

Visual Novel Storyline Represented in Graph

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Abstract—Graph are used to represent discrete objects and as a model to solve some problems. Graph can be used to model storyline as well. This paper will use graph to model storyline in visual novel and classify them according to number and type of branching in the storyline.

Index Terms—Directed Graph, Graph, Visual Novel.

I. INTRODUCTION

Visual novel is an interactive fiction game, featuring mostly static graphics that are usually drawn in anime-style arts or sometimes using live-action stills or sometimes video footage. Visual novels are distinguished from other game types by their extremely minimal gameplay. Usually players just have to click to keep the text, graphics, and sounds moving.

There are two types of visual novel, visual novel proper and adventure game. The former consists predominantly of narration and a very minimal gameplay whilst the latter may incorporate problem-solving or other types of gameplay. This paper will focus on visual novel proper type.

Most visual novels have multiple storylines and many endings. The style of gameplay resembles those of *Choose Your Own Adventure* books (series of children *gamebooks* that allows reader to choose where the story goes by making choices out of the options that are given). Most visual novels nowadays focus on pursuing higher level of plot and character depth than the aforementioned series above.

Nonlinear / branching nature of visual novel storyline can be modelled by a graph and classified to several types based on the storyline, choices, and routes.

Writer will classify visual novel in this paper into three category which are kinetic novel, single route visual novel, and multiple route visual novel.



Figure 1.1 Example of Visual Novel Interface

II. FUNDAMENTAL THEORIES

Graph theory was founded in 1736 by Leonhard Euler in his paper titled, *Seven Bridges of Königsberg*. It was the first paper to lay the foundations of graph theory. Euler represented seven bridges in Königsberg as edges and the land as vertex. His paper proved that it was impossible to travel from any starting point and return back to that point by crossing each bridge only once.

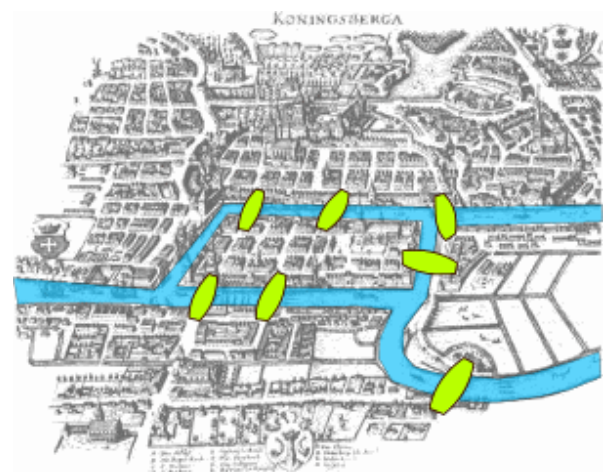


Figure 2.1 Königsberg Bridges

Mathematically graph is defined as pair of sets (V, E) in which V is a not empty set of vertices and E is set of edges that connects a pair or vertices, written as $G(V, E)$.

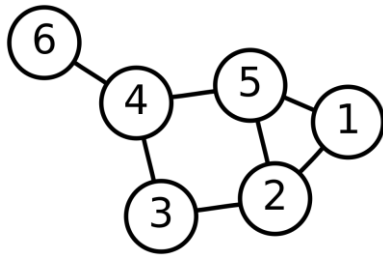


Figure 2.1 Graph

Directed graph or digraph is one type of graph which every edges in the graph have a direction.

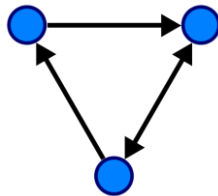


Figure 2.2 Directed Graph or Digraph

III. KINETIC NOVEL

It is a simplest form of visual novel where there is only one storyline and players are still given the choices or there might be none at all. This kind of visual novel resembles normal novel with graphics and sometimes voice enabled if there is no given choice at all, but even if there are choices in kinetic novel, they do not alter the storyline itself as it only has one story line.

Graph representation of Kinetic Novels is modelled on Figure 3.1 below with vertex as the important points in the game and edges as the storyline.

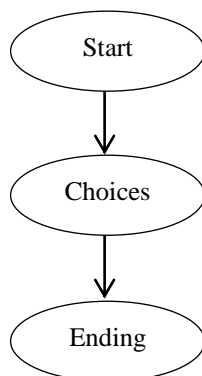


Figure 3.1 Graph Representation of Kinetic Novel

IV. SINGLE ROUTE VISUAL NOVEL

Single route visual novel is a kind of visual novel that only have one route to pursue. Player is given choices that will determine the direction of the story itself. Simplified representation of single route visual novel is shown on Figure 4.1 below to show general form of single route visual novel.

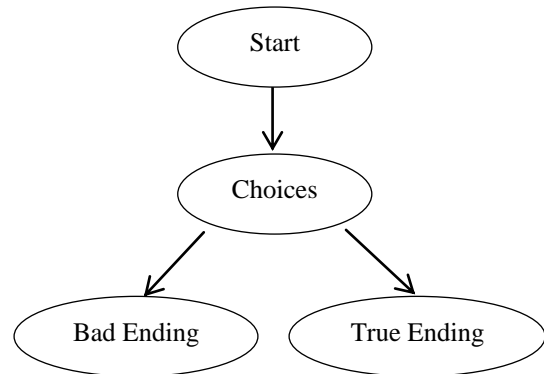


Figure 4.1 Single Route Visual Novel General Form

In Figure 4.1, choices made by player determine the outcome of the story as opposed to choices in kinetic novel which does not affect the storyline at all. There can be more than one bad ending in single route visual novel but it always have only one true ending to the story.

Visual novel that is classified to this category have a general form that is mentioned above, one example of visual novel that are classified into this category is *Tomoyo After: It's a Wonderful Life* by Key. Figure 4.2 is the graph representation for *Tomoyo After* with important choices that determines the branching of storyline as vertex and storyline as edges. Figure 4.2 is an expansion of Figure 4.1 with choices replaced by actual choices in the visual novel itself.

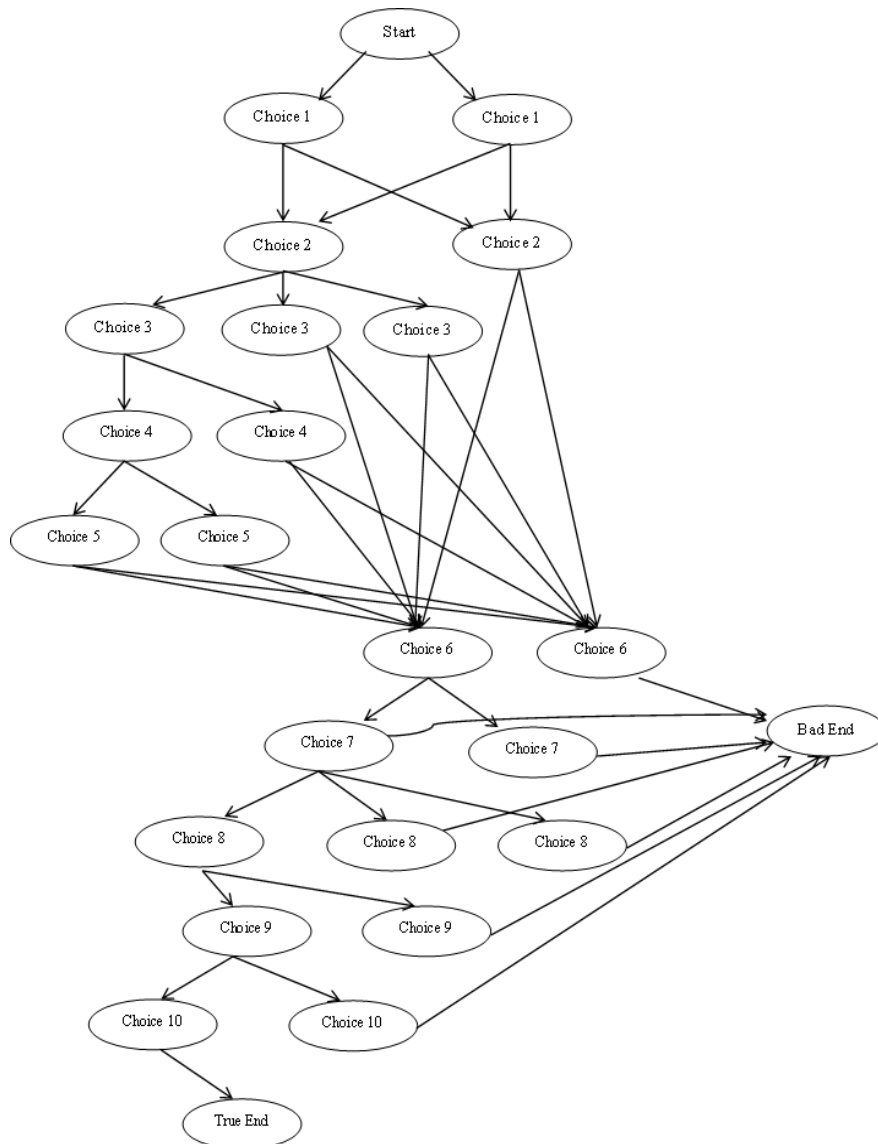


Figure 4.2 Tomoyo After Graph Representation

V. MULTIPLE ROUTE VISUAL NOVEL

Multiple route visual novel is a kind of visual novel that have more than one route to pursue. Player is given choices that will determine the direction of the story and the route. Simplified representation of multiple route visual novel is shown on Figure 5.1.

Figure 5.1 represents multiple route visual novel in general form. Player must make choices that will bring the story to either route 1, 2, 3, ..., n. Each routes can have more than one bad ending but it only has one true ending.

In total it can have maximum of n true ending from n route and minimum of 1 true ending in this type of visual

novel. There are in some cases that a route only has bad ending.

Visual novel that is categorized to this type has the characteristic of general form on Figure 5.1.

One example of visual novel that follows the rule above is *Fate/Stay Night* by Type-Moon and its story has been made into graph form in Figure 5.2 with very important choice as vertex and storyline as edges, actual choices are far more complex than what it is in the graph.

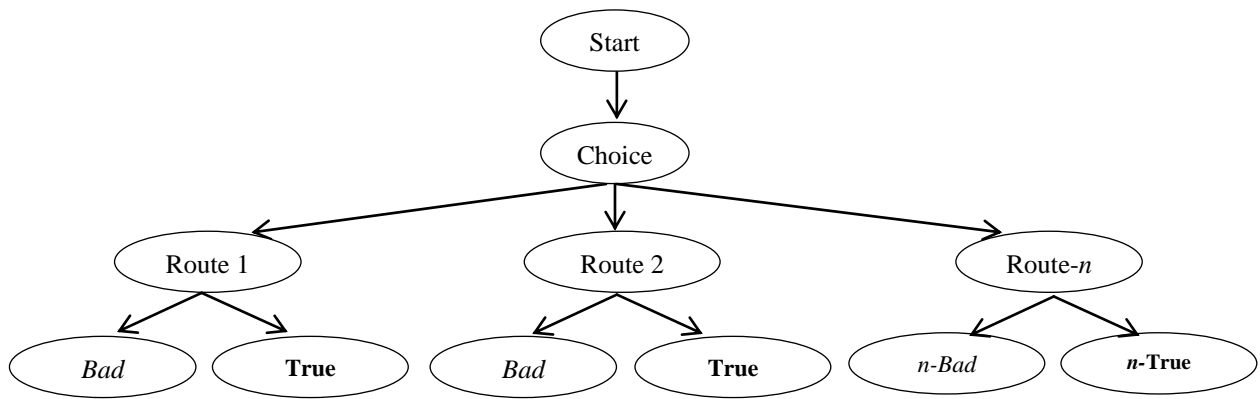


Figure 5.1 Multiple Route Visual Novel General Form

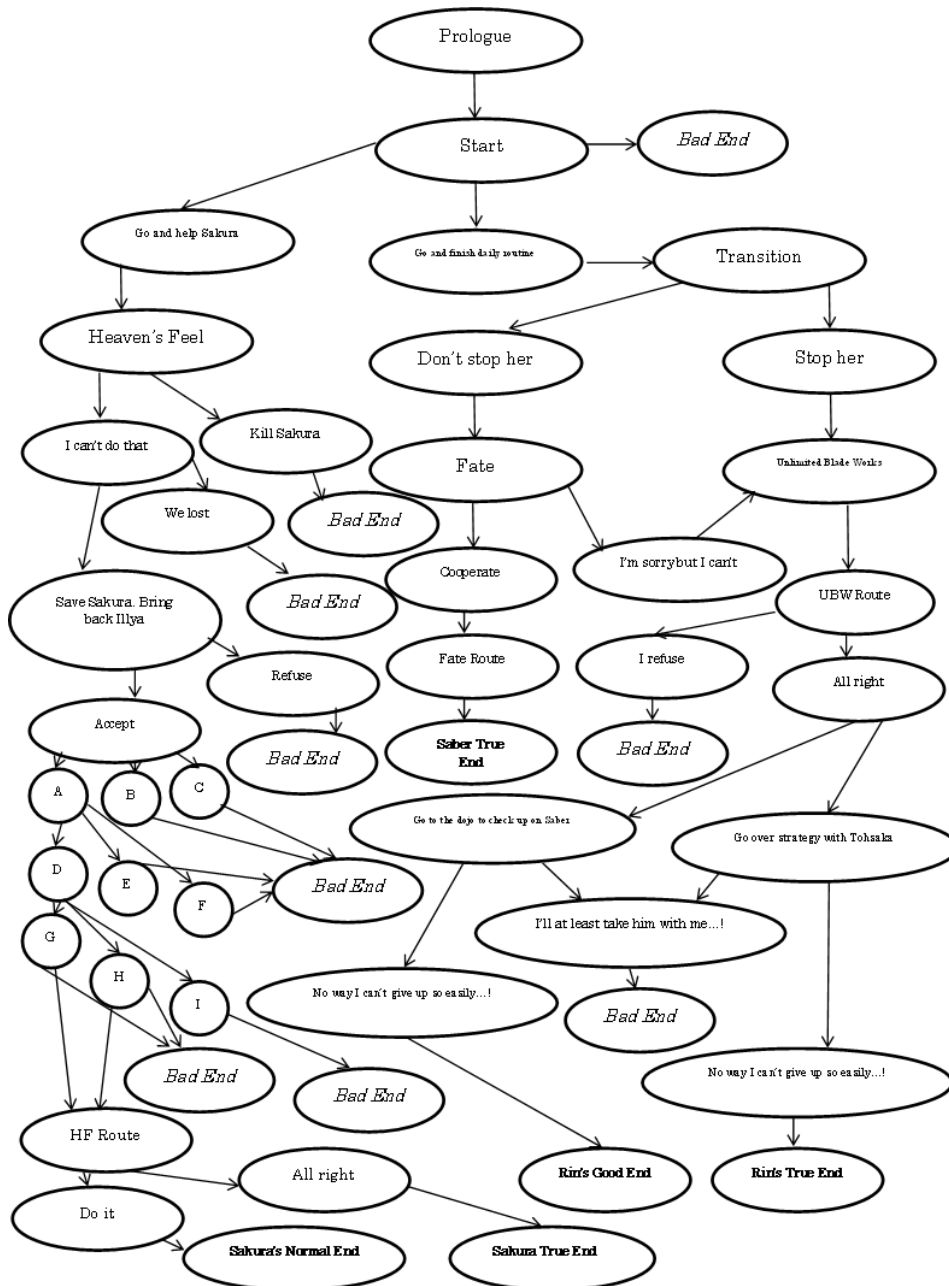


Figure 5.2 Fate/Stay Night Graph Representation

VI. CONCLUSION

Visual novel can be classified into three major classification by its route numbers and graph type of its storyline.

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REFERENCES

<http://s.vndb.org/sf/73/21073.jpg>
(December 17,2013 00:03)

http://upload.wikimedia.org/wikipedia/commons/5/5d/Konigsberg_bridges.png
(December 17, 2013 00:23)

<http://upload.wikimedia.org/wikipedia/commons/thumb/a/a2/Directed.svg/500px-Directed.svg.png>
(December 17, 2013 00:23)

<http://upload.wikimedia.org/wikipedia/commons/thumb/5/5b/6n-graf.svg/1000px-6n-graf.svg.png>
(December 17, 2013 00:23)

Lebowitz, Josiah; Klug, Chris (2011) "Japanese Visual Novel Games"

Munir, Rinaldi (2003) "Matematika Diskrit Edisi Kedua"

Rosen, K.H. (2012) "Discrete Mathematics and Its Applications 7th"

PERNYATAAN

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