DOGTOWN MEDIA

The Magic of Machine Learning: A Revolution Across All Industries

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Machine Learning Benefits Companies Big and Small

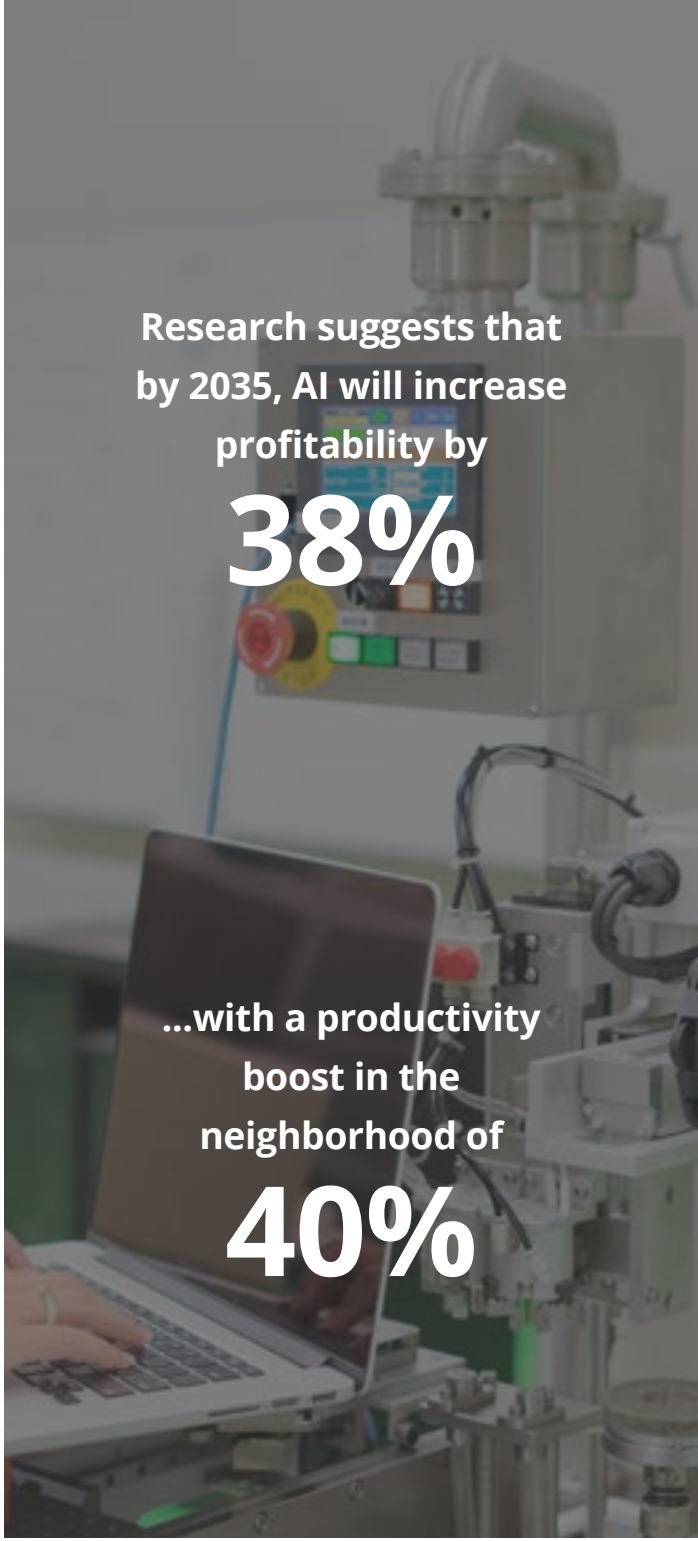
It's no secret that humanity is on the cusp of a fourth industrial revolution, and machine learning is at its heart. Although the technologies necessary for machine learning have been around for decades, the lack of abundant data and the relatively modest computing power available rendered it the exclusive domain of skilled data scientists with the necessary resources.

Today, however, data is ubiquitous, and society is increasingly interconnected. As a result, machine learning allows anyone with basic programming and software engineering knowledge to automatically run the processes to unlock valuable insights from data.

By putting intelligent software to work, it's possible to analyze and process massive amounts of data to create products that were previously beyond the realm of possibility. The impact of this will ripple throughout every industry — from the development of autonomous cars, robots, and drones to the legal, finance, and customer service sectors.

Almost every business will see new tools made available, and those that adopt machine learning technology will enjoy massive productivity increases. **Research from Accenture** suggests that AI will increase profitability by 38 percent by 2035, with a productivity boost in the neighborhood of 40 percent. That's not surprising considering that machine learning algorithms take mere minutes to perform work that would take a team of hundreds of workers years to complete — with the added bonuses of greater accuracy and reliability than human counterparts.

With so much promise, it's no wonder **corporate investment in AI has increased**. Predictions from the International Data Corporation forecast that the $12 billion spent on AI and machine learning in 2017 will balloon to more than $57 billion as early as 2021. Insights from Deloitte Global suggest that machine learning pilot programs and implementations will double this year from 2017 levels — and double all over again by 2020.



The Advantages of Algorithms

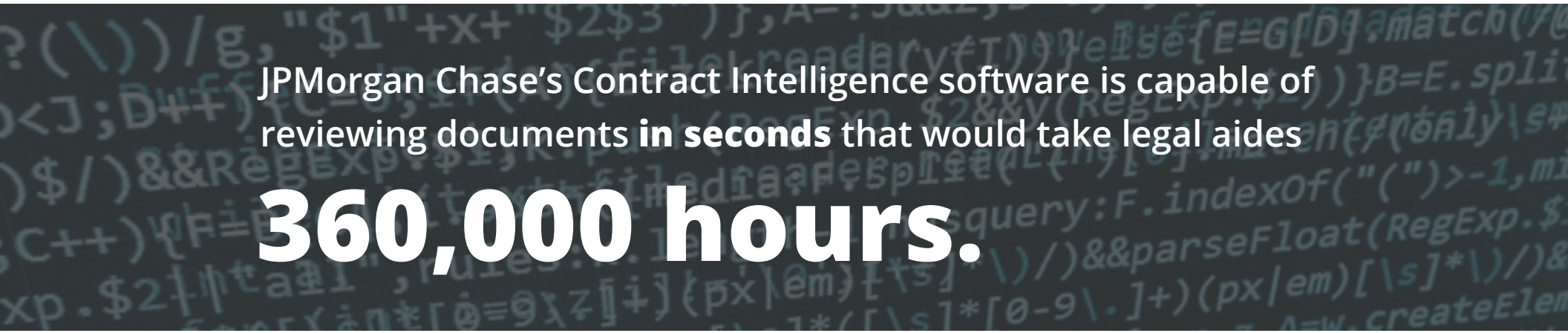
While in-house machine learning implementation will look different from one industry to another, the impact is consistent across all of them: reduced costs, increased profits, and better business outcomes.

In the legal field, machine learning algorithms are saving legal aides from thousands of hours of administrative work. In fact, **JPMorgan Chase's Contract Intelligence software** is capable of reviewing documents in seconds that would take legal aides 360,000 hours to get through. The software is able to glean important details such as arguments and case verdicts, ultimately using this information to guide the best course of action lawyers could take to represent their clients.

The medical implications of machine learning are perhaps some of the most exciting, as technology arms physicians with groundbreaking tools to diagnose and treat illnesses. The early detection and treatment of debilitating diseases such as Alzheimer's and cancer will be especially important, and McKinsey & Co. predicts that big data and machine learning **could be worth $100 billion per year** in healthcare alone.

From an accounting standpoint, machine learning software can automatically perform processes, such as fraud detection. Overall, AI adopters in the financial services sector achieve profit margins that are about **12.5 percent higher** than competitors that lack AI tools. It is important to note, however, that AI and machine learning have incredible implications for businesses outside the legal, medical, and financial industries.

Almost every business, for instance, has customer service needs. AI tools such as chatbots are now able to handle these duties, thanks to a combination of natural language processing and machine learning. With platforms such as Google's new Dialogflow, chatbots can offer a realistic human response to virtually any question. In addition to a massive reduction in the volume of customer service calls, this software can nearly eliminate the cost of dubiously effective service centers while also improving the overall customer experience with a scalable, always-on model.



A Universal Appeal

Machine learning delivers two main benefits that appeal to just about any organization: an improvement in customer satisfaction and a reduction in operating costs through streamlined business processes.

It should come as no surprise that forward-thinking tech companies such as Google and Microsoft have no intention of being left behind. The former has acquired Halli Labs, an Indian startup focused on machine learning systems, and it has created an open-source machine learning framework called TensorFlow.

Microsoft, on the other hand, offers a suite of aptly named Cognitive Services. These pre-built AI tools vary in utility, but they are all designed to help companies use advanced technologies, even if they don't have a dedicated staff of data scientists.

Not to be outdone, Amazon has its own machine learning suite available on Amazon Web Services. Some of the company's more prominent customers include the real estate website Zillow, the entertainment juggernaut Netflix, and even the NFL.

In the coming years, organizations that postpone investing in AI will find themselves unable to keep up with their better-equipped competitors. They'll also fail to tap into what PricewaterhouseCoopers predicts will be $15.7 trillion of GDP growth spurred by AI by the year 2030.

Delving into all the industries transformed by machine learning would be impossible, but it's safe to say that the technology will dramatically alter every sector under the sun in the years to come.

Machine Learning in Transit

While Uber has shaken up the transportation industry over the past few years, autonomous vehicles will take transportation as a service to the next level — and machine learning is at the core of this transformation. Once it's able to transition to driverless vehicles, Uber will go from earning 20 percent of the revenue per ride (and sustaining hefty losses as it expands) to making 100 percent and becoming one of the most profitable companies ever.

The push for autonomous vehicles is reliant on machine learning technologies, particularly computer vision. Mapping technologies can get a vehicle from point A to point B, but an autonomous vehicle's cameras must understand what they're looking at (whether it's lines on a highway or a pedestrian in a crosswalk) to make the journey safely.

Cars in Google's Waymo project have amassed about 5 million miles of road testing, which is nearly twice the mileage of competitors like Nvidia and Tesla. Powered by machine learning technologies, Waymo vehicles become safer and more knowledgeable the farther they drive and the more environmental conditions they encounter.

While major auto manufacturers have their sights set on autonomous cars, expanding the technology to aircrafts such as drones and planes would be the next logical step. In fact, Boeing is currently developing AI that will limit pilot input on commercial flights and further reduce the potential for human error.

Taking pilots out of the equation might sound frightening, but it's a process that has been happening for a long time. Some airlines, such as Asiana, forbid pilots from manually flying an aircraft after it reaches an altitude of more than 3,000 feet. This regulation is aimed at minimizing risk and saving lives — two areas where machine learning excels.

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Medicinal Machine Learning

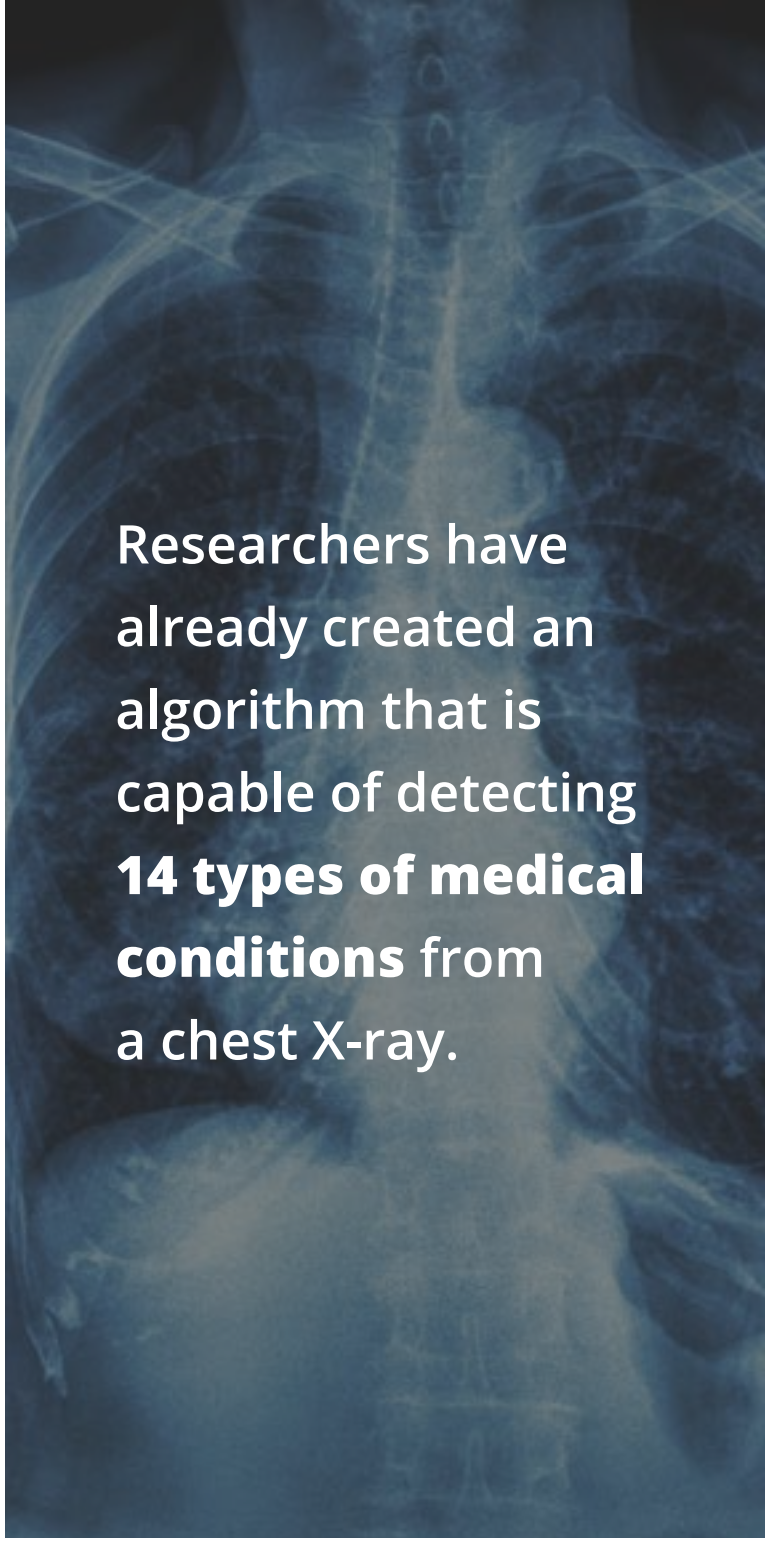
With the advent of wearable technologies such as the Fitbit and the Apple Watch, devices are collecting billions of data points on consumers — everything from their sleep cycles to their step counts to their heart rates. While that information is useful, what is even better is the insight machine learning can glean from analyzing this data.

In the future, patient screenings will include software that analyzes health over time and allows doctors to predict health complications before they happen. Because behavioral changes are the most effective way to keep us healthy, proactive directions from doctors can replace diagnoses after the fact. Significant strides have already been made in this direction at the Georgia Institute of Technology, where **deep learning is already able to predict heart failure**.

When medical professionals do need to make a diagnosis, computer vision technologies can pair with machine learning to comb through millions of X-rays and MRIs. The software is able to learn to identify whether a small tumor is malignant or benign and how to zero in on a small but important indicator that a human radiologist is likely to miss.

This might sound like science fiction, but researchers at Stanford University have already created an algorithm that is capable of detecting **14 types of medical conditions** from a chest X-ray. Unimpeded by human error, these diagnoses will be much more accurate than they are now. This staggering amount of data will also inform the treatment process, with software using historical outcomes to dictate the best treatment options for each patient.

Numerous medical organizations are already working to capitalize on machine learning technologies, from the **partnership between Massachusetts General Hospital and Nvidia** to **Memorial Sloan Kettering's work with IBM Watson** to diagnose and treat cancer. As an added benefit, reducing unnecessary treatments will go a long way toward lowering healthcare costs. Machine learning's capacity to cut costs is certainly exciting, but it also shows promise when it comes to producing profits.



A Fresh Take on Finance

You might have noticed that machine learning has started to revolutionize wealth management. A few short years ago, an investing algorithm would have been out of the question. Today, some of the top investment firms regularly advertise the advantages of their robo-advisors. By leaning heavily on the concept of algorithmic investing, companies such as Betterment and Wealthfront are democratizing finance in a way that makes personalized investing more accessible to people of all income levels.

Naturally, finances are largely dictated by mathematics. It makes sense, then, that software systems are much more capable than humans when it comes to analyzing a financial position. The software is able to simultaneously weigh factors such as an investor's income, age, and risk tolerance, as well as the overall economic environment, to create a customized portfolio that matches an investment strategy. Better yet, this software can scale to offer the same service for an almost unlimited number of clients.

Robo-advisors can also make **iterative portfolio changes** that strike the desired balance of risk and return when it comes to stocks, bonds, commodities, real estate, and a wide array of other investment products. Machine learning is also responsible for **automatic transactions**, enabling users to pay for routine services without the need to write a monthly check. In certain applications, software is able to recognize when customers no longer use a service and pause those services to save them money.

Advantages of software systems:

More capable than humans when it comes to analyzing a financial position

Can scale to offer the same service for an almost unlimited number of clients

Able to weigh risk factors and economic environment

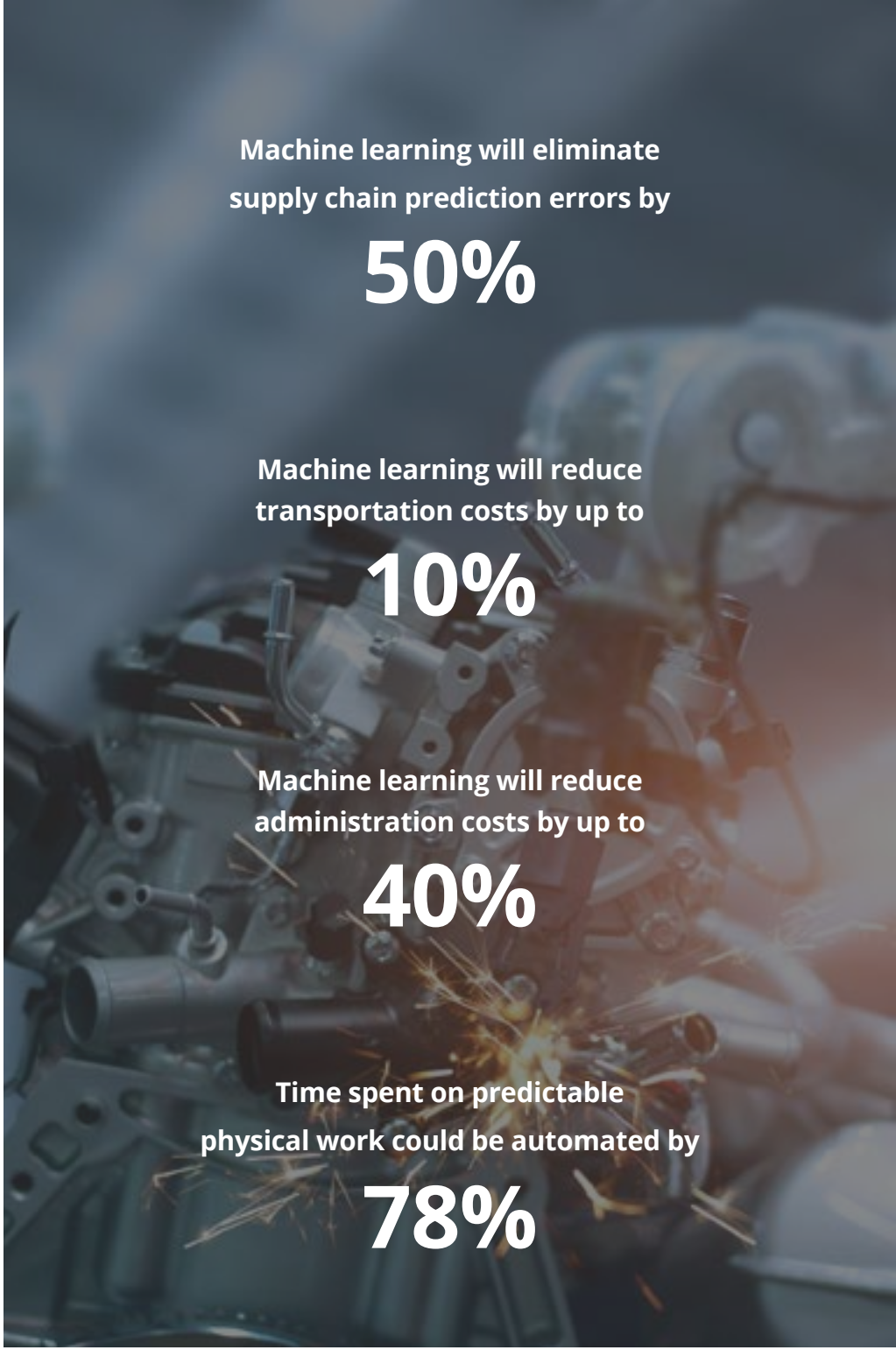
More Intelligent Manufacturing

Manufacturing is all about maximizing efficiency and minimizing waste, which means machine learning has incredible potential in the space. Algorithms can be programmed to not only identify areas of waste, but also optimize processes and logistics to create a more productive manufacturing plant.

By eliminating existing bottlenecks and creating a seamless inventory management system, companies can produce products and get them to market faster and at a greater profit margin. **According to research from McKinsey**, machine learning will eliminate 50 percent of supply chain prediction errors while reducing transportation and administration costs by up to 10 percent and 40 percent, respectively.

Machine learning also creates incredible operational advantages. The same technologies responsible for autonomous vehicles will produce robots that perform work to a more exacting standard than humans — all while working 24 hours a day and 365 days a year. While these capabilities have workers concerned about their job prospects, companies such as Amazon are **still hiring warehousing and logistics employees** at an accelerating rate.

Instead of eliminating the need for human labor, machine learning and AI are likely to simply change the work that people do. McKinsey estimates that about **78 percent of time spent on predictable physical work could be automated**, allowing workers to adopt safer and less strenuous roles over time.



An Early Start

We've examined how machine learning is altering transportation, medicine, finance, and manufacturing, but these scenarios are only the tip of the iceberg. The abundance of data available today means machine learning will undoubtedly be one of the most powerful and transformative technologies of our time, and many of the best and most disruptive applications have yet to be realized.

The potential presented by machine learning promises to shake up myriad industries, but it requires quite a bit of technical skill to integrate in an effective way. To reap the maximum business benefit, you need an experienced partner who can help you jumpstart the process.

At Dogtown Media, we understand the problems your teams face, and we can use our expertise to help you turn these challenges into opportunities. Our team has expertise across every potential application of machine learning to solve your most complex business issues. Natural language processing was the backbone for Dogtown Media's AI chatbot ShoutOut, which was featured as a top app on Google Assistant and Google Home for three consecutive months.

We've flexed our muscles with automation to develop a self-driving car utilizing computer vision and model creation to identify objects in the real world. Those same underlying processes can reduce manual workload and allow employees to reallocate their time to higher-value tasks. We continue to deliver neural network-based machine learning solutions to healthcare providers that monitor a patient's vital signs and enable the diagnosis of diseases with greater accuracy than human doctors.

From problem identification and machine learning ideation to complete implementation, our experts are ready to discuss potential applications of machine learning in any industry and guide you every step of the way.

If you're ready to explore machine learning and gain a leg up on your competition, contact the Dogtown Media team to learn more.

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