Federico Zurani | Lora Bourova | Keny Chan | Niels Gercama
02.10.2023
MA Design & Computation @ UdK / TU Berlin

The life and death of Hans Maximilian

This report documents the process, group dynamic and a few insights into our project on language, play and generation. Specifically, the project resulted in the creation of a device inspired by the well-known kid's toy from Japan named 'Tamagotchi'. The Tamagotchi holds a particularly nostalgic place in the hearts of many in our generation, a memory and theme which invites people to engage quite readily with our project. From a digital interpretation of the theory outlined below, to a coded representation of its language and finally a 3D printed resin object, we reflect on the process which guided us to its creation with interest and no small amount of joy. In particular, we were very happy to showcase the project in a late-stage prototypical format at the Ars Electronica festival in Linz this fall. In this document, the following sections will be discussed:

1. Conceptual and theoretical background of the work thus far
2. A reflection on the group dynamic and the process of working together
3. A brief outlook on future possibilities and interests left unexplored

This report was written by Federico Zurani, Keny Chan and Niels Gercama, although the project could not have been started, created or finished without Lora Bourova, who was simultaneously involved in another project for this studio semester and is writing a report on said project.

Conceptual and Theoretical Background

For this project we focused on language as a recursive system, which led us to apply Chomsky's theory. The project began with a focus on linguistics, specifically Chomsky's (his analysis of basic language components and the language as a recursive system) and some basic notions of how the Sanskrit language works. Instead of a precise question, we had a range of interconnected topics, which prompted us to create a project based largely on our intuitions.
The topics were:

'Web communication codes':

Through social media, memes, video games, comics, and more, we propagated a visual communication code that forms the basis of communication among groups and people in general on the web. This code is not limited to the youth; older individuals also quickly learn the visual and written code specific to the groups they are part of. This "unwritten rules" encompasses behaviours, poses, images, and more, precisely defining belonging to a particular

generation or category. On social media and blogs, these communication codes convey not just values but also a 'vibe,' which we define as the juxtaposition of images and signs that reflects a group identity without explicitly evoking the underlying values.

Video games as communication systems:
We can regard video games as ready-made. Although creating each game requires substantial effort, it results in an interactive system designed for entertainment. These systems can generate simple or complex game scenarios, mediated by both aesthetic and mechanical components. Video games serve as communication systems that persist beyond the gaming experience. Examples like Pokemon, Super Mario, or Tamagotchis endure not only as games but also as interfaces, interactions, and forms of communication that can be adapted to various contexts and media. The aesthetic qualities, game mechanics, and the integrated use of diagrams and text collectively form a communication system that can be repurposed and decontextualized. In this sense, we propose defining video games as 'readymades.' An influential reference for us was the work of the artist Eddo Stern.

Simulation of affectivity:
Building on the preceding points, we explored how to simulate emotions or convey understandable statements using the web communication codes and an interactive, encoded communication system like video games. We focused on an interactive system that simulates communication and caring for a Tamagotchi (virtual pet). To challenge users, we exaggerated the experiment by creating a modular language and user interface, increasing complexity in interactions and pet satisfaction. Initially, we aimed to develop a simple language model based on a modular, repetitive pattern, capable of generating a range of words and sentences. Our approach involved constructing a basic grammar capable of creating up to 24 words through a straightforward geometric system. We designed the language using Panini's Sanskrit grammar rules, allowing for the identification of word meanings and grammatical roles by adding affixes and suffixes to roots. We established rules, starting from concepts like 'void' and 'full,' which could generate diverse meanings within context. None of the signs we used denoted specific roots; they represented concepts such as 'void/full,' 'up/down,' 'plus/minus,' and 'spiritual/material.' Applying these signs according to the rules and within the context of the Tamagotchi experience enabled the creation of words with meaning. The end result was a video game in which players had to decipher the language to understand and meet the needs of the Tamagotchi, including feeding, playing, and showing affection.

Upon completing this phase of the experiment and creating a robust console and video game, we allowed others to interact with the Tamagotchi. While many struggled to grasp the logic of the language, they quickly understood the game's mechanics and appreciated the presented aesthetics. Although the Tamagotchi's language remained challenging to understand due to the

limited time users spent interacting with it, most grasped the essence of the interaction. Our key takeaway was that, rather than focusing solely on a complex language system, the intriguing aspect to explore further lies in nonverbal communication codes and the use of video games as ready-made communicative systems.

Reflection on the group process

The team originally started with Lora and Federico. They were both passionate about exploring generative language concepts and interactive design. Together, they began working on the main project, which eventually ended up as the installation at Ars Electronica. Before the final installation, they also developed a prototype during the midterm of the previous semester. This prototype was more focused on the generative language idea, setting the ground for the later project.
As they decided to join the Ars Electronica exhibition, their roles in the team started to shift. Lora took charge of the product design, focusing on how the Tamagotchi game would look and how users would physically interact with it. She paid great attention to details in the look of the shell, which is also a reminiscence of the original Tamagotchi design. On the other hand, Federico took the lead on 3D character animation and designing various user interactions.
However, as the project evolved, it became clear that they needed more helping hands. They were missing a detailed game logic design and someone skilled in game programming in Unreal Engine. So, Niels joined the team to fill this gap. Based on the original concept, he designed the more detailed game logic and also helped Lora find the right screen and keyboard to match her design vision. Later on, Keny joined the crew to take care of the game programming because Federico felt the project required someone with C++ experience to work in Unreal Engine.
With just one month left until Ars Electronica, the whole team was finally assembled.
Things were looking good initially. Federico and Keny teamed up and worked closely together. Keny developed the animation switching system and the basic interactions with the Tamagotchi. Whenever Federico finished a new animation, it would be seamlessly added to the project. They also spent a lot of time discussing how the actual game should work, like how many states the Tamagotchi should have and how the interaction UI should be designed. By the time the last day arrived, they had fully developed all the main animations and core game functions. The game's look and UI were polished, with only a few minor bugs left that didn't really affect gameplay.
Meanwhile, Lora and Niels were busy sourcing a Raspberry Pi screen that matched Lora's design vision and a soft keyboard that could be customised to fit beneath the buttons. There were some communication hiccups along the way, resulting in one less button than planned. But this issue was resolved through some simple tweaks in the game programming. During the 3D

printing phase, Lora faced challenges with materials and print speed, but thankfully, the 3D printer managed to finish the entire shell just one day before their departure for Ars Electronica. However, our big challenge came when we had to put the software (the game) and hardware (the shell) together for the first time. We didn't have enough time to assemble everything until we arrived in Linz. To our disappointment, we discovered that the buttons were too stiff and didn't respond well when pressed. This could potentially ruin the gameplay experience. We even considered giving up on the interaction part and letting the game run on its own. But a stroke of luck came to our rescue, and we found some sandpaper that helped improve the button response. While the buttons were still a bit stiff, they were finally able to interact with the game as intended.
Just when we thought our troubles were over, disaster struck a day before the exhibition. Keny, while trying to fix the last few game bugs, accidentally dropped the resin-printed shell. It shattered into three pieces, and with only a day left, we couldn't reprint it entirely. We were in a tough spot. However, we didn't give up. With some glue and creative thinking, we managed to patch up the shell. Surprisingly, the repairs made the damage almost invisible, allowing us to display it on time.
Throughout the exhibition, our team continued to face challenges, especially with the buttons.

These issues cropped up from time to time, providing a learning experience for the team. While we couldn't easily fix these problems in Linz, we adapted and learned from the experience. Looking back, our journey was filled with ups and downs. In the early stages, each team member focused on their own strengths, but we also had constant discussions that improved the project as a whole. Our teamwork was smooth, but all the major challenges seemed to emerge right before the deadline. It was unexpected, but we managed to stay calm and find solutions.
In summary, our experience leading up to and during Ars Electronica was a big test to our commitment to their creative vision. We navigated the fine line between creativity and technology, working together to create an ‘cuteness-overloaded’ interactive experience. Despite unexpected challenges, we showed adaptability and conquered all the obstacles.

Outlook

Although we were enthusiastic about the result of our project, in particular the possibility to show a working concept at Ars Electronica at the end of the summer, there are a number of exciting possibilities as of yet unexplored for the Generative Tamagotchi.
Let’s approach the different available improvements and alterations from a top-down perspective, starting from its physical appearance down to the conceptual layer which underpins

its functioning. The outer shell containing the Tamagotchi's hardware sets a ground for further aesthetic incorporation or rather complementation. Meaning that, for an inviting and easy-to-handle feel, our focus was on 'cuteness' and functionality. We did not intend to create a shell too similar to the original Tamagotchi brand, but rather morph outward to accommodate both the hardware and its idea of language. In a sense, the limitation set by the hardware used in term determined the eventual look, forcing us to limit some of Lora's design choices which originally better reflected the concept. In an effort to further compliment our desires and the agenda proposed by the interaction of language in the Generative Tamagotchi, an improved entanglement between the hardware and shell could be implemented.
Our approach to the Tamagotchi construction was further constrained to the limited possibilities of the deployment of its game engine, more specifically, projects built with Unreal Engine but also Unity are not suitable for deployment on small scale devices (at cost). Originally, we had theorised the possibility of deploying the project on a raspberry pi, which should technically be possible, however at the loss of stability and durability. This forced us to opt for a hybrid setup: the Generative Tamagotchi was connected to a PC tower via HDMI and USB, functioning rather as a handheld controller with a built-in display. It is not the technical constraint which interests us as a grounds for improvement - in itself this formed an interesting hybrid possibility. Instead, the unintentional could be embraced as a henceforth intentional rethinking, possibly inverting the flow of construction back down to its conceptual level.
The intention of this part of the report is to reflect on possible further collaboration. Which of the aforementioned steps can be taken relies on an assessment of the further relevance and interest in development of the underlying idea. We formed a basic understanding of a new language, the Generative Tamagotchi's language, which throughout the process remained the most complex to put into context. Do we want to expand upon the notion of play in the language created, or do we intend to redirect our attention to a larger frame, tackling other conversations which came from the process of trying to understand each other? In some way, these moments of misunderstanding or rather complexity revealed the potential for several new streams of thought. For example: in order to achieve an illustrative analog of language in this playful setting, we contemplated doing away with reducing the span of words and instead creating a map between symbols regenerated at each iteration of the game and an accumulation of players' experiences and input. This would in turn reduce the analog of language to a method of survival, as an example based on the metric set by the Tamagotchi environment. Drawing back from this, we contemplated again the use of Natural Language Processing to create 'symbolic clouds' (Word2Vec with K-Means Clustering), which could be paired with what we eventually used (the binary word pairs described in the first part of this report). These are a number of small examples over which the more involved and passionate discussions took place during the group project process, in opposition to choices which were made in a more immediate and unanimous fashion. The latter took place over the body of aesthetic choices and more opaque solutions, which relied on a more individually distributed set of skills. E.g. the particulars of

animating the Tamagotchi did not enter the group discussions as much, since they relied on Federico's background and familiarity with the model, while we placed a well-deserved trust in Lora's hands for the interpretation of our desires when designing the resin shell. As such, the complex and involved discussion relating to the Tamagotchi's model of language remains the more fruitful place of exploration.

In conclusion, the Generative Tamagotchi project presents a number of potential improvements and conceptual explorations. The interplay between its physical shell, language generation, and technical constraints forms a fertile ground for intentional rethinking. The hybrid setup, connecting to a PC tower, unintentionally became a unique possibility, urging us to reconsider its conceptual underpinnings. Moving forward, collaboration hinges on evaluating the continued relevance and interest in developing the underlying idea. The complexity in the incongruities of our project's language invites contemplation to expand play within its linguistic realm or delve into broader conversations stemming from the intricacies of understanding. These nuanced discussions, distinct from more immediate decisions, underscore the project's depth, with the model of language serving as a rich focal point for future exploration.