TechBridge

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5 Tech Trends That are Ready to Dominate 2021!

Visualizing Multi-Dimensional Data: Heat Matrix and Mosaic Charts

Are Pop-Up Bars A Potential Pandemic Solution?

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5 Tech Trends That are Ready to Dominate 2021!

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A new year has begun which means it's time for new and updated trends to look forward to! We've put together a list of five anticipated tech trends that show great promise and will help solve some of the issues that 2020 left behind in order to make the new year a more positive one.

Work-from-home technology

Last March, most states declared stay-at-home orders for all residents. Now, almost a whole year later, many people are still following that order—mandate or not. Many leaders in the United States had hoped that a month-long stay-at-home order would be enough to flatten the curve of this unexpected pandemic, but unfortunately it still exists today and is even worse than before. While many individuals started to go back to work this past summer, many companies and organizations are still working remotely or at least offering the option to do so until things are safer. In fact, many companies such as Microsoft and Facebook have even decided to make working remotely a permanent option, whether or not the pandemic subsides. Regardless of what these companies and organizations do, remote work has become the new norm, so it's only fair to say that work-from-home technology will advance quickly and become a huge investment in the tech world.

According to a survey conducted for CCS Insights, "60% of business leaders in Western Europe and North America expect at least 25% of their workforce, and in some cases all of their staff, to work at least partly from home—even when the pandemic is over." Some of these innovations may include technology like work from home packages with extra routers and security offered by internet providers, or digital whiteboards allowing team members to visually collaborate with each other while at their own homes. Whatever it may be, work-from-home technology is expected to be used widely in this year and it's definitely here to stay.

Social engagement

Social engagement has always been a vital part in growing an organization's audience and the COVID-19 pandemic has only made social engagement even more important. Aside from social media presence, many companies and organizations heavily relied on events such as tradeshows, conferences, and annual conventions to promote themselves to both current and potential customers or supporters. However, most in-person events were cancelled last year and it doesn't look like they will return anytime soon. The lack of in-person events means that it's a must that the level of social media usage across all industries increase as it will most likely become a big factor in a business' success in this new year. Going completely virtual is an adjustment for many of us but it can be a positive change for you and your brand.

Jim Kruger, Chief Marketing Officer at Veeam, explained to Forbes that, "As we move into 2021 and beyond, many events will stay virtual not only because of continued safety concerns, but also as a result of lessons learned in 2020. Companies found that by going virtual, they opened up their event to an entirely new audience as virtual events are more accessible than in-person events. For virtual events, visa issues, travel restrictions and costs aren't as much of a concern as with in-person events, and many companies have found that this allows for higher attendance and more participation. That means lower cost for more people and a higher ROI. The key is to get creative and drive engagement through great speakers, rich content and some fun of course."

Whether it be promoting virtual events, new company web content, or product sales, the way you and your team interact with your customers and audience through social media will be one of the most *positively* impactful strategies of 2021.

Wearable tech

Before the pandemic, individuals usually bought wearable tech like Apple watches as fun gadgets and tools to make their lives easier, during the pandemic, though, wearable tech has become much more essential and even helped make the closings of certain businesses easier.

With the closings of gyms or individuals not feeling safe enough to go to the open ones, the market for wearables increased drastically. Forbes recognized that companies like Peloton helped make our new stay-at-home reality easier with workout devices compatible with wearables and remote competitions as well as leaderboards all from the comfort of one's living room. Another way wearables have been used in the athletics industry was when the 2019-20 National Basketball Association season was suspended for over 140 days after a player tested positive for COVID-19. Although there were no other cases on the team after that, wearables may have been a big reason there were no other cases. Players, coaches and trainers were given a wristband that they could wear off the court which had a small chip inside the band that would set off a light and sound when wearers were not socially distancing from one another. This alarm was so effective that the bands have been "picked up by the National Football League, the Pacific-12 college football conference and other sports leagues around the world."

Kinexon, the company in charge of creating the N.B.A's wristbands is also looking towards introducing their gear to manufacturing and supply chain industries. Henkel, a global industrial and household chemical manufacturer in Germany tested an earlier version "designed to avert collisions between forklifts and workers on high-traffic factory floors." Kinexon offered Henkel a chance to test a variation of that technology, called SafeZone, which is a half-ounce sensor that workers are able to easily wear on their wrist or around their neck and is used in the same way as the N.B.A wristbands—a sound and light alarm that goes off in close proximity to others. Not only do these sensors help in stopping the spread of COVID-19 but post-pandemic, they can still be used as safety precautions, especially in work environments that may carry more safety hazards than usual, like factories.

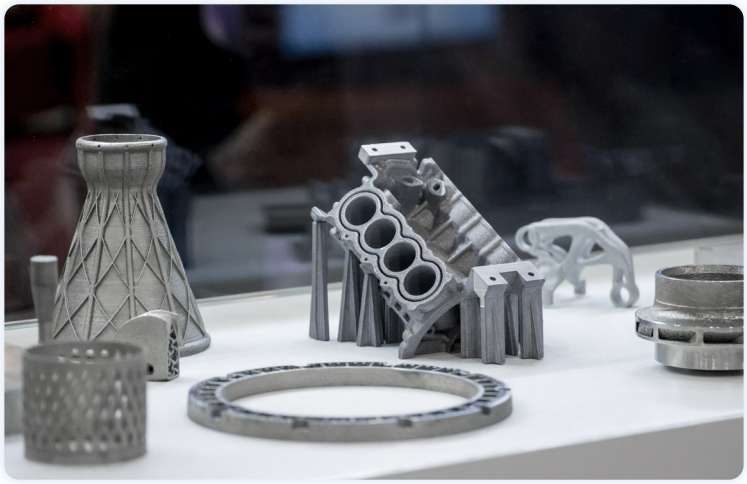
Wearable tech has also become an important tool within the healthcare sector as there have been developments such as smart bandages and monitoring patches that patients can wear and automatically send results to their healthcare specialist to be reviewed through telehealth. According to a Gartner report, consumer spending on wearable technology will double by 2021, possibly making wearables an even larger part in our daily lives as we continue to transition into our "new normal" through this pandemic.

3D printing

3D printing has been around for only a few decades but its accessibility and abilities have been advancing each and every year—with no exception in a COVID-19 year. With stores and vendors shut down due to the pandemic, the demand for products, especially in the supply chain industry, have increased at a speed that's oftentimes too fast for businesses to keep up with. This is where 3D printing comes in handy.

According to the Association of Supply Chain Management, "COVID-19 gave the world 'a glimpse into how 3D printing can be used temporarily to alleviate the strain on supply chains during demand surges and shortages, as it did with medical equipment.'" With 3D printing, products can be made and delivered at a faster speed, helping with the supply and demand that manufacturers have had to deal with during the pandemic.

Brad Rothenberg, founder and CEO of 3D printing software company nTopology says, "The application of advanced manufacturing technologies, including 3D printing and other digital processes, will enable the most advanced products to enter the market—design will, once again, become the differentiator for companies releasing better, more sustainable products." Although 3D printing may not be the newest invention, companies can anticipate a great year with its assistance and abilities.



Checkout-free retail

Photo credit: CascadeCreatives—stock.adobe.com

One of the things people don't look forward to about grocery shopping is finding the shortest checkout line... especially when even the "shortest" line seems like it's moving at the slowest pace possible. However, what if you could grocery shop and leave immediately after without any lines or any wait?

Amazon recently made that vision possible when they opened Amazon Go Grocery. Using the Amazon Go app, customers can scan the app's QR code at the entrance, select as many items as they need from the store, and then exit the store line-free. Amazon explains that their "Just Walk Out Technology automatically detects when products are taken from or returned to their shelves and keeps track of them in a virtual cart. When you're done shopping, you can just leave the store." Later, they'll send you a receipt and directly charge your Amazon account. How is this possible? Using technology such as artificial intelligence, cameras around the store track factors such as motion detection and object identification. "They're augmented by separate depth-sensing cameras that blend into the background like the rest. The images captured from these cameras are sent to a central processing unit, which does the real work of quickly and accurately identifying different people in the store and objects being picked up or held."

Right now, Amazon Go stores are only about 1,200 to 3,000 square feet, they can get as big as 10,000 square feet, as seen in their Seattle store. According to Bloomberg, Amazon was hoping to open as many as 3,000 of these stores by this year, but with the COVID-19 pandemic, that may be delayed. In January 2018, Amazon opened their first store which was around 3,000 square feet, as mentioned previously. Two years later, their store was about 10,000 square feet, and those two years translates to a threefold increase in what Amazon's computer vision technology can handle. If the work on these stores continues, they could expand to 20,210 square feet this year. While these statistics were envisioned before the pandemic hit and there's no telling how COVID-19 will affect its plans, checkout-free stores would be an especially great experience to have during unprecedented times like these where people try to keep their time outside of the home to a minimum. Either way, we definitely expect to see more checkout-free grocery stores opening in the future with 2021 continuing the expansion of it.

From new work-from-home technology to checkout-free grocery shopping, 2021 will be a year of innovation and smarter advancements in the tech industry—pandemic or not—so be sure to keep an eye out for these trends in the new year! □

Visualizing Multi-Dimensional Data: Heat Matrix and Mosaic Charts

If you want to visualize multi-dimensional data, Heat Matrix charts and Mosaic charts are two great options to use. Let's look at some examples of how to do so and walk through which use cases are most appropriate for these two charts.

To follow every step visually, you can stream the online recording of this presentation in our "Knowledge Forum Library."

What are we talking about when we refer to multi-dimensional data? We are talking about the "Cross-tab" style organization that you'll recognize if you're familiar with Dimensional Insight's ProDiver. It allows you to see values in each cell, segmented by two dimensions.

For example, if a hospital is looking at the measure "ED Visits Admitted," a Cross-tab style organization could show we're looking at that across both "Facility" as well as "Day of the Week."

Gabrielle Amarosa

Healthcare Business Intelligence Consultant

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Facility [ED Log - ED Visits Admitted-Dive A]

ED Visits Admitted	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Totals	6,056	764	920	909	920	887	877	779
LONGWOOD	1,542	189	259	224	240	213	223	194
MAPLEWOOD HOSPITAL	1,427	175	211	214	216	209	209	193
SPRINGFIELD HOSPITAL	1,277	164	179	190	197	194	186	167
TRINITY HOSPITAL	1,810	236	271	281	267	271	259	225

Figure 1. Cross-tab Organization

Examining the data for Springfield Hospital on a Tuesday, you can see that there are 190 "ED Visits Admitted." You can also see the Total just by Day of the Week or just by Facility by looking in the "Total" row and column.

Let us talk about ways to visualize data that looks like this and has this structure. We have two options:

1. Heat matrix chart
2. Mosaic chart

Let's look at these two options in Dimensional Insight's software, DivePort.

Here is our Heat Matrix chart.

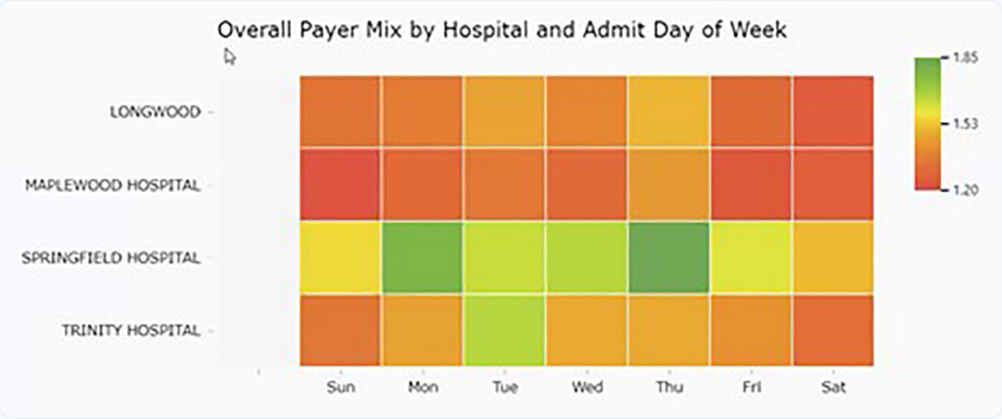

Figure 2. Heat Matrix Chart Example

We're looking at the measure "Overall Payer Mix" by "Facility" and "Day of the Week." This measure is a ratio. You can see the colors that are associated with different ranges of that ratio value in the key on the righthand side of the chart. This Heat Matrix chart allows us to look at the data from both of those angles—"Facility" and "Day of the Week." Examining the data for Longwood Hospital on a Tuesday reveals the Overall Payer Case Mix is 1.45. If you take a quick look at this chart,

you can get a sense of the approximate ratio between the "Facility" and the "Day of the Week" combinations—just from the colors and the key. To see the exact measure value in DivePort, simply mouse over a specific, colored square and a pop-up displays the intersection details.

This example includes a QuickView, which can add more value to this analysis. The QuickView allows users to change the "Admit Year" or any other value to examine changes in the resultant data. This example displays all the years, but if we wanted to look at only 2020, we could do that as well.

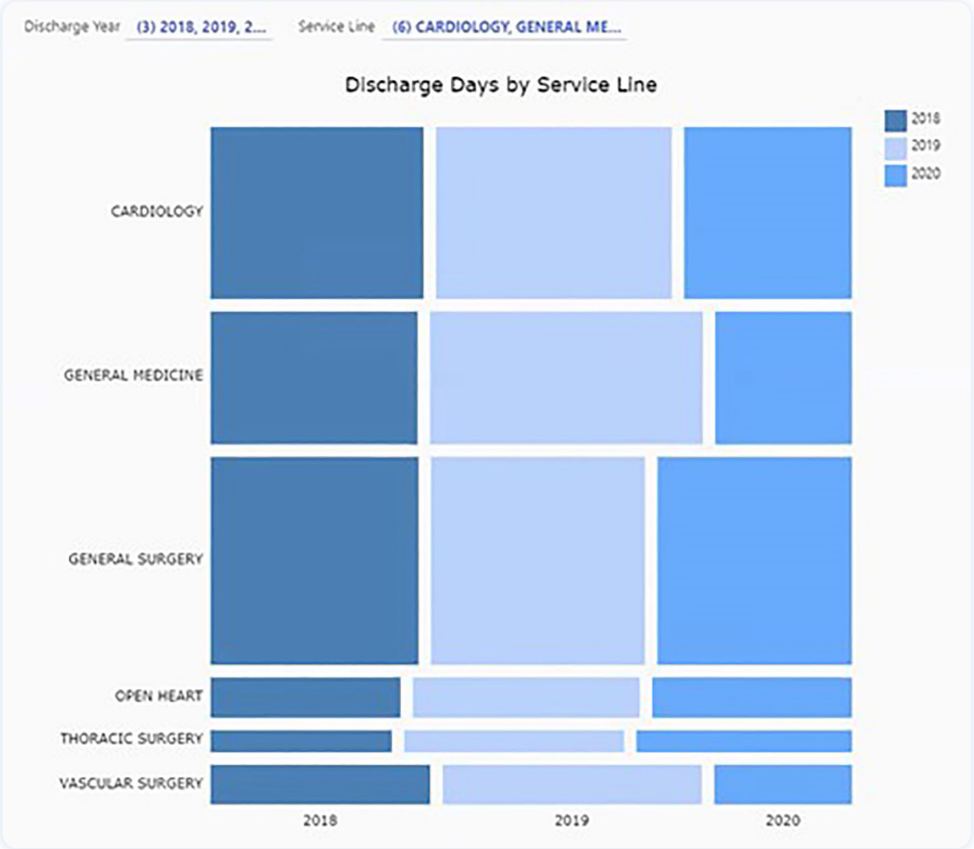

Figure 3. Mosaic Chart Example

Its appearance is like the Heat Matrix chart. However, the Mosaic chart is a visual comparison of magnitudes, not ratios. The Mosaic chart is used when analyzing a count measure. In this example, we're looking at "Discharged Days" by "Service Line" and "Discharge Year." The key is showing us the "Discharge Year." There are two QuickViews in this example: "Discharge Year" and "Service Line." The example chart is showing the result of three selected years and six selected service lines.

You can see that the chart displays colored boxes in a variety of sizes, big and small. The size of each box reflects the volume of discharge days. You get an idea for how this chart shows relative magnitude between discharge days attributed to different service lines and between different discharge years. The chart provides a quick visual and then you can mouse over a specific tile for more detail. Such a pop-up detail window would reveal that for the discharge year 2020, the Cardiology Service Line had a little over 2,700 discharge days. You can see that this chart is great for comparisons of numbers.

In summary, Heat Matrix charts are a great option if you want to display ratios. Mosaic charts are a good option for comparing magnitudes.

If you want more information about how to set up and use these types of charts, you can find that information visiting the Knowledge Forum. □

Knowledge Forum

Are Pop-Up Bars A Potential Pandemic Solution?

by **Meredith Galante,**
Contributing Writer

Back in December 2019, before the pandemic began, people in New York City could wander into a place that felt like Santa's workshop called Miracle, on 9th Street in the East Village. Tinsel decked the ceilings of what used to be any other establishment, the bartenders served holiday-themed cocktails, and the line of people wanting to take advantage of this limited-time pop-up themed bar wrapped around the block.

The limited-time attraction, known as a pop-up bar, only fills the real estate for a predetermined amount of time and usually has a theme, whether it be holiday-themed, rose-themed bar carts at the beach, or whatever else the owners can think of.

Fast forward to pandemic life, where more and more stores and bars are closing and it's safer for people to gather outside until they're vaccinated, and it seems like pop-up bars will see their glory days in 2021.

"Our customers know that every time they visit, they'll find something unique that will only be there for a short time. It keeps people coming back again and again," Vasilis Kyritsis, cofounder of The Clumsies in Athens, Greece, told SevenFiftyDaily.

A pop-up bar's temporary nature allows bartenders who have been laid off to unleash their creativity without the long-term commitment of rent. It also creates a buzz and customer demand because of the temporary nature. While pop-up bars are flashy, are they profitable?

Are pop-up bars profitable?

The short answer is a resounding yes. The typical pop-up can bring in almost 20% to 30% more on a Monday or Tuesday night compared to a typical bar.

By not taking up permanent residence at a certain address, pop-up bars maximize sales by taking advantage of consumer psychology. Customers want to check out something special before it is gone, and the pop-up bar owners avoid adding to an oversaturated market of too many bars to choose from by making theirs particularly special.

"We realized people are not really into tacos and margaritas for the holidays," Ivy Mix, a bartender and co-owner of Leyenda, a pan-Latin cocktail bar based in Brooklyn, New York, told SevenFiftyDaily in 2018. "So, we decided to do a holiday pop-up bar last year. It increased our monthly sales by nearly 60 percent. If we didn't do that, we would really struggle in December."

How do pop-up bars generate buzz?

A limited-time bar's special nature creates buzz, but owners still need that buzz to reach potential customers.

The flashy decorations and special cocktails serve as unique social media content. The average pop-up bar content sees a 5% to 10% jump in social media and website impressions.

In 2019, Aperol handed out Aperol Spritz's at the beach. The visual of the umbrella and colorful drinks helped create great photos and the line to get a drink drew people to the pop-up car without the need for any paid advertising.

"We saw there was a growing interest in Aperol in the U.S., especially at summer events and destinations," Melanie Batchelor, the vice president of marketing at Campari America, told The New York Times. "We invested behind that." Aperol sales were up 25% that year.

How do I incorporate pop-ups into my business model?

If you're a current bar owner seeing depreciating sales because of the pandemic, you can create a pop-up from within. You already have the space leased, so now you need the idea. Ask your staff for inspiration, consider the time of year—a beach-themed bar in the city during the summer can be fun—and then double-down. While it does take money to transform your bar for a month, the uptick in sales should make up for it.

If you don't have a physical location yet, reach out to landlords who have lost tenants due to the pandemic. Landlords may be willing to offer short-term leases to help themselves take in any cash during a time many bar owners are not opening new, permanent bars.

Data Analytics, Artificial Intelligence, and the Coronavirus Vaccine

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The history of our world's health system has not seen a centralized drive for a single solution on the scale of our current COVID-19 vaccine development. From clinical trials and research to private funding and new technological breakthroughs, the information generated from vaccine research is creating a massive data overload that requires a robust data analytics platform and artificial intelligence to effectively turn raw data into positive outcomes.

Data analytics will be vital to research scientists in accessing, combining, and analyzing disparate data sources to drive improvements. Once this initial data collection problem is overcome, artificial intelligence will be able to derive deep, predictive insights into vaccine development, thus speeding up the process and delivering better outcomes.

The data collection problem

The sheer size of research and information being generated by vaccine development is staggering. For example, in the first week of March 2020, there were 500 research papers published on the topic of vaccine development as opposed to 200 for the entire month of February 2020. This influx of research has only gotten larger as vaccine development has reached the later stages. As of February 2021, the World Health Organization has 2,040 vaccine development research papers listed in its library, "COVID-19: Global literature on coronavirus disease."

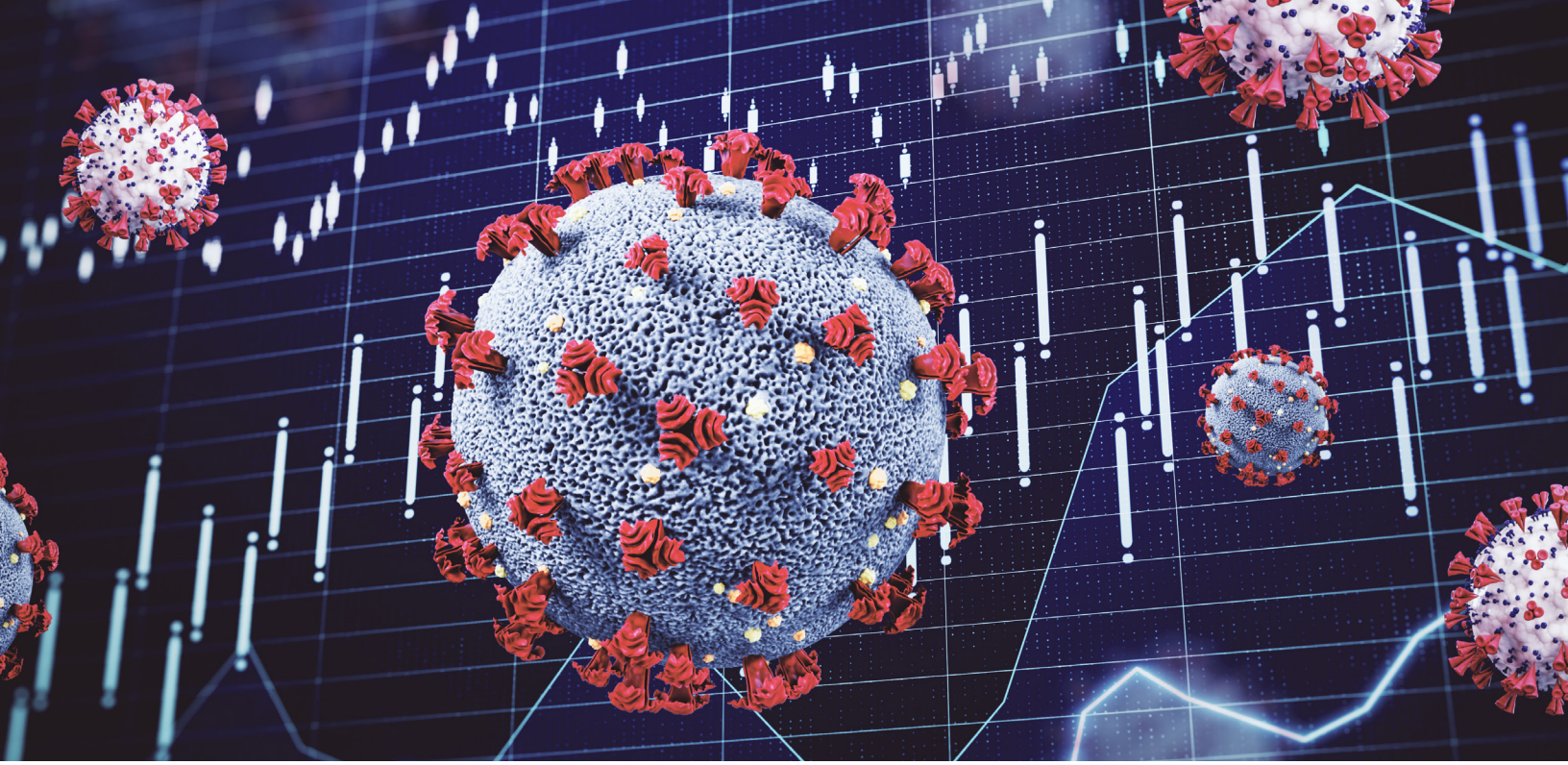
Beyond research papers, vaccine developers must dig through drug advancements, funding practices, and clinical trials to have a holistic view of the situation. Data analytics platforms centralize and standardize these large data sets so health specialists can better understand and combat COVID-19.

The challenge of gathering data and processing it for scientific use, and specifically in the development of the coronavirus vaccine, is well-known. In fact, in March of 2020, the US Government announced its "COVID-19 High Performance Computing Consortium" (COVID-19 HPC Consortium) program to provide researchers worldwide with supercomputer access—over 400 petaflops of computing power.

Analytics already making a difference

Data analytics technology has already been implemented in the fight for a vaccine. Among the COVID-19 HPC Consortium researchers, project leader Mahmoud Moradi at the University of Arkansas used the program to create 3D simulations of coronavirus spike proteins used to assist with vaccine design. Arvind Ramanathan at the Argonne National Laboratory used the program not only for 3D modeling, but also to identify binding sites on the virus for small molecules, find those small molecules, and conduct more analysis of the virus.

Currently, there are 97 projects at the COVID-19 HPC Consortium accessing 600 pentaflops of processing power from 43 consortium members. These members include industry leaders like IBM, Amazon, and Google; Academia from all over the world; the Department of Energy; Federal agencies including NASA; and international government agencies. Clearly, providing COVID-19 researchers access to computational power is important. And that power is being used in areas like bioinformatics, epidemiology, and molecular modeling to fight the COVID-19 pandemic.



In the field of understanding the immune response to exposure, the Human Immunomics Initiative (HII) at Harvard University is a joint effort using artificial intelligence models to accelerate vaccine development. The program hopes to combine expansive data collection of clinical trials with big data analytics to reach their goals. The HII is specifically interested in how the immune system interacts with the virus in aging populations. Through data analytics, research teams gather and manipulate large data sets. The groundbreaking work they do with this clean data is achieved through artificial intelligence (AI).

The influence of AI in the creation of vaccines and medications is a very new development. In February 2020, the first medicine ever developed using AI was put forward by the Japanese company Sumitomo Dainippon Pharma. It was developed to treat obsessive-compulsive disorder, but this breakthrough has clear crossover impact on all vaccine testing going forward.

Using algorithms, the company's AI platform was able to sift through many data points to combine the perfect set molecules that were needed for a solution. Sumitomo Dainippon Pharma's work here is exemplary of the value add using AI instead of human labor.

In the pre-clinical trial phase, AI can be used to test the numerous combinations of molecules that could combine to create an effective drug. A process that usually takes billions of dollars and years of intensive labor can be reached through algorithms. In the case of COVID-19, companies like Atomwise are using this technology to expedite the vaccine development process. By identifying promising molecule combinations, AI can reduce the years-long process down to months.

Another way to look at this process is by thinking of it expediting the scientific method, according to Murat Sonmez. The scientific method begins with a hypothesis and tests it through trial and error to come to a conclusion. For Sonmez, AI can be used to speed up the initial steps in that process. For example, AI can write a massive number of hypotheses, like whether a single compound combination would work, and test the initial viability of the result. Once the compound clears that initial test it must be run through a more thorough, human-led investigation to prove its safety. But the initial writing and testing phase that AI can do is extremely effective in shortening the research process.

The combination of data analytics in collection and AI in testing will be an important tool to speed up the discovery of the COVID-19 vaccine.

Pfizer and Moderna, the companies that created the first two COVID-19 vaccines approved for emergency use authorization (EUA) in the U.S., use artificial intelligence in their medicine development process. According to the Pfizer website, "Pfizer is using automation, artificial intelligence and predictive analytics to modernize, streamline and simplify the development of medicines." Moderna states that AI is one of the 6 key building blocks of their digital strategy—the strategy that their entire company is built on. Johnson & Johnson, the 3rd company to receive EUA in the United States for its coronavirus vaccine, uses data science to track the spread of the virus in real time, analyze data to learn more about who's most vulnerable, and more.

The Future of Data Analytics, AI and Vaccines

Data analytics and AI have been vital tools in the process of COVID-19 vaccine development. Now that the virus is mutating, the new challenge is to stay ahead of the mutations. Vaccine developers are under pressure to create vaccines that are effective at fighting these mutations. A team at the Viterbi School of Engineering at the University of Southern California has created an AI framework that can provide vaccine candidates in seconds—something that previously took months to determine.

Not only will vaccine development benefit from the use of data analysis. The vaccine rollout could get a boost from data. Once vaccines were developed, the biggest challenge has been to get those vaccines into the arms of people. It's a complicated supply chain challenge and something AI is well-suited to address. According to Arijit Sengupta, who is the Founder and CEO of Aible. "This is precisely what AI does best—that is, complex scenario planning and hypothesis testing that's flexible enough to adjust quickly to new information so that decisions can be made based on the best available evidence." An article in Forbes magazine covers interviews with several data analytics leaders who feel AI will be instrumental in:

- Predicting who might have a negative reaction to the vaccine
- Reporting vaccines
- Customizing vaccine communications to individuals
- Rolling out distribution of vaccines

In summary, the use of data analytics and artificial intelligence, though relatively new, are increasing in importance to vaccine research, development, and administration. We expect to see many more incidents of its use in the future for not only the COVID-19 vaccine, but also to address other solutions to human disease. □

What's New in Diver Platform 7.1?

Diver Platform version 7.1 includes several exciting enhancements, including new chart types, a consolidated Measures portlet, enhancements to Workbench for developers, and a fresh look and feel.

Learn more by downloading this quick overview from our website, or speak to your Dimensional Insight account representative to learn more.

Take a look

Latest Podcast Episode: AI for Patient Engagement

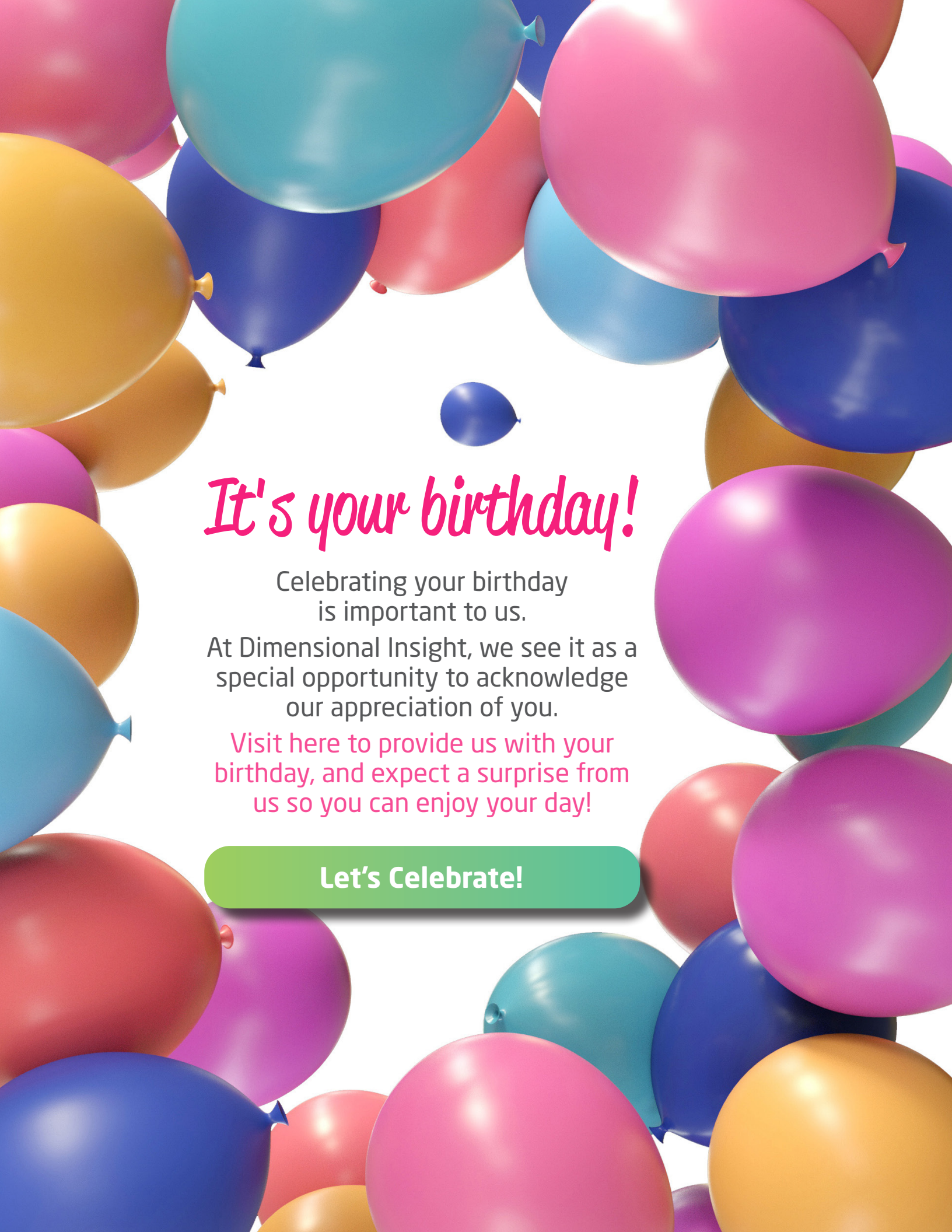
How are healthcare organizations leveraging artificial intelligence to better engage with patients?

In the latest episode of the Smarter Healthcare Podcast, host Kathy Sucich talks to Sheetal Shah of SymphonyRM about how his organization helped Virtua Health in New Jersey use AI to identify patients at greater risk for breast cancer and target them for mammogram screening.

Kathy and Sheetal also discuss how organizations can derive more value from their data to better reach patients, especially during the COVID-19 pandemic.

Listen on smarthcpodcast

Sheetal Shah, Chief Operating Officer, SymphonyRM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Celebrating your birthday
is important to us.
At Dimensional Insight, we see it as a
special opportunity to acknowledge
our appreciation of you.
Visit here to provide us with your
birthday, and expect a surprise from
us so you can enjoy your day!
Let's Celebrate!