Map Location

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Abstract

This paper aims to investigate the interaction between the perspective of a person in a fixed street and the different location the person standing at. In the modelling, the point of view of the person is the key point which connects the location the person standing at and the different buildings. Dependence of the entire model based on the angle. The paper goes on introducing the principles of Empirical Modelling utilized in the processing of completing this model. At the final stage, the advantages and disadvantages would be given.

1   Introduction

This is a paper about an application on Empirical Modelling about Map Location. What Map Location is? It is software developed by the tools of EDEN, like the city map system people usually use to look for places but there are some differences. To some extent, the detailed street scene should be showed in the software, unlike the famous map search engine GOOGLE EARTH. The extra function of the model is that there is a point of view of the person standing in the street himself. The users could not only notice the specific location of that person, but also see what this person observed.

The final model should be able to be used as a web page based software in order to support some kinds of people who want to find a specific building or have a previous scan of this city. At the same time, the focus of this paper will be to critique Empirical Modelling and offer some personal advises to this programming software and the subject EM.

1.1   Background

Time is absolutely a luxury for all of the people living in the earth. In this case, it does not make any sence when we waste too much time in searching a building. Busy people also cannot spend more time in travelling where they want to go. However, some pictures on the web page could not supply enough help as well, pictures of places of interest are static, the guest only can scan the specific angle to these buildings, if the guest wants further information, it is unavailable usually. Behind this rich background, a software which can provide comprehensive point of view is necessary. Empirical Modelling is such a subject to teach students principles and help them develop some useful software like this mentioned before. According to the location the person standing at and the directions of this person looking at, complicated dependencies could be established.

1.2   The process

In Empirical Modelling there are a number of tools and functions can be applied to explore a set of circumstances. In this project, Eden, Donald, and Scout could be used. Donald and Scout there two tools will be used build the entire scene that the project needed. Include the person, the street, buildings, functional buttons, and two main visualization windows for users. Eden is actually powerful tool to achieve diverse complex functions. This environment combines the definitive and procedural paradigms [1]. The colour system could make the screen more clear. Mark the different buildings with colourful shade could essentially help users identify the map.

2   The Study

This section details the outcomes of the use of these three tools chosen for the study: Eden, Donald and Scout. It should be noted that, though the Donald function was used first, it has direct connection with Scout and Eden. Scout part likes a bridge connected Donald and Eden. Finally, all of the functions should be given an expression by Eden. These three separated sections actually have closer relationship.

2.1 Modelling Using Donald

Donald could implement all the basic paint function. It has various definitions to most graphics. All of these graphics based on only one important thing: coordinates. It has a large scope between (0,0) and (1024,1024) which could satisfied various demands. Furthermore, it cleaned itself after the picture was cited by Scout each time with the order 'VIEW-POINT'. Compare to other programming languages, like c, JAVA, Donald provides a fast way to draw graphics, some notations just include one definition and a coordinates. However, in addition to this, the point (0,0) starts at the lower left. The rectangle drew by Donald shows in Fig. 1 below.
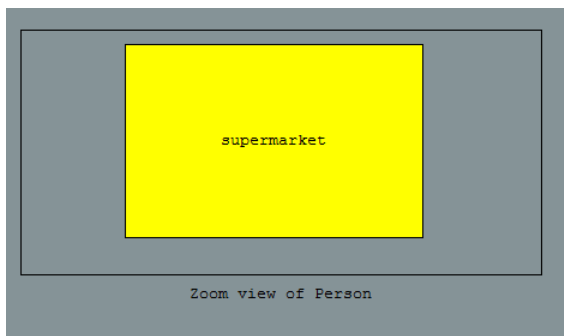
Fig. 1 Coloured rectangle

At the same time, a string named "Super Market" could be labelled on it as well.

2.2 Modelling Using Scout

Scout has the same function with Donald but more formidable. Unlike Donald, it is unlimited in drawing a graphic only if the resolution of your own computer supported. As mentioned above, Scout contains a capability to 'VIEWPORT' the picture drew in Donald. Furthermore, users can define the function of Scout themselves, to be a text box, a frame window, or even attach an existed picture in local computer. It is noteworthy that the (0,0) coordinate starts at the upper left corner different from Donald. The buttons in the project are showed below in Fig. 2.
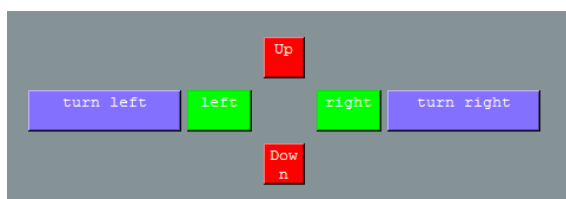
Fig. 2 Buttons

2.3 Modelling Using Eden

The sections Donald and Scout were used to help develop the model. The model is from two view point, one from the head above the person standing at the street like a camera or a satellite. The other one is from the person himself. When users control the location with different various functional buttons, the two screens of different perspective both changed at the same time. Figure 3 and Figure 4 show the different perspectives of the model.
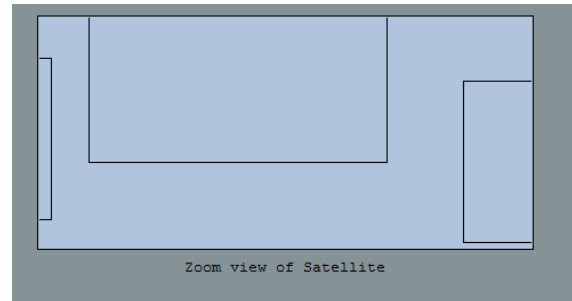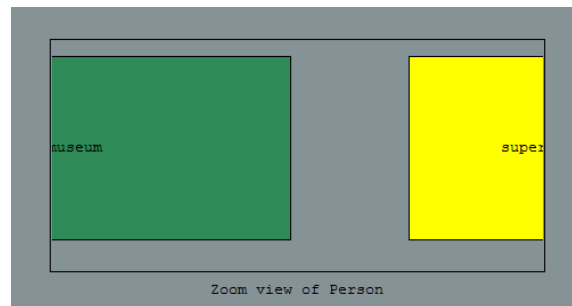
Fig. 3 The viewpoint of satellite

Fig. 4 The viewpoint of person

2.3.1 Model Functionality

The model has been developed to allow users control the person, to observe the whole agents changing, some of scope for interaction with the variables. The variables in the code are based on Donald and Scout for the "person" agent with the addition of the location coordinate changed. The whole interface is showed in figure 5.
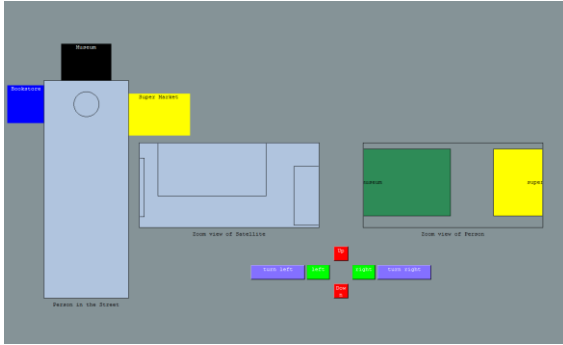
Fig. 5 The whole interface

2.3.2 Dependency in the model

The model has been developed with the Empirical Modelling principal of dependency in mind and so effort has been made to ensure that variables are defined such they are calculated based on the value of some variable to which they are linked [2]. To realize the model better, the information should be clear first. This model contains three main bodies. The person, streets, and objects in streets. Supposed there is a street with a supermarket, a museum and a bookstore. These things are just there and do not change. Then put a living person in street, if he walks, that is relative motion. With the point of view in users' sight, this person supposed to be a labelled point on the map. He can see the objects in streets. What can the person do is walking along the street wherever he wants. Turning left, turning right, or turning back. With the movement of his body, the direction of his face changed, so the view of his eyes changed. Thirdly, the people can see different buildings in the street such as the supermarket or the museum when he walking around. Users could control the people on the map to go anywhere in street. This modelling supplies a chance to users to get an overview of the conditions in the street without being there himself. With the connection of coordinate, though the three tools mentioned above, the person, buildings all have the relationships.

The building coordinate built system works using variable as dependency in the model. The buttons have the functions of controlling are made up of these variables. When users click one button for an action of that person, the whole coordinate changes because all of the points change, so that the graphics in the viewpoint windows change.

On one hand, although sometimes some coordinates do not change with other points, this does not impact the dependency in the model since it is not necessary. For this aspect explained the model being studied. On the other hand, the model could be bet-

ter than now. For example, when users control the person walk to the left direction till the end, if he is facing the bookstore, now the graphic in the viewpoint of person window should be larger than the person standing in the middle of the street. Similarly, the graphic of building supermarket should smaller as well. I tried to achieve this function using four lines to draw each building instead of a rectangle, in order to control the dimension of buildings, but when clicking the turn left or turn right button to let the person rotating angle of 360, the building resumed unabated. Actually in Empirical Modelling, it is enough to use these tools to complete this function and it would make this model truer. But the logic of controlling the size of graphics confused me a long time. If this difficult has been conquered, the model must be more useful.

3 Modelling Methods Compared

Although Empirical Modelling has been exited for about 30 years, the programming language of Modelling should be maturing gradually. As a new user to study from zero, obviously, there are plenty of advantages together with disadvantages.

Eden environment is full of functions defined itself in addition to allowing features such as dependency. Unlike C language, users could define the function as what they like. No statement, no complex definition, only need to explain where this function would be used. Though from the model developed as part of this study it isn't highlighted as well as it might be, an important concept in the Empirical Modelling approach is that the models are agent orientated[3] rather than focusing on the overall process. The notion of dependency is clearly very helpful in terms of modelling, some other aspects of EM such it being agent orientated are useful alternatives. The principles and tools for EM are different to other approaches to modelling and this method should be explored in computer field and more large area together with mathematics modelling.

There are some problems when I did this model and advices to Eden.

It did not type check or validate a reference to a procedure when it was submitted although there are some tips saying "phrase error". No type checking and being allowed to switch a variable that has not been declared from an 'int' to a 'real' was a power feature because it gives more freedom to the author of the model. However, this brings with it a set of problems that are probably the reason type checking has been introduced in modern programming languages. A miss spelt variable name would be readily accepted by the Eden parser and take plenty of time

to identify as the cause of unexpected behaviour in the model [2].

As an original creation modelling language, although it was based on C language, compare with C, it improved a lot. To the user of this language, a graphical interface is quite necessary. For some reason of modelling, choosing to draw a line is more convenient than drawing two pints to take shape of a line. Marked on the scale at the interface is also a good way to help uses to draw graphics.

4 Conclusion

Overall, the model has been finished using the principles and agents, dependency in Empirical Modelling rather than traditional modelling methods. Possible extensions are mentioned in section 2.3.2. The model would supply the ideas to build a multi-functional map system by providing the point of view of the observer's perspective.

References

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