International Journal of Engineering & Technology, 8 (1.9) (2019) 152-156

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Qur'an Basic Game for Fun Learning Using Dynamic Weighting A Star

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Abstract

The phenomenon of people who cannot read the Qur'an in Indonesia is quite significant. There are approximately 65 percent of Indonesian Muslims cannot read the Qur'an and 35 percent could read the Qur'an there are 21 percent who do not want to read the Quran (http://bimasislam.kemenag.go.id, 2015). Needed some strategies in learning to read the Qur'an. Along with technological developments in the media, then the media should be utilized as much as possible to support the learning of the Qur'an for Muslims in Indonesia. The combination of learning in synergy between classical learning method with learning methods based on Information Technology (IT) is expected to produce a model of learning to read the Qur'an so fun and not boring. In this study discusses the making of instructional media-based desktop and or android by combining computer technology with implementing Dynamic Weighting A Star Method on Non Player Character (NPC) so that its movement is better for NPC moves towards the target in accordance with the route that is generated by the algorithms.

Keywords: *Qur'an, Basic Learning, Dynamic Weighting A Star, Algorithms*

1. Introduction

The Qur'an is the word of Allah revealed to the Prophet Muhammad as a miracle. We as individual Muslim is obliged to continue to always read the Qur'an. But sometimes one forgets the importance of reading the Qur'an and also do not care to read the Qur'an with due regard to the science of reading the Qur'an. So we need a discipline of its own on how to read the Qur'an is good and right, in accordance with makhraj each letter.

At the present time, neither the children nor the adults could not read the Qur'an and some even did not understand reading the Qur'an. Therefore, it is highly recommended to get used early on to continue to learn to read the Qur'an.

In This game is educational games that have the genre Adventure Game by reading Al'Qur'an played in single player. The name of this game is to learn to read the Qur'an, because its mission is to find reading the Qur'an in the arena game. In this game there are characters as the main players that will be run by the user, which is the enemy character opponent's character will run automatically by computer. This game is targeted for users who sits in elementary school. This game is more play while learning and can provide insight in reading the Qur'an.



Fig.1: Research object for fun learning qurán basic game.

Fig.1 shows a object model of qurán basic game fun learning. In actuality, the traditional qurán learning process is more boring for several children.

2. Literature Review

Joris Dormans (2010) investigates strategies to generate levels for action adventure games. The approach outlined by this paper distin

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guishes between missions and spaces as two separate structures that need to be generated in two individual steps.

Cavallari, B., Hedberg, J. & Harper, B. (1992). detail an investigation into the educational applicability of adventure games. The current status of adventure games in the classroom, and the need for further research into their educational viability and research possibilities are discussed.

Ismail, Marina, et al.(2011) applied a supplement to the process of learning tajweed which is currently being taught in classroom setting through books and one-to-one interaction with the teacher.

Suriani, M. B. (2004) main focus is to highlight whether games can help the procedure of learning. In summary, the overall findings suggest that game design with regard to functionality of education, and are embedded within rich multimedia based learning environments have the potential to provide user with greatly enrich experience of learning.

3. Method

In this game has a mission is to collect pieces of reading the Qur'an Surat an Nas in the game. Each piece of reading the Qur'an has a bonus score and also minus score, if the player manages to reach the bonus score that has been determined, the player successfully completing the mission of the game to learn to read the Qur'an this. However, if the time has expired, then the game is finished or game over.

Players must search for an item in accordance with the mission of the game to learn to read the Qur'an, which is where each item contains a bonus score and minus score. If the item is taken right it will sound reading Surah An Nas and players will get a bonus score of 100 points. If the items are taken incorrectly or not in accordance with the mission at that level then it will get a reduction of 50 points and appeared Sounds wrong. With the enemy in the game arena will be difficult for players to collect these items.

Implementation of Finite State Machine in this game is to regulate the behavior of the Non-Player Character (NPC) in Figure 2, while the main character's behavior following the orders of people who play games. Here is a picture of Finite State Machine game created:

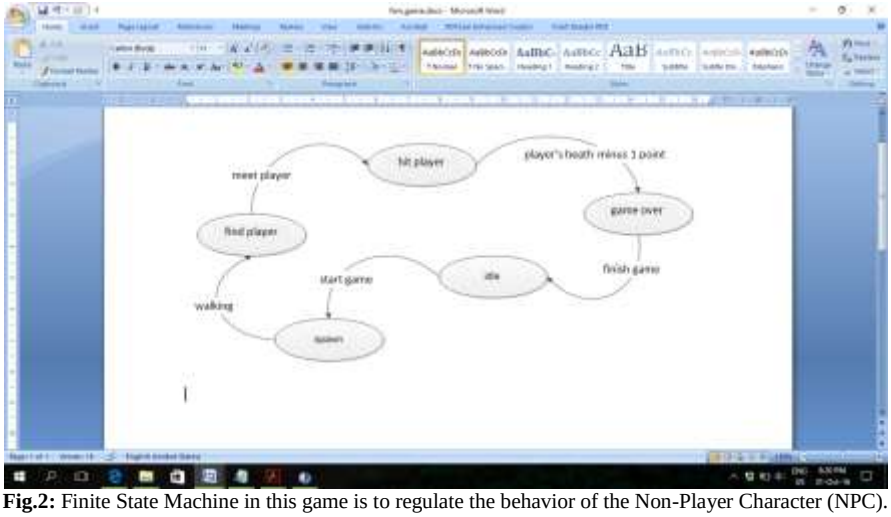


Fig.2: Finite State Machine in this game is to regulate the behavior of the Non-Player Character (NPC).

A Star algorithm is one of the algorithms used as a method for finding routes (pathfinding). Pathfinding is used to determine the direction of movement of an object from one place to another based on the state map and other objects.

The create navigation, we use A Star algorithms. The best-established algorithm for the general searching of optimal paths is A. This heuristic search ranks each node by an estimate of the best route that goes through that node. The typical formula is expressed as (Faisal, Muhammad, et al. 2016; B. Stout. 1996; Muhammad Faisal, et al. 2014).

The algorithm used for pathfinding so many have found, for example, Bellman-Ford, Dijkstra, Floyd-Warshall, A Star , Dynamic Weighting A Star (DWA) and others.

The algorithms will be implemented in the game in this study is the DWA algorithm . But because the algorithm is a development of the A Star algorithm then first discussed on A Star. A Star algorithm is an algorithm that combines the Best First Search Uniform Cost Seach and Greedy Best-First Search. The distance are calculated derived from actual distance, plus the cost estimates. In mathematical notation is written as:

$$f(n) = g(n) + h(n)$$

where :

f (n) = function evaluation (number of g (n) with h (n))

g (n) = distance from start node (implementation in the game)

h (n) = distance of the end node (implementation in the game)

DWA algorithm is an extension of the A * algorithm. * DWA algorithm is one type of algorithm that implements the search system solutions by calculating the value heuristic. Differences with the A Star algorithm is the algorithm provides a dynamic weight value of the heuristic function h. By using this dynamic weight, it can be assumed that at the beginning of the iteration, the search should be carried out in all directions, but so will reach the goal state, the search process can be focused towards more specific.

To do this, one requires the dynamic weight value, where the value will be smaller when they are approaching the goal. The algorithm also still uses heuristic functions, in the mathematical notation written as follows:

*f (n) = g (n) + w (n) * h (n)*
where:
f (n) = function evaluation (number of g (n) with h (n))
g (n) = distance from start node (implementation in the game)
h (n) = distance of the end node (implementation in the game)
w (n) = weight of dynamic

In the formulation of the heuristic function, the value of w should be greater than one. In early iterations, you should use the value of w is very large, and in the next iteration, the value of w can be reduced gradually. By the time the process will achieve the goal, then the value w which used to be closer to the value of 1. From this it can be seen that in the early iterations of the value of h (n) is considered important to be taken into account, while at the time of going to reach the goal, the search process is more influenced by the value actual g (n).

Variations such as this will be felt usefulness in problems with heuristic function produces a value that varies. In other words, there could be cost estimate is very much smaller than the actual costs, and there is also the cost estimate is already very close to the actual cost. This is what distinguishes it from the A Star algorithm, where the A Star algorithm is still the possibility of error in the node generate induced weight that is used all the same node.

Dynamic Weighting A Star (DWA) algorithm can provide the right solution and fast execution time and memory usage is small. DWA execution time is affected by the number of nodes that exist in the problem space. The execution time will increase along with the number of nodes. Dynamic value at DWA influence in finding the goal state, the exact value of w will lead to the right solution, whereas if the value w improper would tend to make the search being misdirected.

DWA algorithm implementation is equal to A Star, but there w conversion mechanism so that the heuristic function to be dynamic. To better understand the DWA, in Fig. 3 illustrates to resolve the issue DWA. As well as on steps to resolve the problem the shortest route to the A Star algorithm, a node that is already in closed in this case is not ignored, but still have to check again whether or not to replace its parent, because the actual cost or g (n) on this masalh value themselves differently in the distance between the knot. Meanwhile, when implemented on a game in unity (discussed in chapter 3), g (n) has the same value is always +10 for horizontal or vertical movement and +14 for diagonal movement.(Suyanto,2011).

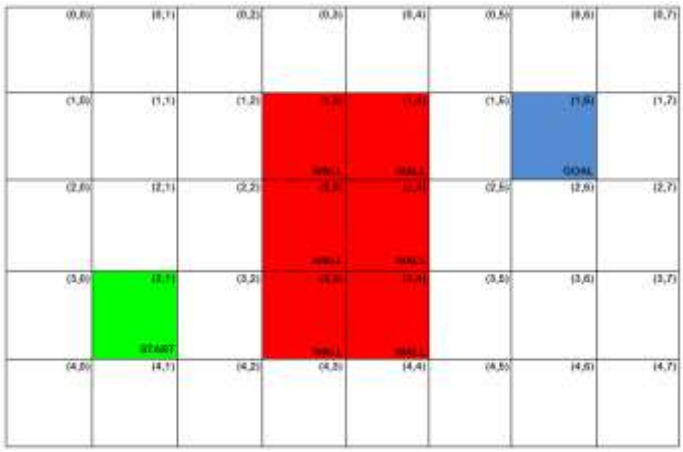
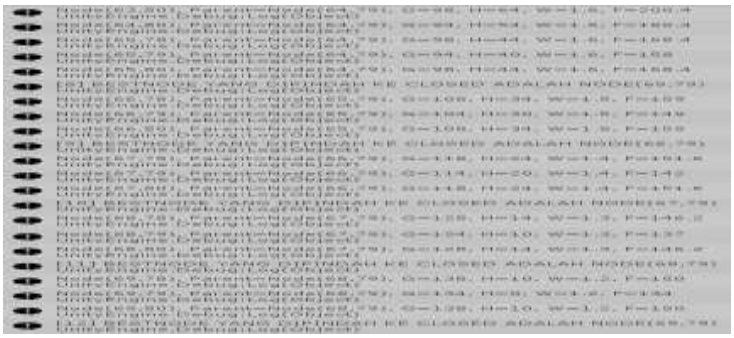


Fig. 3: illustrates to resolve the issue DWA

4. Discussion and Conclusion

A test weighting algorithm Dynamic A Star do to see results from the algorithm implementation to the game that has been created using unity. Figure 4 is a tab to see the unity console that displays the results of the calculation algorithm DWA and in Figure 5 is a scene tab to see the unity that displays a grid, each box use node, used for calculating the DWA algorithm. Published also managed to find the shortest route that the algorithm.



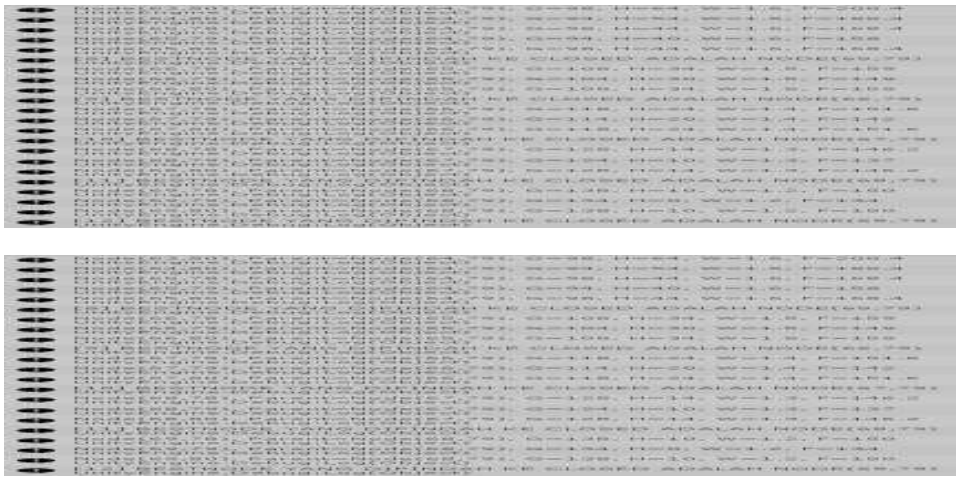


Fig. 4: is a tab to see the unity console that displays the results of the calculation algorithm DWA



Fig 5: A scene tab to see the unity that displays a grid where each grid used for calculating the DWA algorithm



Fig. 6: Successful Shortest route Found On Scene Tab Unity

DWA algorithm successfully applied to the application quran learning game on NPC Army. NPC Army managed to find position of all the data that is in the playing area if they are not taken by a player, then walks to take Sura and get all obstacles during her travels.

Dynamic weight on DWA algorithm has been going well and according to the concept of the algorithm.

One of the advantages of the weight given to the algorithm dynamically DWA is compared with the A Star algorithm, then the algorithm DWA generate fewer nodes than A Star algorithm.

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