Design Fiction Report

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What if you could use character creation screens as seen in video games, for your own real babies?

Access the Diegetic Prototype:

https://jribh.github.io/GenoCorp/homepage.htm

Introduction

Set in the year 2035, the design fiction explores a world where gene editing is available for fetuses, but technological limitations only allow for certain abilities to be increased at the cost of others. Basically, the total number of allocated ability points remains the same, akin to how character attributes are set in video games. If some abilities get above average points, others abilities suffer. With only a fixed number of points to choose from, parents have to choose between a given set of five stats wisely (intelligence, strength, emotional control, immunity and confidence).
The rules are simple-

- All fetuses with age ranging from 1-4 months are eligible for the attribute edit program, because that's the time period when the fetus is in its primary developmental stage. After crossing this stage, it is impossible to make any edits to the selections because the attribute values would have been formally registered in the genome.
- To make the technological interface simpler for everyone to understand, as this program is available to the masses worldwide, a total of 50 attribute points have been allocated to each fetus, to be distributed amongst the 5 stats/abilities as mentioned above.

Trends observed

Some technological and behavioral trends have been observed, which cement the possibility of this design fiction premise turning into reality-

Technological advancements:

- The rapidly progressing field of genetic engineering has made genome editing more easily available than ever before. Advancements in understanding of a technique called CRISPR (Clustered Regularly Interspaced Short Palindromic

Repeats) makes genetically altered babies seem like a very plausible part of our near future, especially when one encounters news such as the one claiming how scientists in China were able to make such genetic edits in a fetus (MIT Technology Review, 2018). As a matter of fact, BBC in 2019 claimed that an ethically sound attempt at creating genetically modified babies might be less than two years away.

- Amidst all the positive news of fast advancing technology, one must not overlook the limitations CRISPR faces, and would continue to face for a substantial amount of time. A suite of experiments using gene-editing tool CRISPR–Cas9 to modify human embryos have revealed that the process can make large, unwanted changes to the genome. (Nature, 2020)
- Although genetic variables can be associated with quantitative traits, genes actually have target sites with performance variables splattered all over these sites. Genetic engineering aims to target these sites and not the variables themselves. This results in a lack of complete control over the values of all variables individually, something this design fiction takes into account.
- CRISPR has certain limitations that would be there for a long time- for example, there is no ‘perfect’ or ‘normal’ human genome (Human Genome Editing: Science, Ethics, and Governance, 2017), there are just various types of genomes. This makes it difficult to ‘fine tune abilities’. Thus, for this DF world we are assuming a technology that can increase or decrease abilities, but drastically. The differences would be more than perceptible and not subtle at all.
- There’s further evidence that there are no superior genes, only genes that provide advantages with a tradeoff for other disadvantages. For instance, the COMT gene encodes for the catechol-O-methyltransferase enzyme involved in degradation of dopamine in the prefrontal and temporal cortex. People with two copies of a mutation have a fourfold increase in COMT activity, while if you have

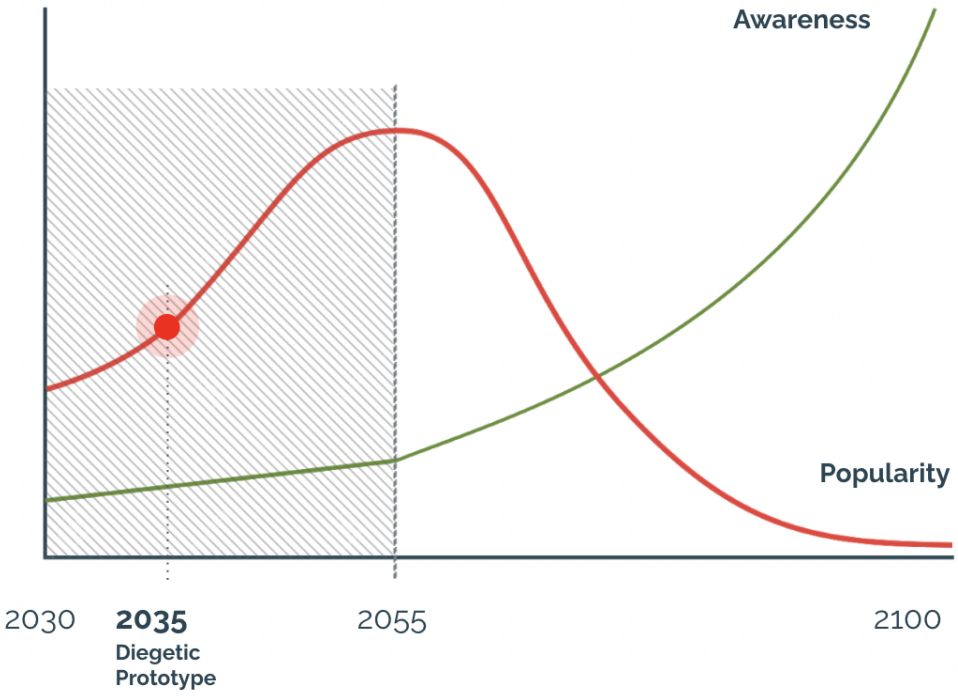
less you may have better concentration, but also be more jittery (Scientific American, 2016).

Behavioural observations:

- The current world strives for utter and sometimes absurd levels of perfectionism; some values are overlooked and some are considered extremely important to possess.
- Parents are getting overprotective, their expectations are getting bigger. This can even lead to moral boundaries getting increasingly blurred, as could be seen in the recent US college admissions scandal.
- In such a scenario, one can only expect the rise of procreative beneficence- it will not only become a right but a duty of parents to manipulate the genetic codes of their children to better their lives.
- People very proficient in something have a usual tradeoff with some other quality, as can be seen in some real world examples around us. As an example, we see how people with reduced or compromised eyesight have heightened spatial awareness and auditory senses. There are also instances that show how very high intelligence can negatively affect personal life and thus, emotional balance of the individual, because of not being able to fit in the society as easily.

Scenario

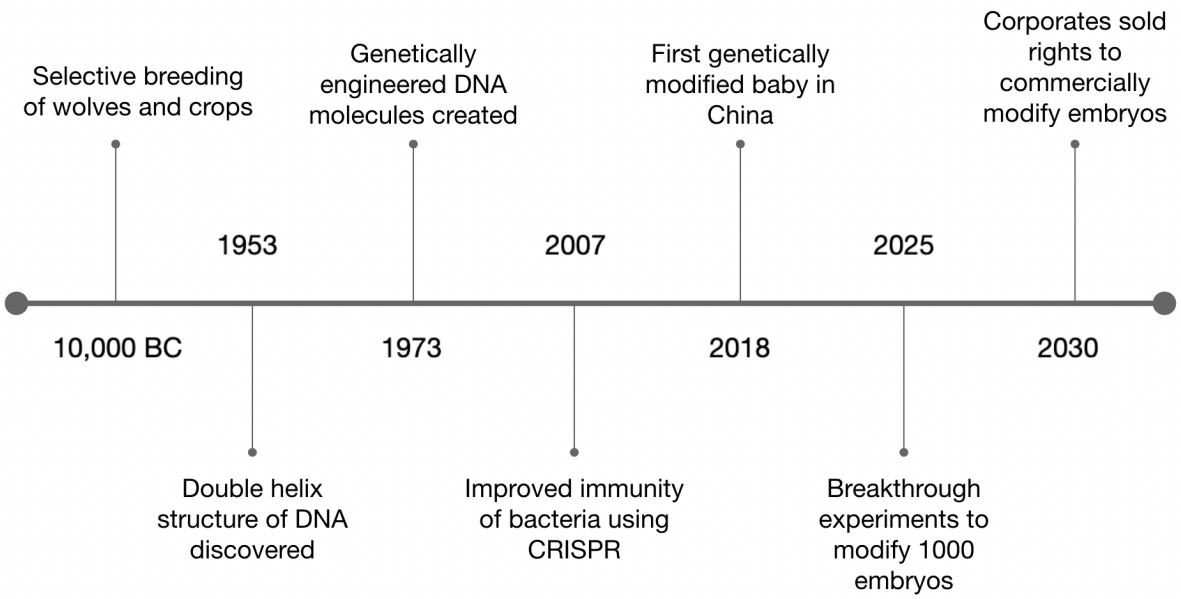
The premise is explored through the eyes of GenoCorp, a corporation that excels in fetus gene editing. GenoCorp is one of less than ten multinationals that provide the gene editing service, has coverage in more than 100 countries, and describes itself as a leader in this space.



As can be seen from the graph, the technology, after becoming commercially available in 2030, reached its peak in around 2055. However, the limitations soon made the masses aware of the adverse effects such a randomly controlled evolution would have on the human race. This led to a gradual decline in popularity over time, as everyone pursued for a better technological alternative that could replace CRISPR and not suffer from the compromises CRISPR has.

For the purpose of this design fiction, the focus would be set on the period before the eventual fall, in the time of ever increasing popularity. The scenario presented by GenoCorp is set in 2035, giving the technology 5 years for market maturity and allowing it to have a global reach.

GenoCorp Archives- A Brief History of Gene Editing



The history of human advancements in genome editing dates back to around 10,000BC, when we began the selective breeding of crops and animals such as wolves, to make them domesticated, and goes on to show how we made our understanding of the genome better over the years. Although CRISPR as a technology was invented decades ago, it was only in 2008 that scientists could actually demonstrate its use by making bacteria have improved immunity against viruses. The timeline above, provided by GenoCorp in their archives, delineates the path innovation in genome engineering took to reach to the stage it is at at present. The decision of the governing bodies to sell fetus modification rights to corporates resulted in the birth of companies like GenoCorp in 2030. A detailed look at the timeline can be found at GenoCorp Archives, here.

Method and Limitations

GenoCorp uses a technique that targets variable sites to change their values. After the customer submits their desired attribute values, constrained by the total number of available points as discussed before, the appropriate sites are decided that should be targeted. This method has its limitations as well, which mainly arise from the fact that performance variables lie close by in these sites. This makes fine tuning and specifically increasing/decreasing traits a challenge, forcing companies like GenoCorp to allocate a fixed number of 50 points for each fetus, to be distributed amongst the five attributes.

Diegetic Prototype

The diegetic prototype for this project is GenoCorp's website, which provides information about genome editing, a trial portal that gives customers a feel of what the real interface at the medical facility would look like, and the documentation and details about the company. Effort has been put into making the UI and interface design feel like a part of 2035, focussing on minimalistic presentation of information. Please note that for the best experience, **one should view the website on Chrome browser on a desktop**.

GenoCorp Homepage

The homepage gives the visitor a brief introduction about GenoCorp and company policy. It also links to the documentation and the simulation portal. It can be accessed from here.

Archives

GenoCorp does a great job of archiving the progress humanity has made in gene editing over time, as has been detailed above, and can be seen here.

Customization Portal

The portal is the most important part of the GenoCorp website, and is made to give a feel to the user of the actual interface they would be dealing with at the medical facility when finally customizing their child's traits, and can be found here. To make the user a bit familiar with the technology's capabilities, GenoCorp has tried to make this portal as close to the actual experience as possible, where the user can tinker with various options while not actually risking the future of their offspring. Apart from the actual interface, the portal also provides the user with a mock registration page and the documentation.

Conclusions and Reflections

The idea of this design fiction allowed me to explore the limitations of a technology that is currently being thought of as invincible and a harbinger of a perfect future for humanity. Gene editing, and CRISPR in particular, is believed to be a near perfect technique that would provide us with nothing short of superhumans. However, as we discussed in the limitations section, it comes with a lot of significant compromises that many people tend to overlook when imagining a perfect future, forcing us to ask the question of whether it will even be a field worth pursuing.

Apart from this, I should point out regarding the diegetic prototype that interfaces in 2035 might look very different from the two dimensional websites we explore today on the internet, with a high probability that we would move on to holographic experiences. However, for telling the story of GenoCorp while being limited by today's technology, a website seemed to be the most appropriate product to prototype.

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