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Software Studies

Final Synopsis – Reflecting on Input and Output

Introduction

I want to engage in an analysis of the computational concept of Input/output (I/O). By critical thinking and reflection, I want to open up for new insights into the aesthetics of the concept, and try to illuminate the cultural, social and political phenomena's occurring with the contemporary practice of the concept. To do this, I first and foremost want to clarify what the notion of I/O is in the digital world. I will further investigate what kind shapes both input and output can take form? How is the connection between an input and an output defined, are there always an output in case of an input? And where do we especially engage in a collaboration relying on input and output between the human and the machine? This could be a specific instance for submitting inputs to receive wanted outputs. The machine needs some sort of input to deliver and output or for it to even execute anything. We, as humans are interested in the outputs to get what we want or to gain new knowledge or insight, therefore we are constantly feeding our machines with input.

Method

To answer these questions, I want to relate to the use of API's (Application Programming Interface's), that relies very much on inputs and outputs. When working with API's the terms request and response is used, two factors that can both be related to input and output. A request works by submitting an input defining the guidelines to which form you want the response take (inclusions, factors, numbers), the response takes form as an output, answering to the request that has been made. API's are a good example of the notions of precariousness, while using these services you are particularly dependent on circumstances created by the will of another, thus making you lose control of the situation. Once you have made an API request everything is beyond one's control, leaving it up to the API owner what happens next, what is exposed and what is hidden. For this part I seek inspiration from Taina Buchers article, *Objects of intense feeling: The case of the Twitter API* (2013). That is about how third-party developers view and understand the APIs that they are using, and how we may begin to understand the work that APIs perform, the article is asking the

question of whether it simply has become too dangerous to build an application on an API you can't control? A question that clarifies our important reliance on machine output and collaboration.

Inputs are often stored in databases, storing all the data for immediate or later use. It might therefore be interesting to dig in to Paul Dourish's text, NoSQL: The Shifting Materialities of Database Technology (2014). "*The hope is that such a project can speak to the historically situated practices of information processing and provide a perspective from which some of the mutual influences of evolving technical practice and evolving material forms become visible."*

I want to bring forth and illuminate my idea of a precariousness that is experienced while the machine is executing code with a human submitted input, waiting for it to return an output. You are rarely in control of what is being done with the input that you have submitted, numerous events can take place, so what happens during the execution? what links are there in the chain of events occurring after submitting an input? what is exposed to you and what is hidden from your sight and knowledge? With this, I want to discuss the grade of transparency and black-boxing in connection with input and output. With this in mind, I might also work with framing what happens in between an input and the return of output as a "distance" between the two, a measuring with the amount of time and executions taking place. Here I might look for inspiration In Software Studies \ a lexicon by Matthew Fuller in the chapter "Button" written by Søren Pold and in Winnie Soon's final PhD – Executing Liveness, the chapter of "Executing Unpredictable Queries" (2016)

Definition

I/O that is simply pronounced "eye-oh", stands for "Input/Output", on TechTerms they say that "*Computers are based on the fundamental idea that every input results in an output"* (Christensson, I/O Definition, 2006). They further elaborate this with the example that "*if you are running a word processor program and type a sentence on your keyboard, the text will appear on the screen. The keyboard is an input device and the screen are an output device*". So, to go into depth with this concept I need get the technical definitions of both what is considered an input and what is considered an output.

<input>

Again, by looking up input on TechTerms, it is written that "*whenever you enter data into your computer, it is referred to as input*" (Christensson, Input Definition, 2006). So, what are the data's

that can be entered to a machine? If we look towards the personal computer, there is something as simple as the click of a button or the movement of the mouse. There is also text that has been typed to a text processor or made into keywords for a search engine. We are constantly feeding our machines with inputs, it can be entered manually as human to machine or automatically as machine to machine, this for instance from cameras, sensors or measurement units. For most occasions the feeding of input is for purpose of receiving a desired output. The "path" from the input to the output can vary from a very low, to a very high amount of complexity. Meaning the "length" of executions taking place from receiving the core input to the result of the final output can be very long.

</input>

<output>

Output is described as data generated by a computer, this can in a software level be described as the result of a calculation or in physical level be the document printed by a printer, which defines it as an output device (Christensson, Output Definition, 2006). The most commonly used output device is the computer monitor, made for visualization of data. Therefore, I want to investigate and refer to Richard Wright's notion of data visualization (2008). Further I want to clarify how an output can be expected or be seemingly random. I want to look in to the unpredictability and surprise that may occur in the machines return of an output.

</output>

References

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Keywords: input/output (I/O), API, request, response, distance, path, time, execution, precariousness, transparency, black-boxing, unpredictability, surprise, cybernetic, feedback, problem, solution, questions, answers.