Product Vision Context Project
Desoxyribonucleïnezuur

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1. Introduction

This document is the Product Vision of the Programming Life context. The product vision serves as a guideline to the scrum team, Desoxyribonucleïnezuur, further referred to as “us”. Furthermore, it acts as a means to align stakeholders and customers.

Firstly, we will list the customers of the project and identify the characteristics these groups have. Secondly, we will identify the needs of the customers and how our product solves these needs. Thirdly, the crucial product features are listed and explained. Fourthly, we will compare our product to other existing products, to clarify where our product is unique. Finally, the timeframe in which the product has to be delivered is stated.

2. The Customer

The customer for this product is GenomeViz Inc. Due to recent technological advances, scientists have been able to determine DNA sequences of genomes. GenomeViz Inc. aims to visualize these sequences with our product. Through these interactive visualizations they hope to gain a better understanding of what causes certain differences in organisms.

3. Customer Needs

GenomeViz is doing research in differences on DNA sequences. Finding the differences between two sequences of base pairs can be very complicated. This product aims to visualize these differences in an intuitive way and provide quality of life features, such as bookmarks and history functionality.

4. Product Attributes

To satisfy the aforementioned needs certain key attributes have to be present in the product. These attributes will define when all customer needs are satisfied.

Visualization

Our product needs to support visualization of genomes. The overall genome visualization will be in the form of a graph. This is done by representing similar

segments of DNA in different genomes as a rectangle, which grows with the size of the segment. Differences in genomes should be visualized as an edge going from one rectangle node to multiple rectangle nodes depending on how many genomes differ from one another. The ratio of AT and GC pairs in segments will be visually encoded by color. If a segment contains too little information to be considered useful, the segment will be colored black.

Interactivity

While visualizing the genomes, the product should allow the user to pan over the graph. When selecting a segment, information on that segment should appear in a console. The product should allow zooming and adapt properly to the amount of information shown.

Data Scalability

The product should be able to load files containing at least 250 million base pairs, and 500 different genomes.

5. Comparison With Previous Work

Since the ability to sequence entire genomes is quite new, there are few products available that are comparable with our product. The product that compares best with our product is Bandage (Wick, Schultz, Zobel, & Holt, 2015). Bandage has many of the same visualization aspects and many of the features. It does however differ in a few areas.

First of all, bandage has a 2D graph, while our application will have a 1D graph (meaning that our graph always goes from left to right, while Bandage goes in seemingly random directions).

Second, it does not seem to be possible to see the sequence of a node, except by copying it to the clipboard and pasting it to some text editor.

Further, it does not seem to handle big files very well (human can be loaded, but drawing with a radius of 500 nodes completely freezes it)

Last, our most distinctive feature is the bookmarks. Nodes in bandage can be labeled, but they can only be labeled individually. This means that you cannot include nodes in multiple bookmarks in Bandage. It is also not possible to give a description to labeled nodes, except by putting it in the label name.

6. Project Organization

Timeframe

The product will be developed over the course of 10 weeks. Weekly working versions will be delivered according to the Scrum methodology (Rubin, 2013). The final product will be delivered on friday, the 23rd of June 2017.

Budget

The product will be developed free of charge by a group of students studying computer science at Delft University of Technology.

7. References

Rubin, K. S. (2013). Essential Scrum: a practical guide to the most popular agile process.

Wick R.R., Schultz M.B., Zobel J. & Holt K.E. (2015). Bandage: interactive visualisation of de novo genome assemblies. Bioinformatics, 31(20), 3350-3352.