

# An Exploration of Robot Utilization for Vehicles in Tracking Shortest Route

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**Abstract-** It is evident to state that the robotics is the arm of science and technology that is confined to build robots with high level of confidential information. For every developing countries robotics has proved to be an asset for the world wide nation, rather describing its value as a whole. This paper not only includes current but the future amendments. Today, robotics is a quickly arising field, as a technology advancement, day by day research that aims in building new types of robots to serve various practical purposes, whether it is domestically, commercially, or on a militarily significant scale. From this paper robotics phenomena can be explained in dealing with designing, construction and operation. In this report we explored its overview, history and implementation for finding the shortest path from source to destination using Kruskal's Algorithm.

**Keywords:** Robots, Kruskal, Spanning Tree, Sensors, Datawarehouse, Image Processing.

## I. INTRODUCTION

Robotics is the arm of science and technology that deals with the aim, intention, construction, operation, and application of robots, as well as computer systems also plays a important role for their control, sensory feedback, and data processing. The word robot[1][2] has been derived from the Slavic word Robot, which means Labour. It is a man-made machine that can perform work or any other actions which is normally performed by humans, either automatically or by remote control. Robotics has been frequently seen to mime human behavior and also manages tasks in a similar fashion. Today, robotics is a rapidly growing field because of the technological advancement, continue research, aim, and building new robots serve various practical purposes, whether it is domestically, commercially, or militarily. Through some components every robot works that is power source[3][4](batteries, pneumatic, hydraulics etc.), actuation, electric motors, linear actuators, series elastic actuators, air muscles, muscle wire, electro active polymers, piezo motors(also called ultrasonic motors), elastic nanotubes, sensors like LIDAR, RADAR, SONAR, tactile sensors, vision and also artificial intelligence[5][6]. There are many other components which are used according to the work of robots.

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A programmer plays a vital part and is the only person who gives the 'smartness' to the robot. A smart and well programmed robot contains lots of sensors, control systems, manipulators, power supplies, hardware and software which all working together to perform a specific task according to the programmer wants. A robot is a combination of all types of engineering as well as physics, mathematics and computing which can be either use for designing or building it or for doing programming and testing. Most of the robots are used to do repetitive jobs which might be create a boredom for a individual and also considered as too dangerous for humans.

They are used in factories to build things like vehicles (land, air or water). Some robots are also even designed to explore deep underwater and out in space. NASA is the big example that has been sent robots to explore other planets that is 'Moon and Mars'.

## II. USE OF ROBOTS

The reason behind the use of robots is it is cheaper as compared to manual labour[7][8][9], and makes the work easier thus saving time and sometimes it is the only way through which we can get the things done technically. Robots can be inquire inside gas tanks, near volcanoes, on Planets and other places which are too dangerous and are not suitable for humans to go there. Robots never get sick, quarrel, vulnerable and bored which become sophisticated for a human being, also robots do not need any type of leave, they can work 24-7 hours a day if necessary, and one of the best thing about robots is they do not ever complain and always having allegiance towards their wizard. They can move, push, pull and pick up stuff that one could never dream about moving that stuff. Robots can help us out a lot more than we assume[10][11]. We can feel safer with a robot operating on us than a person. Robot's do not make mistakes that people do all the time, even professional ones having a lots of experience.

## III. TYPE OF ROBOTS

Modern robots are used for different types of operations[11][12]. They are:

1. Collaborative robots- These robots can safely and very effectively interact with human workers in the performance of simple industrial tasks. However, end effectors and other environmental conditions could create hazards or problems, and thus a risk assessment is done with any industrial motion control application.

2. Military robots- These robots are used for a military purpose. Also, they are more complex, there should be more attention needed to implications of their ability to make autonomous decision. Quadrupedal military robot is a big example of military robots.

3. Factory robots- These robots are widely used for making production faster and cheaper. For a car production, packaging, printed circuit boards(PCBs) production. These robots are far out performing a human in speed, accuracy and reliability.

4. Industrial robots- It usually consist of a jointed arm on a fixed surface. It is generally used for a specific work that uses the same process to do that work again and again to avoid boredom. A pick and place robot is widely used in industry.

5. Mobile robot- It has the capability to move around in his environment and are also not fixed to one physical location. An automatic guided vehicle is a mobile robot that follows marks and wires in the floor or uses vision or lasers. These robots are mainly found in industry military and mainly in security environments.

Some other robots which contribute an important role in the field of science and technology.

- ASIMO Robot is a humanoid robot
- Articulated welding robots is a type of industrial robot
- Quadrupedal robot cheetah is used for military

#### IV. PROBLEM STATEMENT

Imagine a future where we are surrounded with electronic gadgets like mobile phones, cars and online services that can read our minds and react to our moods. Suppose we are working with a major manufacturer to implement this system in vehicle that would give variety of routes including source to destination through which it can travel, possible problems it may face on the way and those can be removed in an automated way. The system is computerized and designed so that it can detect all the special features of the vehicle and suggest the best-shortest route with low fuel consumption thus making the entire system automated without manual labour. Using a digital video camera, the mind-reading computer system is fitted to the freight where we input the source and destination of the transportation system for the goods to be delivered along with the type and no. of goods.

#### V. PROPOSED ALGORITHM

Algorithm for real-time vehicle operation for developing a knowledge based innovative perspective :

Step I: Input the video of real time movement of vehicle.

Step II: The different possible paths from source to destination can be retrieved from an existing automated database.

Step III: Kruskal's Algorithm is used to find the shortest, non-cyclic path by which congestion can be overcome by the vehicle.

- In Kruskal we cover all the nodes.
- The minimum distance is found.
- No cycle is formed in the graph.

Step IV: The robot controlled vehicle would be regulated automatically by the motion sensors attached to it by reading the images obtained from the MRI(Magnetic Resonance Imaging) of the user(robot) who is controlling it.

Step V: A decision support datawarehouse is developed both for source and destination and images obtained from MRI.

Step VI: This Intelligent System can be helpful in developing a smart vehicle.

An Kruskal's algorithm to find a minimum spanning tree for the graph.

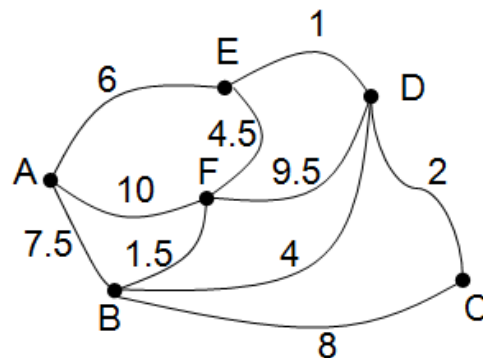


Fig.1 Minimum spanning Tree - Kruskal Tree

The total weight of the tree is 16.5.

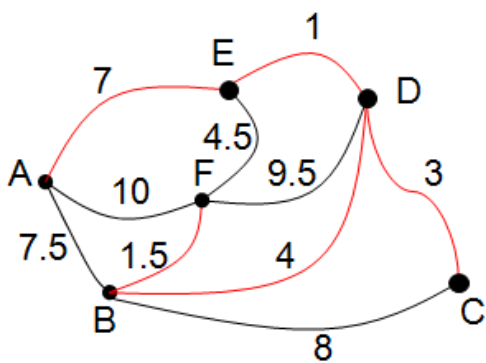


Fig.2 Minimum spanning Tree - Krukul Tree

Fig.1 shows different weighted path from one node to the other.

First, we choose ED (the smallest weight). Next we choose the next smallest weight i.e BF Now CD and then BD and last is EF , but that would create a cycle so we choose AE and we are done. So finally we obtain the weight 16.5. The result is obtained by keeping in mind the three concepts that is we cover all the nodes, minimum distance is found and no cycle is found.

## VI. CONCLUSION

With the fast growing technology in robotics, there is a seemingly increase of interest in designing artificial intelligence robots. Within artificial intelligence mechanism which promotes highly parallel processing and computing that allows the enhancements on the robot capability. It is a atone in the field of technology. It helps in the progress and development of countries as well as advances in science and technology.

## VII. FUTURE SCOPES

It is the big problem in robots that they do not have their own mind that is why they are unable to take any type of decisions at a time of hazard. Since, their works are generally repetitive works. So artificial brain for robot is developed using artificial intelligence. Robots are not able to work until the instructions are not given properly by the programmer or the individual who is handling it. The main problem is to maintain a balance between robots and human workers so that conflicts can be reduced between them which makes the work more efficient and reliable. If the robots are kidnapped or its functionality is change by an unauthorized person through that he can misuse

it or use it in a wrong direction against the wizard or the authorized person which can become a big problem for individual, organisation, country and other one also. So further security of a robot has to be established. Mind control system will be also taking robotics at another level and in a more complex level which enhance the quality and become a remarkable achievement in the field of robotics.

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