Dynamic Highway

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Abstract— We introduce a dynamic technique for fast route planning in large road networks. For the first time it is possible to handle the practically relevant scenario that arises in the present day road system. When the edge weight changes (e.g. due to traffic jam and collision of vehicle), we can move the road to overcome from the situation of jamming and accidents. We can move the side lane for 10 to 15 minutes for the passage of vehicles from backward and then density of jamming will decrease, movement of vehicle will be normal. It is expensive than traditional road but other problem like multi car pile-up, jamming, air pollution, wastes of fuels and other factors like noise pollution and most importantly traffic delay will be solved. It is based on advanced mechanical technology by which we move our side lanes for the ease of vehicle. The side lanes further use as pedestrian or cycle track. It will be technical and very efficient road network.

Key words: Multi Car Pile-Up, Dynamic, Collision, Jamming, Pedestrian

I. INTRODUCTION

Highway is means to transport the people and goods. It is the widely used mode of transportation. In India a large number of population travel by road daily for work, home ,tourism, college, school etc. the jamming and multi car pileup condition is very usual on highway near the intersection or bridge. A lot of troubles occur in that case people stuck in between traffic, wastage of time, fuel also. So to overcome this we design a dynamic highway which will automatically sense when the weight at that area increases from usual values then it start moving and vehicle will climb on it and it will transfer backside vehicles towards front ,when intensity will decrease jamming will be solve. This highway will be used for large road network and having a mechanically design side lanes which works as a carrier for vehicle under jamming situation. after that it will work as pedestrian.

India is recognized as has having major problems with highway jamming condition, predominantly due to unorganised roads and routing. Metro cities and mega cities are facing these problems occasionally. The traffic flow is not good and rise many problems on highways like air pollution caused by engine of vehicle, noise pollution due to continue horn, and time loss, as we all know time is the most important in this developing era. To overcome all these problem we plan for this technologically advanced dynamic highway.

0ne of most important objective of this dynamic highway is solve the problem of accidents and blocking of road. So we can easily open the road for movement of vehicle. Here we draw a rough diagram of our project with the help of 3D max software, where it is clearly shown how it we look like.

Fig. 1: Highway with Moving Lane in 3DMAX

II. METHODOLOGY

The design methodology is based on gear and drive mechanism under the extra lane. In this gear drive is used to move the vehicles from one part of the road to another part. A belt is a looped strip of flexible material used to mechanically link two or more rotating shafts. A gear drive offers a smooth transmission of power between shafts at a considerable distance. Gear drives are used as the source of motion to transfer to efficiently transmit power or to track relative movement.

In this we take 4 lane 2 way highways in which we provide one extra lane (3.5m) on the both side. This extra lane is the main concept of this project and it is built in accident prone areas or narrow road where jamming is a major problem. For now we take the length of road (500m) as it is built up of -----its load carrying is limited. In case of accident or jamming the lane will be used as a part of highway otherwise it is used as cycling track or pedestrian. This lane is (20cm) above the main lane to avoid the fall or collapse of vehicles.

III. GEAR DRIVE MECHANISM

Transmission of motion or torque from one shaft to another by means of direct contact between toothed wheels. A mechanism consisting of toothed wheels that engage and transmit rotary motion, usually transforming angular velocity or torques. It is the most practical and widespread type of mechanical transmission. They are used to transmit power – from negligibly small value to tens of thousands of kilowatts and to transmit circumferential force of fraction of grams to 10 mega Newtons (1000 tons force).

The main advantages of gear drive are their significantly smaller dimensions, high efficiency (losses in precision –made, well lubricated drives are 1-2% and under especially favourable condition), longer life and greater dependability, lack of slippage and small shaft loads.

The disadvantages of gear drives include noisy operation and the need for precision manufacture.

The satisfactory operation of gear drives requires high precision. Twelve degrees of precision are provided for

gear drives; they are selected on the basis of the purpose and conditions of operation of the drive involved.

The main reasons for the breakdown of gear drives are the breaking of gear teeth, the fatigue pitting of the surface layers of gear teeth, abrasive wear, and binding of the teeth (which occurs when the oil film is broken by high pressures or temperatures).

Fig. 2: Multicar Pileup Problem

This is very hard and destructive kind of accident occurs on highways although this is very rare condition but when happen it leads a large problem in highways. Lots of life loss, damage of vehicles, blocking of roads, and time loss. To overcome blocking and time loss we implement our technique of dynamic highways which will provide the back vehicles space to move and also damage protection.
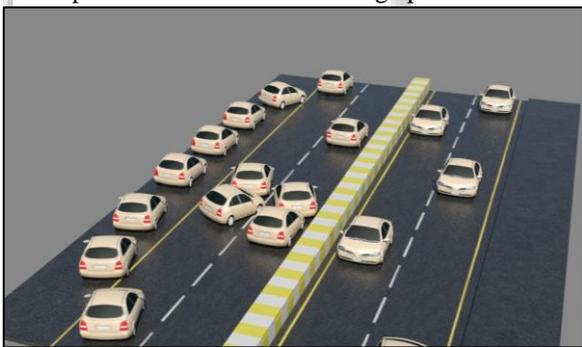

Fig. 3: Dynamic Highway Working in Case of Multicar Pileup Accidents

When this problem occur a huge mass of vehicle collapse to each other and leads to heavy destruction of vehicles and people life. A case of blocking of highway occur and further movement of vehicle is also blocked, lots of problem occurs like time loss, ambulance blocking, etc. it's not easy to remove all these immobilised vehicles in time. It takes many of hours to resolve this problem. So the safe and mobilised vehicle which is on the back side of the accident is to move and open the road for next coming.

So to overcome we allow the vehicle to move over the extra dynamic lane built up besides main lane. When the vehicle go on the starting point of this lane it sense the lane if the load is in the range of its threshold it allow the vehicles and starts moving automatically and transport the vehicle from one side to another. With this the problem is minimised and road will not blocked. And cranes and other escape agencies gets their full time to save all collapse.

And other objective of this road is to minimise the jamming condition by allowing the back vehicle to move and clear up the intensity of jamming. The same mechanism is use as in case of accidents for the movement of lane.

IV. CONCLUSION

A. Reduce Traffic delay
Improving the traffic management by introducing dynamic highway we can solve the traffic delay problem.

B. Resolve Multicar Pileup Problem
A pile up is a road traffic collision involving many vehicles causes deadly accident, it leads major losses like human death and scrap of vehicle on a very large extent causes economic losses. In this case bottleneck condition occurs on the highway, so for the ease of traffic moving lane is constructed.

C. Reduce the Pollution (Noise & Air)
In metropolitan cities pollutions are major concern which arises due to traffic congestion increases vehicle emissions degrades ambient air quality and noise pollution.
Increase the economic growth of nation.
Control uses of fuel.

V. ACKNOWLEDGEMENT

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