Assignment 1

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# Evolution of the Web

*What are the main characteristics of three different eras of the web? Give a concrete example for a Web 3.0 development from your personal experience (e.g. search engines, web sites you visit).*

## Web 1.0:

The web mainly contains plain static documents. There is no interaction between the user and the website. View only.

## Web 2.0:

Websites start to interact with the user. Users can actively participate. They can edit and add content to websites. Characteristic websites for web 2.0 are for example blogs and social media websites.

## Web 3.0:

Web 3.0 or the semantic web can be split into semantic markup and semantic web services.

Semantic markup describes the communication gap between human web users and computerized applications. Which basically means to decides what data is relevant and what is not.

Semantic web services use semantic markups to bring relevant data to the clients. Search engines learn from older queries and start to personalize the results.

One example for a semantic web service could be that if I search for a hotel to stay the search could also suggest local events or restaurants and user reviews.

# Computer Science of the 21st Century

*What is the principal difference between computer science of the 20th century and web science? Try to explain based on the characteristics of web science.*

Computer science of the 20th century focused on abstracting hardware. In other words: how to represent and transfer data from the server to the clients.

Modern web services are abstracting software and try to link and combine different resources and services.

## Characteristics:

* **Openness**
  + everybody can act as a provider or consumer of services.
* **Heterogeneity**
  + services are created in isolation from one another thus interoperability is an issue.
* **Distributed’ness**
  + no centralized computing unit
* **Scalability**
  + ability to adapt on growing user size

The Difference between service and a web service is that a service focuses on a single task/job whereas a web service can combine many different services. So a service can be a single unit in a web service.

1. Data Science, Web and Social Considerations

The recent increase in the success of artificial intelligence is not only because the algorithms, but also the increasing amount of data to train them, mostly powered by web. Many of these AI and machine learning techniques are used to support important decisions. Can these algorithms be objective? If not, how can the bias occur? Explain your answer with examples.

Systems that are using machine learning algorithms update their knowledge with experience. Therefore the knowledge is based on statistical data rather than reprogramming. If we look at the programmer (company), such algorithms are pretty objective because the knowledge is independent of the programmer’s beliefs.

But on the other hand, such algorithms are dependent of big data structures, and it’s possible that an algorithm is only looking at data of one type of users or some want to manipulate the data. For example, there was the Microsoft’s AI chatbot that the company described as an experiment in “conversational understanding” [1]. Through the influence of other users, the chatbot tweeted a lot of racist messages in less than a day. It’s a perfect example that the objectiveness of this chatbot got lost pretty easy.

[1] https://www.theverge.com/2016/3/24/11297050/tay-microsoft-chatbot-racist