

- ไฟล์ ML.html ประกอบด้วยเอกสารและ html element ต่าง ๆ ส่วน ml-style.css ประกอบด้วย style rule ที่ใช้กำหนด style ให้กับ HTML element ส่วนต่าง ๆ

Comprehensive Overview

What is Machine Learning?

"Machine Learning is the science of getting computers to learn and act like humans do, and improve their learning over time in autonomous fashion, by feeding them data and information in the form of observations and real-world interactions."

The above definition encapsulates the ideal objective or ultimate aim of machine learning, as expressed by many researchers in the field. The purpose of this article is to provide a business-minded reader with expert perspective on how machine learning is defined, and how it works. [Machine learning and artificial intelligence](#) share the same definition in the minds of many however, there are some distinct differences readers should recognize as well. References and related researcher interviews are included at the end of this article for further digging.

Machine Learning Basic Concepts

There are many different types of machine learning algorithms, with hundreds published each day, and they're typically grouped by either learning style (i.e. supervised learning, unsupervised learning, semi-supervised learning) or by similarity in form or function (i.e. classification, regression, decision tree, clustering, deep learning, etc.). Regardless of learning style or function, all combinations of [machine learning algorithms consist of](#) the following:

- *Representation* (a set of classifiers or the language that a computer understands)
- *Evaluation* (aka objective/scoring function)
- *Optimization* (search method; often the highest-scoring classifier, for example; there are both off-the-shelf and custom optimization methods used)

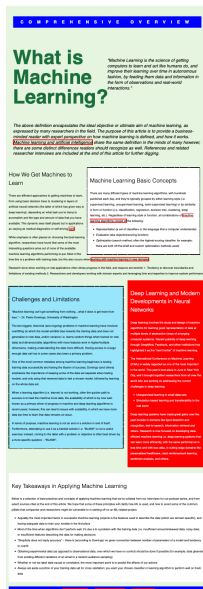
How We Get Machines to Learn

There are different approaches to getting machines to learn, from using basic decision trees to clustering to layers of artificial neural networks (the latter of which has given way to deep learning), depending on what task you're trying to accomplish and the type and amount of data that you have available. This dynamic sees itself played out in applications as varying as medical diagnostics or self-driving [cars](#).

While emphasis is often placed on choosing the best learning algorithm, researchers have found that some of the most interesting questions arise out of none of the available machine learning algorithms performing to par. Most of the time this is a problem with training data, but this also occurs when [working with machine learning in new domains](#).

Research done when working on real applications often drives progress in the field, and reasons are twofold: 1. Tendency to discover boundaries and limitations of existing methods 2. Researchers and developers working with domain experts and leveraging time and expertise to improve system performance.

- ในไฟล์ ML.html ห้ามมีการแก้ไขใด ๆ ให้แก้ไขเฉพาะ ml-style.css เท่านั้นโดยใน ไฟล์ ml-style.css มีตัวอย่าง selector ให้บางส่วน นักศึกษาสามารถเพิ่ม selector ได้ตามที่ต้องการกำหนด style ให้กับ HTML element หรือ class
- ถ้าต้องการ element ตัวสุดท้ายที่อยู่ใน element อื่น ให้ใช้ pseudo-class คือ :last-child
เช่นตัวอย่าง .summary p:last-child หมายถึง ใน .summary มี <p> อยู่หลายตัว แต่ต้องการตัวสุดท้าย ใช้ p:last-child
- ให้ใส่ rule เพื่อให้ออกเอกสารตามเอกสารใน ML-Final.pdf



- ให้สร้าง rule ในไฟล์ style.css ดังนี้
 - ให้สีพื้นของเอกสาร เป็น สีเขียว rgb(230, 248, 224)
 - Font ที่ใช้ในเอกสารทั้งหมดใช้ sans-serif มีระยะห่างระหว่างบรรทัด 2em
 - ขนาดของ font ในแต่ละ paragraph ใช้ขนาด 1.2em
 - ตัวหนังสือ “Comprehensive Overview” แสดงอักษรตัวใหญ่ และมีสีพื้นเป็นน้ำเงิน (blue) และสีตัวอักษรขาว ช่องว่างระหว่างตัวอักษรให้มีขนาด 1.2em มีช่องว่างระหว่างหนังสือกับกรอบ ดังแสดงในรูป

- 5.5. ตัวหนังสือ “What is Machine Learning?” แสดงตัวหนังสือที่มีขนาดตัวหนังสือใหญ่ขนาด 7em และตัวหนังสือมีสี rgb(25,111,61) และมีความกว้างเพียง 50% และมีระยะห่างระหว่างบรรทัด 1em เพื่อให้ตัวหนังสือไม่ดูติดกันเกินไปในแนวตั้ง ดังแสดงในรูป

What is Machine Learning?

- 5.6. ข้อความ “Machine Learning is the science of” แสดงทางด้านขวาของข้อความ “What is Machine Learning?” โดยให้ข้อความอยู่ต่ำลงมาจากด้านบน สีตัวอักษรให้เป็นสีดำ และมีขนาดตัวหนังสือ 1.5em และมีสไตล์ตัวหนังสือแบบ italic ส่วนข้อความย่อหน้าถัดมา “The above definition encapsulates the ideal objective...” ให้แสดงขึ้นบรรทัดใหม่ สีตัวอักษรให้เป็นสีดำ และมีขนาดตัวหนังสือ 1.5em และมีสไตล์ตัวหนังสือแบบ italic ดังรูป

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- 5.7. heading ของแต่ละ div ให้แสดง font ขนาด 2em และมีน้ำหนักแบบ lighter
- 5.8. ให้มีระยะห่างระหว่างข้อความ (กรอบสี่เหลี่ยมเส้นก่อนแสดงข้อความ “How We Get Machines to Learn..”

researcher interviews are included at the end of this article for further digging.

How We Get Machines to Learn

Machine Learning Basic Concepts

- 5.9. ข้อความ “Machine Learning Basic Concepts” ให้แสดงในกรอบสี่เหลี่ยมทางด้านขวา และสไตล์ของกรอบสี่เหลี่ยมแบบ dashed ความกว้างกรอบเป็น thin พื้นสีของกรอบเป็นสีขาว สีตัวหนังสือสีดำ ขนาดความกว้างของกรอบเป็น 60% ให้มีระยะช่องว่างเพื่อไม่ให้ข้อความติดกับกรอบ ตามรูปที่แสดง

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- 5.10. ข้อความ “How We Get Machines to Learn” ตัวหนังสือสีดำ และให้มีระยะช่องว่างเพื่อไม่ให้ข้อความติดด้านซ้ายและติดกรอบด้านขวาเกินไป ให้แสดงดังรูปข้างบน

- 5.11. ให้มีระยะห่างระหว่างกรอบสี่เหลี่ยม (กรอบสี่เหลี่ยมก่อนแสดงข้อความ “Challenges and Limitations..”

Challenges and Limitations

“Machine learning can't get something from nothing...what it does is get more from less.” – Dr. Pedro Domingo, University of Washington

The two biggest, historical (and ongoing) problems in machine learning have involved overfitting (in which the model exhibits bias towards the training data and does not generalize to new data, and/or variance i.e. learns random things when trained on new data) and dimensionality (algorithms with more features work in higher/multiple dimensions, making understanding the data more difficult). Having access to a large enough data set has in some cases also been a primary problem.

One of the most common mistakes among machine learning beginners is testing training data successfully and having the illusion of success; Domingo (and others) emphasize the importance of keeping some of the data set separate when testing models, and only using that reserved data to test a chosen model, followed by learning on the whole data set.

When a learning algorithm (i.e. learner) is not working, often the quicker path to success is to feed the machine more data, the availability of which is by now well-known as a primary driver of progress in machine and deep learning algorithms in recent years; however, this can lead to issues with scalability, in which we have more data but time to learn that data remains an issue.

In terms of purpose, machine learning is not an end or a solution in and of itself. Furthermore, attempting to use it as a blanket solution i.e. “BLANK” is not a useful exercise; instead, coming to the table with a problem or objective is often best driven by a more specific question – “BLANK”.

Deep Learning and Modern Developments in Neural Networks

Deep learning involves the study and design of machine algorithms for learning good representation of data at multiple levels of abstraction (ways of arranging computer systems). Recent publicity of deep learning through DeepMind, Facebook, and other institutions has highlighted it as the “next frontier” of machine learning.

The International Conference on Machine Learning (ICML) is widely regarded as one of the most important in the world. This year's took place in June in New York City, and it brought together researchers from all over the world who are working on addressing the current challenges in deep learning:

- Unsupervised learning in small data sets
- Simulation-based learning and transferability to the real world

Deep-learning systems have made great gains over the past decade in domains like object detection and recognition, text-to-speech, information retrieval and others. Research is now focused on developing data-efficient machine learning i.e. deep learning systems that can learn more efficiently, with the same performance in less time and with less data, in cutting-edge domains like personalized healthcare, robot reinforcement learning, sentiment analysis, and others.

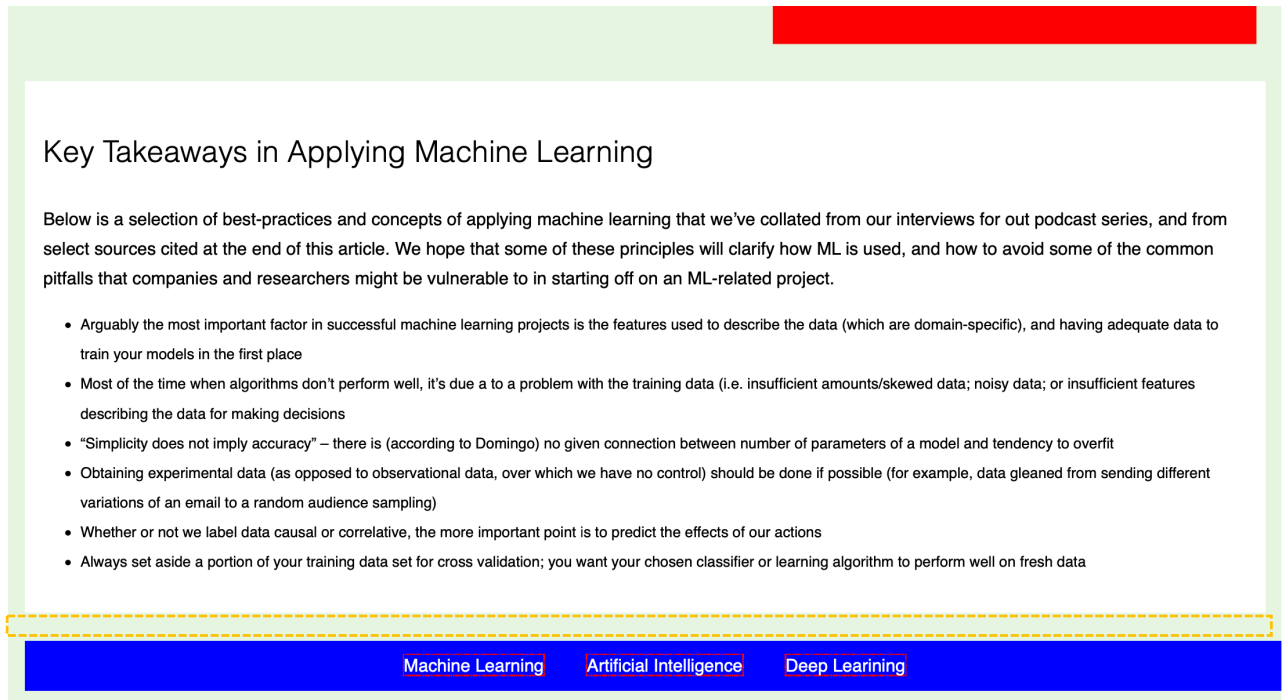
5.12. ข้อความ “Challenges and Limitations...” ให้แสดงในกรอบสี่เหลี่ยมทางด้านซ้าย และสไตล์ของกรอบสี่เหลี่ยมแบบ dashed ความกว้างกรอบเป็น thin มีความกว้างของกรอบ 55% แสดงพื้นสี rgb(153,230,255) ตัวหนังสือสีดำ และให้แสดงต่ำกว่าข้อความ “Deep Learning and Modern...” ให้แสดงกรอบสี่เหลี่ยมทางด้านขวา มีความกว้างของกรอบ 36% และแสดงพื้นสีแดง (red) ตัวหนังสือสีขาว ดังแสดงในรูป

<h3>Challenges and Limitations</h3> <p>"Machine learning can't get something from nothing...what it does is get more from less." – Dr. Pedro Domingo, University of Washington</p> <p>The two biggest, historical (and ongoing) problems in machine learning have involved overfitting (in which the model exhibits bias towards the training data and does not generalize to new data, and/or variance i.e. learns random things when trained on new data) and dimensionality (algorithms with more features work in higher/multiple dimensions, making understanding the data more difficult). Having access to a large enough data set has in some cases also been a primary problem.</p> <p>One of the most common mistakes among machine learning beginners is testing training data successfully and having the illusion of success; Domingo (and others) emphasize the importance of keeping some of the data set separate when testing models, and only using that reserved data to test a chosen model, followed by learning on the whole data set.</p> <p>When a learning algorithm (i.e. learner) is not working, often the quicker path to success is to feed the machine more data, the availability of which is by now well-known as a primary driver of progress in machine and deep learning algorithms in recent years; however, this can lead to issues with scalability, in which we have more data but time to learn that data remains an issue.</p> <p>In terms of purpose, machine learning is not an end or a solution in and of itself. Furthermore, attempting to use it as a blanket solution i.e. "BLANK" is not a useful exercise; instead, coming to the table with a problem or objective is often best driven by a more specific question – "BLANK".</p>	<h3>Deep Learning and Modern Developments in Neural Networks</h3> <p>Deep learning involves the study and design of machine algorithms for learning good representation of data at multiple levels of abstraction (ways of arranging computer systems). Recent publicity of deep learning through DeepMind, Facebook, and other institutions has highlighted it as the "next frontier" of machine learning.</p> <p>The International Conference on Machine Learning (ICML) is widely regarded as one of the most important in the world. This year's took place in June in New York City, and it brought together researchers from all over the world who are working on addressing the current challenges in deep learning:</p> <ul style="list-style-type: none">• Unsupervised learning in small data sets• Simulation-based learning and transferability to the real world <p>Deep-learning systems have made great gains over the past decade in domains like object detection and recognition, text-to-speech, information retrieval and others. Research is now focused on developing data-efficient machine learning i.e. deep learning systems that can learn more efficiently, with the same performance in less time and with less data, in cutting-edge domains like personalized healthcare, robot reinforcement learning, sentiment analysis, and others.</p>
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5.13. ให้มีระยะห่างระหว่างกรอบสี่เหลี่ยม (กรอบสี่เหลี่ยมเส้นประ) ก่อนแสดงข้อความ “Key Takeaways in Applying...”

	sentiment analysis, and others.
<h3>Key Takeaways in Applying Machine Learning</h3>	

- 5.14. ข้อความ “Key Takeaways in Applying...” ให้แสดงในกรอบสี่เหลี่ยมพื้นสีขาว ตัวอักษรสีดำ ให้มีระยะช่องว่างเพื่อไม่ให้ข้อความติดกับกรอบดังแสดงในรูป



- 5.15. ให้มีระยะห่างระหว่างกรอบสี่เหลี่ยม (กรอบสี่เหลี่ยมประ) ก่อนแสดงข้อความ “Machine Learning” “Artificial Intelligence” และ “Deep Learning” ดังรูปด้านบน
- 5.16. HTML Link ทั้งหมด ให้แสดงสีตัวหนังสือตามสีในแต่ละ paragraph และให้แสดงกรอบสี่เหลี่ยมสไตล์ dotted สีแดง (red) และความหนาเส้นบาง (thin)
- 5.17. Link ข้อความ “Machine Learning”, “Artificial Intelligence” และ “Deep Learning” ให้แสดงพื้นสีน้ำเงิน (blue) สีตัวอักษรขาว จัดตัวหนังสือให้แสดงตรงกลาง (center) ข้อความแต่ละตัวให้มีช่องว่าง 20px เพื่อไม่ให้ข้อความชิดกันเกินไป ดังแสดงในภาพ



- 5.18. HTML Link ทั้งหมดเมื่อทำการเลื่อนเมาส์เหนือ Link ให้แสดงพื้นสีแดง (red) และสีตัวอักษรสีขาว ดังแสดงในรูป

