

A Quick Way to Reach a Certain Point with Bypassing the Traffic

Amir Masood Bidgoli

MIEEE PHD MANCHSTER UNIVERSITY

Tehran Branch, Islamic Azad University, Tehran, Iran

Seyed Ali Mousavi

Khoramshahr Branch, Islamic Azad University, Khoramshahr, Iran

Hasan Didari Haghighi Fard

SAMA Technical and Vocational Training college, Islamic Azad University, Ahvaz Branch, Ahvaz, Iran

Abstract-- To reach more rapidly from one point to another point in a particular network, Surely we must choose the shortest path from several directions .but usually shortest path has problems such as Traffic, damage,Thus, the node can't reach to particular target with high speed. Due to the above problems, It takes more time to reach to goal point rather other long paths that reach to goal point.To solve this problem we should bypass the traffic.To bypass traffic at any moment, the status of nodes, different routes, and node points and other nodes are compared ,then The best route is selected. For inform from the status of nodes at any moment , the GPS system can be used.using Satellite Systems is another way to know the status of a node.To solve the mentioned problems , We propose a method that use Dedicated wireless system that with Using the equipment, the information is passed from node to server.After transferring data to the server, it should be analyzed to determine the shortest path and the node will aware of the path.for analyze the information the Petri graph is used.

Keywords-node, path, traffic, transfer, Information

INTRODUCTION

To reach a certain point more quickly if the point is a central point and some nodes Simultaneously trying to reach to it , the traffic of path should be controlled and the path with most low traffic should be chosen ,This is a way that usually used For network security , security , military, war and health centers . These equipments controlled automatically and intelligent. We install on vehicles, vessels, aircraft and other transportation equipment a board and then by using the related software desired nodes will be controlled . by Using this method, it is possible for us to view and observing the movement of all nodes that have board and number and situation of them is clear ,so Whenever there is a need , we can obtain information from traffic. With this information we should find the shortest path that has lowest traffic. For example , If the node that we want is an ambulance car that transport a sick or injured person to hospital , All paths that leads to the hospital must be reviewed and decided the path with the lowest traffic routes with minimal traffic and destroyed the same, and then choose the shortest path leading to hospital We lead the way to the hospital. Informed of the status of the nodes is now possible only through GPS That the method is not perfect Using GPS and GSM and GPS by the RSS in this

article have been corrected . Have developed new ideas and approaches to these problems disappear.

The use of GPS systems

One of the ways that you can get traffic conditions Tracing the route node is using Tracker.GPS consists of 24 satellites that The hourly rates for different orbits around the Earth is in orbit Each of the satellites around the Earth would be within 2 days.

Each node can communicate with satellites to point to. Then the Board will be installed on the server node. And software installed on the server Receive data sent from the Board and will analyze them And defines the location of each node and simulate the speed and location using software. From GPS satellites, the two signals can be sent to the board installed on each node. Node can receive the coordinates and direction by receiving and analyzing signals.

*Normal signal or c/a : This signal is for public using and there are no restrictions on it for using.

*Control signal or signal-precision : This signal is reserved only for military applications And now we cannot use it. Thus the above can be discussed only in the first (normal signal). In c/a signal a Pseudo-random code that is equal to 1023 bits Is sent from the satellite to The receiver (Board installed on the node) That its speed is equal to 23.1 mega-bits per second.

Now the boards are installed on each node Can have the following hardware

- 1- Antenna for transmitting and receiving gps signals
- 2-RAM to store the satellite data and the database code
- 3-Registers to store the node coordinates
- 4-Currently, SIM card reader to transfer data to a node (Coordinates, speed, etc.)

As a first stage Signal is sent Randomly As a pseudo-code . After receiving it by Antenna connected to the Board , compare it with the database code of the satellites If the code is approved Namely, to ensure the integrity of sent code , its Confirmation (ack) Sent to satellite by GPS With serial number of the bard . In the second stage, Next Satellite Receives, Receiver serial number from The first satellite and sent the coordinate of x node to receiver. Receiver Receives the coordinate of x node and store it in the register. Then code coordinate and serial number with complexity of grade 2 And to ensure its integrity Sends it to the first satellite. In the third , Next Satellite (third satellite) received Information

from the second satellite And decode it If it was correct ,will send to the receiver the coordinate of y node . After receiving the information, receiver inserts them in the register. Now The exact coordinates of the node has been stable .if the node is in space it can send x,y coordinate to receive the coordinate from The fourth satellite

Analysis moved codes

Navigation codes Is composed of three parts.

A) first part Includes of Date and time of sending message, Status and well being the Satellite

b) Part II ,is the Astronomical Data of receiver

c)third part is named Calendar Calendar that update the information of All 24 satellites Every 30 minutes. The transmission speed of messages is 50 bits per second

Advantages and Disadvantages of above systems

1- GPS system

Advantages : The advantages of this system can be referred to Global coverage by these satellites Also Highest accuracy in determining the desired position Also The equipment cost of the receiver is low

Disadvantages : In contrast to these advantages, there are disadvantages to this system , Regional dysfunction In dense urban areas and break down in Closing pressures and using an interface To transfer data from client to server (Such as SIM cards)

2-fixed satellite system

Advantages : The advantages of this system can be referred to Global coverage by these satellites Also No need for mobile communication systems

Disadvantages : there is need strong transporter for data transfer (Coordinates and controls) Otherwise tall buildings of city may block the transfer.

2- Using fixed satellite system

Another type of Intelligent Tracking Systems Which makes tracking nodes In a certain direction is using of fixed satellite systems.

Velocity of these satellites Is equal to velocity of the earth And Spins at 22,238 miles above Earth's surface . Consequently Position of this satellite always unchanged and to use of it's signals we can set receiver's Frequency in ku band range (14 to 16 MHz) Transfer information from node to server To monitor the tracks. After choosing one of these two systems (in Iran gps is commonly used) Coordinates of the nodes must be transmitted to the server. The cellular system is one of the methods for transferring data to a server node. The cellular communication is a bilateral system that nowadays is used in mobiles.

In this method Information is transferred Through the SIM card that is installed on the Board to closest Telecommunication tower witch covers the SIM card.

Then information Transferred from the tower to central tower and this transmission will continued till the information reach to receiver and it deliver to server. For using this method one sim card will add on Board. this sim card have the duty of data transmission. Data transfer methods used by the mobile cellular system

1-information transfer pointy(GSM)

This data transfer speed is much less than other methods. Nowadays, this method Are used for sending SMS. This data is transmitted in packets of 50 kbs.if the volume of per data is more than 50 kbs. The data is divided into several parts and is sent successively. Because of high costs and low speed this method is not used for data transfer, because until Obtain information from the node to server may change its position and the previous coordinates have no value.

2) INFORMATION TRANSMISSION USING GPRS SYSTEM

For data transfer between nodes and server this method can be used.

This method is faster than GSM and audio and video data can also be transported in a moment. For example, the alarm, hints and ... could be transferred from control center to the node Also speed control, heat, light, turning off-on of the node can be done using GPRS.

After receiving the coordinates of a node using one of these two technologies, with using a SIM card Easily transferring to the control center or server will be done and the coordinates would analyzed and use to determine the location of the nodes.

If we use the second method, security issues can be applied to nodes. For example, after receiving the coordinates and direction and speed of a node, it can be analyzed.if the speed of node is higher than allowed rate , Assuming that the node is a private car After three warning message on the monitor node, if node don't reduce speed it can turn off the car from control center Or number and position of the car will be sent automatically on the mobile of police and The simulated path will automatically sent to the mobile .

Using dedicated telecommunication lines

This method uses the cell phone system and the infrastructure, equipment and cost conditions are ideal.Because using a SIM card that produce in low cost by telecom companies and there is no need to expensive equipment and telecommunication network design and architecture transition to active GPRS in any other node. Sometimes telecommunications network that include transmission equipment may face with the disorder. For example, in a short part of time, the GPRS system or GSM system may break down, so with considering this Assumption Project may fail

Solution:

Our proposed solution is using of wireless leased lines with fixed broadband to transfer information. Because these lines are used exclusively for this project And does not popular .by using these lines , Reducing risk, traffic, interference, disturbances will be Obtained To transfer information with this method A specific frequency transmitter and receiver are installed on boards and by that, the Node is connected to the server. For transmission information from board to server, every few miles a tower is built. Information will be sent with this towers step by step to another tower till to reach to server and vice versa.

To use this method, instead of installing sim card on boards, we could use a 3.5-inch nano with a frequency of 1600. As a result, information is transferred with the speed of 700 Mbps. Also on each tower a radio with 360 degree aye can be used and Using a signal amplifier after a few tower would be the logical .

Choosing the shortest path

According to The cases that mentioned above, we could simulate Different paths and nodes which are in paths And get informed from the traffic in the way ,before reaching to the Desired point. Now, We should choose the shortest path between paths that has same traffic And we issued the s command to move nodes. Therefore we send the information that is included of shortest path and Most low-traffic path to the monitor which is installed on board of the node.

Find the shortest path

to find the shortest path ,we use Petri net. In this case we define for each node a graph with 6 elements, (N=(P,T,F,M.,K,W),in this graph ,P element is node location and T is Transmission path .therefore each node for reach from origin to destination should move on T element .in some conditions , There may be a crossroads.

When a node is over a crossroads, three-way or four-way, it, monitoring of each four ways should be considered and the traffic should considered just like Previous case.

M is named Preliminary definitions or The first point. some times it is shown with i .

K defines the High Range of each node in the path and w checks the distance From one node to another node And helps to prevent from accidents. For Always giving priority to the first node, we consider The way of accessing to transmission line as token. Assume n is a node. We consider ni as beginning point and nj as end point. The distance between I and j is named S.

If d be length of path ,therefore $w(s*d)$ that is weight of path is contained from bellow formula :

$$W(s*d)=V*t*d$$

We consider that the d collection may be 1,2,3,...According to the above definition, it can be said , the wight of various paths is changeable toward size of d and each path that has minimum size of d is Shortest path therefore

$$W(s(d))=\min td*V=\min w(sd)$$

CONCLUSION

Nowadays GPS is using for monitor various paths, by that the coordinate of a path is taken from satellites that are in around the earth and will Be transferred to the server for monitoring. Hereby At any moment the status of a node is determined for server managers and other nodes. Therefore they informed from traffic of path. Sometimes Because of using mobile phone's sim cards and using GSM and GPRS Technologies the network is brokeed down And for a few times all communication between nodes and control center will be Disconnected.

We've raised the idea of using dedicated lines To solve these problems That sometimes impose Irreparable damage to the projects and make the projects failed.

Instead of using a SIM card we can use on-board 3.5-inch Nano station and set the 16000 frequency with 700 trunk, therefore information will send with 700 Mb per second also we can use towers that distance between them is 15 km between node and server.

It is good to use a signal amplifier after each tower. JPT or RVM Amplifiers can be used. After monitoring the path, Among the few tracks with the same traffic we should choose the shortest path. We Investigate All routes one by one and with comparing the weights of paths , The shortest path that has less complexity will be choosen.

REFERENCES

- [1] Yuan Chongyi, Petri network principle, Electronic Industry Press,1998
- [2] Feldmann K,Schnur C, Colombo W.Modularised,distributed real-time control of flexible production cells,using Petri nets. Control Engineering Practice, 1996,4(8):1067-1078.
- [3] Zhiwu Li,Na Wei,Rongming Zhu.Deadlock prevention policy for FMS using Petri nets.International Conference on Control and Have it to the route shortest: Automation,2005,2(2):1187-1192.
- [4] Bo Huang,Fang Zhou,Ya-Min Sun.A Multimodal Integration Model of Military Cotrol Systems. Journal of System Simulation,2004,16(10):2135-2139.
- [5] Claude Girault,Rudiger Valk. System engineering petri network-Modeling, proving and employing the guide,Electronic Industry Press,2005
- [6] Simon Hardy ,Pierre N.Robillard, Petri net-based method for the analysis of the dynamics of signal propagation in signaling pathways Jan2008, Vol. 24 Issue 2, p209-209, 1p
- [7] Latif Salum.Petri nets and time modeling [J].The International Journal of Advanced Manufacturing Technology, 2007, (6),London:Springer.
- [8] Peterson J L. Petri Net Thoery and the Modeling of System. Prenticehall, 1983
- [9] Carlier J,Chretienne P. Timed Petri Net Schedules.LNCS,Springer-Verlag,1988;62-84