Deep Learning has gotten a lot of love from both the AI community and the general public. But most recently, researchers have started to question and doubt that deep learning is really the future of AI. The prominent deep learning techniques used today all rely on supervised learning, yet we see quite clearly that humans learn things, patterns, and concepts without much supervision at all. In a sense, our learning is quite unsupervised.

Unsupervised learning doesn’t get as much love and there are a few clear reasons for that. It’s hard, it doesn’t work as well (yet), there hasn’t been as much work done on it, and unsupervised frameworks themselves are quite challenging to even concretely define.

That being said, we do have some base of unsupervised learning techniques that work quite well in certain applications and settings. These techniques might hold clues for the future of AI research. In this post, I am going to go learn about basic unsupervised learning technique named Clustering and how it can be applied!

**Clustering**

[Clustering](https://towardsdatascience.com/the-5-clustering-algorithms-data-scientists-need-to-know-a36d136ef68) is a technique that involves the grouping of data points. Given a set of data points, we can use a clustering algorithm to classify each point into a specific group. In theory, data points that are in the same group should have similar properties and/or features, while those in different groups should have highly dissimilar properties and/or features. The similarity between points is usually quantified by a distance metric based on some sort of feature variable set.

Clustering techniques are simple yet effective; they require little intensive work yet can often give us very valuable insight of our data. As such, it’s been used in many applications for decades including:

1. Biology, for genetic and species grouping  
2. Medical imaging, for distinguishing between different kinds of tissue  
3. Market research, for understanding the different groups of businesses and customers based on some attributes  
4. Recommendation systems, such as giving you better Amazon suggestions

Just to name a few! Check out the illustration below to see what the process of a typical clustering algorithm looks like.

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| https://3.bp.blogspot.com/-4oT01Ac2708/W_OI4AyT_RI/AAAAAAAAARY/MQBXob8OzNol-znc0ENCK8G3lJahLnNFQCLcBGAs/s1600/AAA.gif |
| The popular K-means clustering algorithm |

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