What is Machine Learning

Applications of Machine Learning in Education by Chun-Shu Wei, 108-1

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Learning

Learning is the process of acquiring new, or modifying existing, knowledge, behaviors, skills, values, or preferences (Gross, 2015).

http://21things4teachers.net/images/PD-modules/23PD-ple.jpg

Machine Learning

- Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead.
- Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to perform the task.

(Wikipedia)

AI, Machine Learning, Deep Learning

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Data

Data is a set of values of subjects with respect to qualitative or quantitative variables (Wikipedia).

Q: What are the differences between data, information, and knowledge?

Data

https://i.pinimg.com/originals/8b/b5/85/8bb5853bdc0fd3007e9efdd8ae4acc3e.png

Learning from Data

- Question: No handsome guy in NCTU?

https://s.newtalk.tw/album/news/152/5bc011bc5a1b5.jpg
https://lh3.googleusercontent.com/-pjlKuvF48_A/UaHJP-0uljI/AAAAAAAASv8/F57h1C-CxfU/s468/000000-6359051_809103.jpg

Learning from Data

- Question: No handsome guy in NCTU?
- Defining ‘handsome guy’

https://www.zmonline.com/media/17935748/new.jpg?mode=crop&width=620&height=349&quality=60&scale=both

Learning from Data

- Question: No handsome guy in NCTU?
- Defining ‘handsome guy’
- Data collection (pictures)

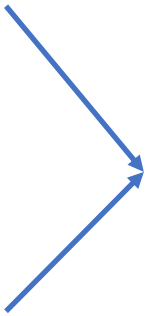
https://1gew6o3qn6vx9kp3s42ge0y1-wpengine.netdna-ssl.com/wp-content/uploads/prod/sites/5/2018/12/facial_recognition_action.jpg

Learning from Data

- Question: No handsome guy in NCTU?
- Defining ‘handsome guy’
- Data collection (pictures)
- Model training

Handsome

Not so handsome



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Learning from Data

- Question: No handsome guy in NCTU?
- Defining ‘handsome guy’
- Data collection (pictures)
- Model training
- ’Handsome guy’ recognition

→ → Handsome

‘No handsome guy in NCTU’ is false.

https://images.chinatimes.com/newsphoto/2019-07-26/900/20190726002811.jpg

Applications of Machine Learning

https://rampavanphd2018.blogspot.com/2019/06/machine-learning-in-real-world.html

Applications of Machine Learning in Education

- Increasing efficiency
- Learning analytics
- Predicative analytics
- Adaptive learning
- Personalized learning
- Assessment
- …

https://www.thetechedvocate.org/6-ways-machine-learning-will-revolutionize-the-education-sector/

Increasing efficiency

- Machine learning in the form of artificial intelligence has the potential to make educators more efficient by completing tasks such as classroom management, scheduling, etc. In turn, educators are free to focus on tasks that cannot be achieved by AI, and that require a human touch.

Learning analytics

- Machine learning in the form of learning analytics can help teachers gain insight into data that cannot be gleaned by using the human brain. In this capacity, computers can perform deep dives into data, sifting through millions of pieces of content, and making connections and conclusions that positively impact the teaching and learning process.

Predicative analytics

- Machine learning in the form of predictive analytics can make conclusions about things that may happen in the future. For instance, using a data set of middle school students' cumulative records, predictive analytics can tell us which ones are more likely to drop out because of academic failure or even their predicated score on a standardized exam, such as the ACT or SAT.

Adaptive learning

- Machine learning in the form of adaptive learning can be used to remediate struggling students or challenge gifted ones. Adaptive learning is a technology-based or online educational system that analyzes a student's performance in real time and modifies teaching methods and the curriculum based on that data. Think AI meets dedicated math tutor meets personalized engagement.

Personalized learning

- Machine learning in the form of personalized learning could be used to give each student an individualized educational experience. Personalized learning is an educational model where students guide their own learning, going at their own pace and, in some cases, making their own decisions about what to learn. Ideally, in a classroom using personalized learning, students choose what they're interested in, and teachers fit the curriculum and standards to the students' interests.

Assessment

- Machine learning in the form of artificial intelligence can be used to grade student assignments and exams more accurately than a human can. It may require some input from a human being, but the results will have higher validity and reliability.

AI and bias

Amazon scraps secret AI recruiting tool that showed bias against women (Reuters, OCT 10, 2018)

https://media.dhakatribune.com/uploads/2018/10/t030344z-1387107523-rc14635f58f0-rtrmadp-3-amazon-com-jobs-automation-1539190695965.jpg