1.INTRODUCTION

1.1 OVERVIEW

Generally in a warehouse there are many items that are stored. These items may be finished products or even raw materials. So whenever there is any order for items these items need to be picked from the warehouse and delivered. In order to do this the warehouse needs to be travelled to pick the required items. As the warehouse is big and we have huge possibilities that the required items will be in different locations in the warehouse we have problems regarding which item to pick after picking one item. So in order to solve this problem we determine an optimal path through which we can pick all the required items in a single journey. This process is called routing. Using this process a path which uses less time to pick all the items can be determined. So for doing this routing, we use genetic algorithm. A Genetic Algorithm is a population based search and Optimization method that mimics the process of natural evolution. This algorithm takes the distance between the items in the warehouse and calculates the fitness scores there by prioritizing the path. Here a population size will be taken and based on it no. of chromosomes are produced. The fitness scores are compared between and then these chromosomes are mated to produce the child chromosomes. Then the child chromosomes are further mated in a process called mutation and the process continues

and then we get a final chromosome which will be our desires optimal path.

1.2 STATEMENT OF THE PROBLEM

In the future it is expected that robots can do the same activities as the operators in a traditional warehouse. So, one could have a warehouse where both robots and operators are responsible for replenishment and picking tasks. The assignment is to make a system where we can learn from the operators in the WH (how is the slotting and picking routes operator uses). The idea is to use artificial intelligence, that learns from operators, to develop a strategy which will be used to instruct Robots.

1.3 OBJECTIVES

There are certain objectives that are satisfied on picking these routes. They are:

1. **Minimize Time:** This is the main objective of the routing process. The time taken for picking items should be lessened by determining effective and optimal path to pick the items.
2. **Minimize work load:** Determining an effective route for picking items reduces the workload on the workers and even the transport units. By predefined paths the workers need not think about in which path to go in the warehouse thereby decreasing the mental thinking.
3. **Increase in picking efficiency:** There should be a significant increase in picking efficiency. The no. of items picked with in a certain amount of time should increase.
4. **Minimize distance travelled:** The distance travelled with in the warehouse should be minimized. The picker should be able to pick the shortest path in order to pick the item that are required.

1.4 SCOPE

Proposed System:

1.This project is to construct an efficient route picking system to determine the shortest possible path in a warehouse.

2. In this the admin can simply give items that needs to be delivered from the warehouse.

3.After that our system prepares the picking list and it wil be used to pick the required items by the picker.

4.It works based on the genetic algorithm.

1.5 APPLICATIONS

There are several applications for the genetic algorithm we are using here.

They are:

Robotics

Robotics involves human designers and engineers trying out all sorts of things in order to create useful machines that can do work for humans. Each robot's design is dependent on the job or jobs it is intended to do, so there are many different designs out there. GAs can be programmed to search for a range of optimal designs and components for each specific use, or to return results for entirely new types of robots that can perform multiple tasks and have more general application. GA-designed robotics just might get us those nifty multi-purpose, learning robots we've been expecting any year now since we watched the Jetsons as kids, who will cook our meals, do our laundry and even clean the bathroom for us!

Automotive Design

Using Genetic Algorithms [GAs] to both design composite materials and aerodynamic shapes for race cars and regular means of transportation (including aviation) can return combinations of best

materials and best engineering to provide faster, lighter, more fuel efficient and safer vehicles for all the things we use vehicles for. Rather than spending years in laboratories working with polymers, wind tunnels and balsa wood shapes, the processes can be done much quicker and more efficiently by computer modeling using GA.

Computer Gaming

Those who spend some of their time playing computer Sims games (creating their own civilizations and evolving them) will often find themselves playing against sophisticated artificial intelligence GAs instead of against other human players online. These GAs have been programmed to incorporate the most successful strategies from previous games – the programs 'learn' – and usually incorporate data derived from game theory in their design.

DNA Analysis

GAs have been used to determine the structure of DNA using spectrometric data about the sample.

1.6 LIMITATIONS

- Repeated fitness function evaluation for complex problems is often the most limiting segment of genetic algorithms. Finding the optimal solution to complex high-dimensional problems often requires very expensive fitness function evaluations. In real world problems, a single function evaluation may require several hours to several days of complete simulation.
- Genetic algorithms do not scale well with complexity. That is, where the number of elements which are exposed to mutation is large there is often an exponential increase in search space size. This makes it extremely difficult to use the technique on problems such as designing an engine, a house or plane.
- The "better" solution is only in comparison to other solutions. As a result, the stop criterion is not clear in every problem.
- For problems with more amounts of input data, it becomes difficult in order to determine or set a stop criterion because it takes more time for the processes like mutation, selection and crossover. With the complexity in data the complexity in the solution increases.