**Machine Learning**

1. Explain how you can implement ML in a real world application.

1. Facial recognition

Facial recognition is one of the more obvious applications of machine learning. People previously received name suggestions for their mobile photos and Facebook tagging, but now someone is immediately tagged and verified by comparing and analyzing patterns through facial contours. And facial recognition paired with deep learning has become highly useful in healthcare to help detect genetic diseases or track a patient’s use of medication more accurately. It’s also used to combat important social issues such as child sex trafficking or sexual exploitation of children. The list of applications and industries influenced by it is steadily on the rise.

2. Product recommendations

Do you wonder how Amazon or other retailers frequently know what you might like to purchase? Or, have they gotten it wildly wrong and you wonder how they came up with the recommendation? Thank machine learning. Targeted marketing with retail uses machine learning to group customers based on buying habits or demographic similarities, and by extrapolating what one person may want from someone else’s purchases. While some suggested purchase pairings are obvious, machine learning can get eerily accurate by finding hidden relationships in data and predicting what you want before you know you want it. If the data is incomplete, sometimes you may end up with an offbase recommendation—but don’t worry, because not buying it is another data point to learn from.

3. Email automation and spam filtering

While your inbox seems relatively boring, machine learning influences its function behind the scenes. Email automation is a direct result of successful machine learning, and one function that goes most unnoticed is spam filtering. Successful spam filtering adapts and finds patterns in email content that is undesirable. This includes data from email domains, a sender’s physical location message text and structure, and IP addresses. It also requires help from users as they mark emails when they’re mistakenly filed. With each marked email, a new data reference is added that helps with future accuracy.

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4. Financial accuracy

Machine learning has created a boon for the financial industry as most systems go digital. Abundant financial transactions that can’t be monitored by human eyes are easily analyzed thanks to machine learning, which helps find fraudulent transactions. One of the newest banking features is the ability to deposit a check straight from your phone by using handwriting and image recognition to “read” checks and convert them to digital text. Credit scores and lending decisions are also powered by machine learning as it both influences a score and analyzes financial risk. Additionally, combining data analytics with artificial intelligence, machine learning, and natural language processing is [changing the customer experience in banking](https://www.tableau.com/learn/whitepapers/3-ways-data-is-changing-customer-experience-in-banking?ref=wc&signin=8fea1e52a66e54def2d4115aedc271c8).

5. Social media optimization

Platforms from Facebook to Instagram and Twitter are using big data and artificial intelligence to enhance their functionality and strengthen the user experience. Machine learning has become helpful in fighting inappropriate content and cyberbullying, which pose a risk to platforms in losing users and weakening brand loyalty. Processing data through deep neural networks also allows social platforms to learn their users’ preferences as they offer content suggestions and target advertising.

6. Healthcare advancement

Every day, we’re getting closer to a full transition to electronic medical records. That means healthcare information for clinicians can be enhanced with analytics and machine learning to gain insights that support better planning and patient care, improved diagnoses, and lower treatment costs. Healthcare brands such as [Pfizer](https://www.tableau.com/solutions/customer/pfizer-deploys-tableau-to-25000-employees-increases-collaboration-uncovers-insights) and [Providence](https://www.tableau.com/solutions/customer/providence-caregivers-improve-care-reduce-patient-costs-with-Tableau) have begun to benefit from analytics enhanced by human and artificial intelligence. There are some processes that are better suited to leverage machine learning; machine learning integration with radiology, cardiology, and pathology, for example, is leading to earlier detection of abnormalities or heightened attention on concerning areas. In the long run, machine learning will also benefit family practitioners or internists when treating patients bedside because data trends will predict health risks like heart disease. As an example, wearables generate mass amounts of data on the wearer’s health and many use AI and machine learning to alert them or their doctors of issues to support preventative measures and respond to emergencies.

7. Mobile voice to text and predictive text

Machines are also capable of learning language in other formats. Like Siri and Cortana, voice-to-text applications learn words and language then transcribe audio into writing. Predictive text also deals with language. Simple, supervised learning trains the process to recognize and predict what common, contextual words or phrases will be used based on what’s written. Unsupervised learning goes further, adjusting predictions based on data. You may start noticing that predictive text will recommend personalized words. For instance, if you have a hobby with unique terminology that falls outside of a dictionary, predictive text will learn and suggest them instead of standard words. It’s working when autocorrect starts trying to predict them in normal conversation.

8. Predictive analytics

Predictive analytics is an area of advanced analytics that uses data to make predictions about the future. Techniques such as data mining, statistics, and modeling employ machine learning and artificial intelligence to analyze current and historical data for any patterns or anomalies that can help identify risks and opportunities, minimize the chance for human errors, and increase speed and thoroughness of analysis. With closer investigation of what happened and what could happen using data, people and organizations are becoming more proactive and forward looking. Florida International University is one [example](https://www.datarobot.com/webinar/florida-international-university/). By integrating predictive models with data analysis from Tableau, they’re communicating critical insights about academic performance before students are at risk and supporting their individual needs to help them successfully complete all courses and graduate.

**Deep Learning**

1. Explain how you can implement DL in a real-world application.

**1. Computer vision**

High-end gamers interact with deep learning modules on a very frequent basis. Deep neural networks power bleeding-edge object detection, image classification, image restoration, and image segmentation. So much so, they even power the recognition of hand-written digits on a computer system. To wit, deep learning is riding on an extraordinary neural network to empower machines to replicate the mechanism of the human visual agency.

**2. Sentiment based news aggregation**

Carolyn Gregorie writes in her [Huffington Post piece](https://www.huffingtonpost.in/entry/violent-media-anxiety_n_6671732): “the world isn’t falling apart, but it can sure feel like it.” And we couldn’t agree more. I am not naming names here, but you cannot scroll down any of your social media feed without stumbling across a couple of global disasters – with the exception of Instagram perhaps.

News aggregators are now using deep learning modules to filter out negative news and show you only the positive stuff happening around. This is especially helpful given how blatantly sensationalist a section of our media has been of late.

**3. Bots based on deep learning**

Take a moment to digest this – Nvidia researchers have developed an AI system that helps robots learn from human demonstrative actions. Housekeeping robots that perform actions based on artificial intelligence inputs from several sources are rather common. Like human brains process actions based on past experiences and sensory inputs, deep-learning infrastructures help robots execute tasks depending on varying AI opinions.

**4. Automated translations**

Automated translations did exist before the addition of deep learning. But deep learning is helping machines make enhanced translations with the guaranteed accuracy that was missing in the past. Plus, deep learning also helps in translation derived from images – something totally new that could not have been possible using traditional text-based interpretation.

**5. Customer experience**

Many businesses already make use of machine learning to work on customer experience. Viable examples include online self-service platforms. Plus, many organizations now depend on deep learning to create reliable workflows. Most of us are already familiar with the use of chatbots by organizations. As this application of deep leering matures, we can expect to see further enhancements in this field.

**6. Autonomous vehicles**

The next time you are lucky enough to witness an autonomous vehicle driving down, understand that there are several AI models working simultaneously. While some models pin-point pedestrians, others are adept at identifying street signs. A single car can be informed by millions of AI models while driving down the road. Many have considered AI-powered car drives safer than human riding.

**7. Coloring illustrations**

At one point, adding colors to black and white videos used to be one of the most time-consuming jobs in media production. But thanks to deep learning models and artificial intelligence, adding color to b/w photos and videos is now easier than ever. As you read, hundreds of black and white illustrations are being recreated in colored form.

**8. Image analysis and caption generation**

One of the greatest feats of deep learning is the ability to identify images and generate intelligent captions for them. In fact, image caption generation powered by AI is so accurate that many online publications are already making use of such techniques to save time and cost.

**9. Text generation**

Machines now have the power to generate new text from the scratch. They can learn the punctuation, grammar, and style of a piece of text and pen down effective news pieces. Robo-journalists riding on deep learning models have been producing accurate match reports for at least three years now. And the skill isn’t limited to match report writing exclusively.

AI-based text generation is fully equipped to handle the complexity of opinion pieces on issues concerning you and myself. As of now, text generation has helped create entries on just about everything from children’s rhymes to scholarly topics.

**10. Language identification**

At this point, we are looking at a preliminary stage where deep learning machines can differentiate between different dialects. For example, a machine will make the decision that someone is speaking in English. It will then make a distinction based on the dialect. Once the dialect has been established, further processing will be handled by another AI that specializes in the particular language. Not to mention, there is no human intervention in any of these steps.