Project Plan: (Ontology Visualizer)

Written by: (Team No. 15)
(Chandan Singh, Piyush Bansanl, Gv Karthik)

1. Introduction

This document lays out a project plan for the development of Ontology Visualizer Tool system by the project team no.15. The team consists of three SSAD students at the International Institute of Information Technology, Hyderabad.

The intended readers of this document are current developers of the project, end users, and the sponsors of the project. The plan will include, but is not restricted to, a summary of the system functionality, the scope of the project from the perspective of the team no. 15, scheduling and delivery estimates, project risks and how those risks will be mitigated, the process by which team no. 15 will develop the project, and metrics and measurements that will be recorded throughout the project.

2. Overview

The project aims at developing a visualization tool to deal with graphs. The tool is required to be very flexible so that it can be deployed easily and can be easily changed further to cater the needs the needs of the clients.
The idea is to provide user with a platform where he can easily add and delete edges and nodes in a graph. The visualizer should represent the graph in a user-friendly way such that it can be visualized and manipulated easily. It should also give user a way to define certain rules such that the graph is changed according to that rules. Rules may involve to insert or delete a new node in between a cycle or to replace a subgraph with some other subgraph and so on. The tool should also provide the user with an option to collapse a subgraph into a single node and then to expand it later on without changing its connections. The tool also needs to handle conditions such as what happens when the graph becomes very large or if the user defines an ambiguous rule and so on.

2.1 Customers

The customers would be anyone whose primary need is to represent graphs in a responsive and interactive manner. The user would be provided with all the features on Graphical User Interface, which would eliminate the need of prior knowledge of any type of technology, other than the basic graph concept. The current expected users of this project would be people form CEH, who need to represent their data in graph format.

2.2 Functionality

The Ontology Visualizer Tool is a graph visualization tool which would serve basic and advanced functionalities such as:

1. Adding a node in the graph.
2. Deleting one/multiple nodes form the graph.
3. Adding an edge between two already existing nodes.
4. Deleting an already existing edge.
5. Replacing a part of the graph (called sub graph) with another graph.
6. Also, the tool would be capable of identifying basic geometric shapes such a triangle or a rectangle etc . in a graph , and would take commands from the user such as " replace all triangles by rectangles with new node containing some specific data".
7. The tool would also tell the user if his entered rule is ambiguous or is impossible to implement.

2.3 Platform

The Tool is expected to be web based graph visualizer, which would do computing at the server end and render the results at the user end. As of now, we are planning to use JavaScript and basic html5 to create this project. However, if the need arises, we would try to package it in a way that it would a standalone application independent of any other application (in the above case, a browser).

2.4 Development Responsibility

The Project is to be developed by Team no. 15, which includes adding basic and various advanced functionalities stated above. The Database would not be handled / created by the Team no. 15, however the initial example database and database constraints (informally used here) would be provided by the team. The database is expected to be created by the CEH end users/ any other independent user of the product. Also, the project idea has, in general appealed to us, so we would do its maintenance if need arises. The Source code would be open source, which means that it would be available to anyone and everyone provided that the user doesn't use it for commercial purposes without prior permission of team no. 15. That is it would be licensed under Creative Commons, GPLv3.

3. Goals and Scope

The team intends to implement all the functionalities mentioned in Section 2. The scope of the project is quite clear from the functionalities. However for a greater understanding of the scope and analysis point of view, we can safely state that this project can serve as a very powerful tool for anyone desiring to manipulate/represent graphs. It can be used for

teaching purposes in basic Data Structures/Algorithms courses. It can also be used in the field of data analytics where entities are related to one another and a relation(edge) exists between two entities(stock analysists/ Data engineers). Though the functionalities specified in section 2.2.6 and 2.2.7 will be very basic and limited.

4. Deliverables

The Team no. 15 aims to provide the sponsor with the tool which would be a web based application residing on an external server / user's own database and written in JavaScript / html5. Also, if required by the sponsor a fully functional standalone application independent of browser, employing its own applet would be written, however that depends solely on the sponsor's demand.

The end product would also include a Feature specification, which would also be covered in detail in the User Manual.

The team no. 15 would also provide the user with a basic user manual, which would enable a person naïve to programming or any technology use the tool efficiently. For the user's who are interested in studying the source code and modifying it as per their own personal requirements, would be provided with a thorough documentation of the source code , describing in detail each method used (very similar to an API).

Also we aim to provide, along with documentation, test case suites (unit test data) so that it is easier for the next developer of the tool to work and debug the application later.

5. Risk Management

5.1 Risk Identification

- The major risk of this project lies in the visualization of the graph optimally in the space.
- It is also difficult to come up with an algorithm which would help to give an optimal arrangement of the nodes and edges in the space. The difficulty lies in determining the relative spacing of the nodes and that how would adding one node affect all the existing nodes.
- It would also be challenging to integrate such an algorithm with proper visualization and further to develop it as a web application.

5.2 Risk Mitigation

- Proper visualization of the graph can be achieved by integrating the devised algorithm with web layout.
- An algorithm can be devised by abstracting the nodes as some physical quantities and then finding their relative distances and hence the optimal arrangement of all the nodes. For example, the nodes can be assumed to be charged particles whose charge depends on the number of edges arising from it.
- Devising such an algorithm would solve at the backend but to solve at the frontend it would be required to integrate with the GUI through JavaScript and HTML5.

6. Scheduling and Estimates

Milestone	Description	Release Date	Release Iteration
M1	Basic web layout	September 30, 2011	R1
M2	Delete a node, delete an edge	October 7, 2011	R1
M3	Add a node, add an edge	October 14,2011	R1
M4	Replace a subgraph with another	October 21, 2011	R2
M5	Implement the rules specified by the users on the graph	October 28, 20011	R2
M6	Final web layout	November 5, 2011	R2

7. Technical Process

The Project would involve a basic iterative process, where, at the end of each iteration, some features would be added to the Tool. The First iteration would lead to the creation of just the basic web layout of the Tool. Subsequent iterations would lead to addition of functionalities to this tool. The very basic functionalities like addition/ deletion of a node/edge would be implemented in earlier iterations. Later iterations would comprise, implementation of advanced features as stated above. Also, at the end of each iteration we plan to test those particular features by unit test method. This would eliminate the very basic fault in the basic iterative model of development, which is that iterative model doesn’t take into consideration that errors may have crept into the project from previous levels. Since unit testing would be done at each level, such error creeps would be taken care of at a very initial level. At the end, a complete integrated test process is aimed to be conducted which would remove further bugs, which may creep as various modules are woven together to make a complete application. Each iteration would lead to production of various modules which would also be standalone testable units, independent of each other. We plan to employ these ideas in our incremental iterative model based development process.