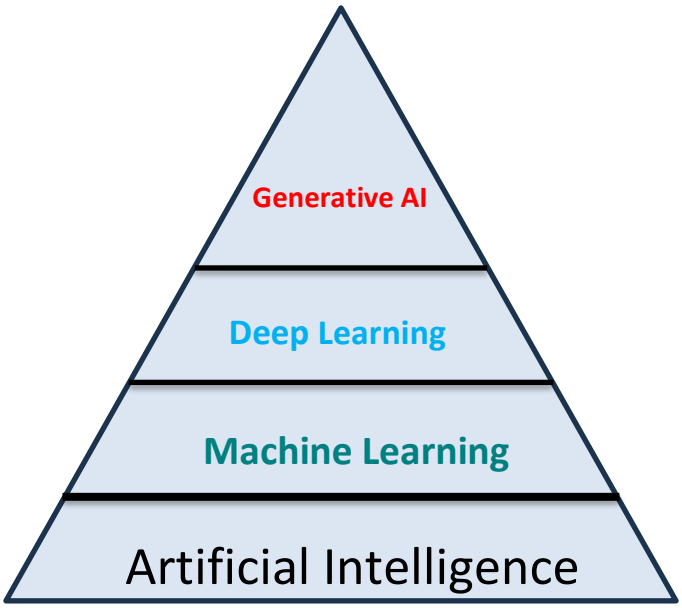

Figure 5 AI Levels

Here comes the question … is Generative AI dangerous? Here are some issues that comes with this leading-edge technology:

- ***Potential for Bias*:** AI-generated text and images can reflect biases and inaccuracies present in the training data. This may cause propagation of misinformation or inappropriate content.
- ***Ethical Concerns*:** Using GenAI for content creation raises important ethical concerns, including impact on human jobs, and copyright, intellectual property, and privacy issues.

- ***May be Misused*:** GenAI's ability to create highly-realistic images can lead to concerns on potential for misuse, such as creating deepfakes or spread of misinformation. [18]

Pros & Cons of AI for Small Business

From the perspective of a small business, the ultimate question is whether the benefits outweigh the risks and cost to invest. While a recent survey from the Small Business & Entrepreneurship Council found that 75% of surveyed small businesses used AI tools, most are holding back on increased investment. The following table summarized the pros and cons of AI investment:

Pros	Cons
1. **AI is impersonal:** Small businesses always prided as "family owned", where personal touch is often what sets a company apart from competition. While an AI-powered chatbot might be more efficient than a human in a call center, you also don't want customers to feel like you've delegated customer service to a robot.	While nobody wants to interact with a robot, AI can improve the customer experience and give you a competitive advantage. There are ways to deploy AI in a balanced approach to maintain authenticity or "human touch". For example, AI can automate repetitive tasks, freeing humans to focus on areas where they can add unique value, such as strategic decision-making, creative tasks, or customer interactions.
2. **AI will take people's jobs:** 36% of full-time and part-time workers in the US are worried AI will take their jobs. The last thing you want is for new AI-powered tools to be perceived as a threat to employees' jobs. [20]	By offloading the mundane and repetitive tasks to AI, workers can actually boost productivity and a win-win scenario.
3. **AI is too complicated to use**: Small business operatives don't have the time and resource to get "side tracked". New technology Is risky and scary. Figuring out the ROI takes time and money. And, if there aren't clear use cases and the right tools, the long-term benefits may not be worth the short-term impact to business.	Compared to many technologies, AI tools are surprisingly intuitive. Take ChatGPT as an example. It only requires you to learn a few simple things like writing prompts, refining prompts, reviewing reports, etc. Focus on AI solutions that take care of time-intensive tasks to free up time for innovation. Small business owners *reported they saved 13 hours a week* themselves, while also redirecting employees to focus on higher-value work and investing in new solutions, equipment, and technology to improve customer engagement and retention. [18]
4. **Plagiarism & error prone**: one of the big concerns is the specter of plagiarism or copy rights, rendering clients distrusting of your brand. AI generated content may also be riddled with errors and omissions and characterized by a lack of creativity. [19]	Just like any other innovations, AI is just a tool, not an answer to everything, and cannot be used effectively without human oversight. Knowing what the weaknesses and strength of AI determine your success rate. In fact, AI is helping solve two of the biggest problems every company—even small ones—has faced in the digital age: there's too much data and no way to use it all. That combination can *lead to higher costs for data storage and increase compliance and privacy risks*. [18]

Table 3 AI Pros & Cons

Conclusion: The Future of AI

As the internet has totally transformed the way we do business, AI has, in the last few years, usher in a global revolution that has the potential to again reshape the way we live and work. It has swiftly popularized across various industries, touching on everything from finance to technology. By 2030, the AI market is expected to exceed $2 trillion, reflecting the increasing integration of AI across various industries [17]. This reflects the importance of AI in business transformation. It is therefore vital for businesses to stay updated with AI advancements in order to realize its full potential.

One big question for small businesses is: Is AI here to stay? Undoubtedly, AI seems to be at the peak of a boom cycle. With the significant advancements in machine learning and deep learning, big data availability, and computational power improvements, all the right pieces seem to fall in the right place for a technology revolution. But with the painful lessons of bust and boom of so many technologies, is this another “Snake Oil”, and do we have to be cautious about whether AI can sustain the transformation of business operations?

The pace of workplace transformation is unclear, but one thing for sure is that AI is here to stay. Moreover, AI is going to affect the way everyone does business. As an entrepreneur, it is of the utmost importance not only to learn how to use AI in the workplace and benefit from its power but also to realize the risks it poses [19].

As mentioned in the beginning of this paper, AI is the new frontier. Moving forward, there is no doubt that AI, like the internet before it, will be a pervasive part of our lives. It will be increasingly more integrated into our daily routines and play a significant role in various sectors, from healthcare to education, transportation, engineering and beyond. As evidenced from the daily news, AI will continue to evolve, bringing new capabilities and challenge. By keeping abreast of new AI tools and interfaces, this revolutionary and cutting-edge technology will dramatically improve how we live and work. Businesses, small and large must monitor and actively engage with these developments to determine when is the right time to deploy AI. By doing so, they can ensure that they are prepared for the changes AI will bring and can effectively use these new tools to their advantage.

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