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A

Seminar report

On

INTELLIGENT HIGHWAY

Submitted in partial fulfillment of the requirement for the award of degree
Of MCA

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Preface

I have made this report file on the topic ***INTELLIGENT HIGHWAY*** ; I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to ……..who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

Acknowledgement

I would like to thank respected Mr…….. and Mr. ……..for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as i went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

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INRODUCTION

Each year, over 42,000 people lose their lives on our nation’s roads. The losses associated with these accidents include not only the lives of those involved, but also the time spent in stopped or slowed traffic, excess fuel consumption, the cost of health care, and tax dollars spent on emergency response. The total cost reaches over $230 billion, according to a GAO cost $32.6 billion, and property damages make up $59 billion of the $230 billion. This is roughly equivalent to $820 for every person living in the United States.The cost to society in lives, wasted fuel and time, emergency services and decreased productivity is report in 2001. Productivity loss accounts for $81 billion of the total cost, medical expenses unacceptable and must be reduced.Government transportation agencies are seeking out new, cheaper technology to replace the high-priced loop sensors and other invasive technologies that have been used in the past. .

for example:-The main artery for travelling in and out of Toronto, Ontario, is Highway 401, a thoroughfare that expands to 12 to 14 lanes at its widest. And at over 350,000 vehicles per day, including 45,000 trucks, Highway 401 is exceeded in terms of traffic volume only by the Santa Monica freeway in Los Angeles. "It's world-class congestion. It comes to a grinding halt at rush hour virtually every day," Traffic is a growing problem in almost every city in the world. The average American motorist spends 36 hours in traffic delays every year. The cost of traffic congestion just in the United States is $78 billion, representing the 4.5 billion hours of travel time and 6.8 billion gallons of fuel wasted sitting in traffic. Billions more dollars have been spent on electronics and systems to alleviate this logjam.

Government transportation agencies are seeking out new, cheaper technology to replace the high-priced loop sensors and other invasive technologies that have been used in the past.

Drivers and passengers lose two billion hours each year to nerve-wracking traffic jams caused by an estimated annual increase of 20 percent to 30 percent in the number of vehicles clogging the highways. Every year, according to the General Accounting Office (GAO), it costs the nation approximately $100 billion in traffic delays, and an additional $70 billion per year is spent on traffic accidents.

1. **Each year 42000 people lose their lives on our nation roads**
2. **Driver and passenger lose two billion hour each year to never-wracking traffic jam**
3. **According to General Accounting Office (GAO) $70 billion spend on traffic accidents**

Current Traffic Tracking

. Over the past two decades, state departments of transportation have installed billions of dollars worth of electronics to keep an eye on and manage traffic.

Tracking cell phone signals could be a way to reduce highway congestion.

Three basic devices used in managing traffic today:

- **Loop detectors**
- **Video cameras**
- **Electronic display signs**

Loop detectors: These are wires embedded in the road that detect small changes in electrical voltage caused by a passing vehicle. Traffic speed can be determined by detecting how quickly cars pass between two sets of loop detectors. Volume and speed data is transmitted to a central computer, which is monitored by local transportation departments.

Notice the loop detectors placed in the road. As cars pass over the loops, the detectors are able to detect speed and movement.

Video Cameras:- If the detectors sense a slowdown or an increased quantity in traffic, workers can use **video cameras** to get a better understanding of what's causing it. Meanwhile, **messages** can be displayed on electronic signs to warn motorists of congestion ahead and to advise of alternate routes.

"The traditional loops in the road and cameras up on poles and guys sitting behind desks looking at monitors is too expensive to extend as far as people would like," Installing these detectors, cameras and signs has been a long process to complete, and is costing billions of dollars for state and federal governments to implement. Transportation officials are now searching for **cheaper alternatives** for managing traffic.

New traffic-management system will utilize communication devices already in place to ease traffic flow.

Future Traffic tracking

you are in a shrinking minority of the American population if you don't own at least one electronic communications device. There are more than 119 million cell-phone users in the United States as of July 2001. Each day, thousands more sign up. Millions more have two-way pagers. The radio signals emitted from these devices can reveal our location at anytime.

As children playing hide and seek, there seemed to be so many places where we could hide and never be found. With the world becoming ever smaller through technology, hiding is increasingly difficult. Cameras peer down on us at red lights, in our workplace, in stores and even at home. Now, those cameras are being augmented by new technologies that track our cars, cell phones and possibly any product we buy.

This location-tracking technology also is being used to streamline supply chains for corporations, seeking to move products to the market faster, and to monitor assets and prevent inventory loss. Soon, companies also will be able to track your location. Imagine walking through your local supermarkets, and as you pass through

the aisle, an electronic coupon for your favorite cereal is beamed to your phone.

This ability to locate cell-phone users will become a vital component of future traffic-management systems.

Example of Cell-loc in Calgary,Alberta:-

On a short stretch of highway in Calgary, Alberta, **Cell-Loc** is testing out its new cell-phone tracking technology. In July 2001, the company sent a known vehicle down a 1.25-mile (2-km) section of a major highway, through the heart of the town, to test the accuracy of its system. The truck carried a GPS receiver onboard to compare the system's accuracy.

"We collected data from both the GPS receiver in the vehicle, and from our system that was monitoring the cell phone remotely, and we compared the two and found them to be, not identical, but close enough for our applications we're talking about," **Andrew Hillson**, Cell-Loc's director of service technology, said.

CELLOCATE:

Listening posts are placed throughout a city, either next to a cell-phone base station or in independent locations. Listening posts are

comparable to half a base station: They can detect but not transmit radio signals.

- Three listening posts are needed to get a **two-dimensional position** of a cell-phone user.
- Listening posts **detect** cell-phone transmission, **decode** it and then **time-stamp** the arrival of a wavefront from the transmission.
- Once three towers have time-stamped a transmission, the information is quickly sent to a central computer that uses **hyperbolic multilateration** to determine the cell phone's position on a highway.

Hyperbolic multilateration

It is just a fancy way of saying **triangulation**, . A position is determined by locating the intersection of the hyperbolas from the radio waves detected by the listening posts. By analyzing how long it takes the radio wave to reach the listening post from the cell phone, a computer can calculate almost precisely where someone is located on the highway. If the person's location on the map is shown as off the highway, the computer corrects for this and snaps the location to the road. The entire process of detecting a person's position occurs in seconds.

Cellocate meets the FCC's mandate and is accurate within 330 feet (100 m) 67 percent of the time. Within 990 feet (300 m), the system is accurate 95 percent of the time. It supports **AMPS** (Advanced Mobile Phone System) and **CDMA** (Code Division Multiple Access) air interfaces. Cell-Loc is pursuing partnerships with cell-phone service providers. The service, which would allow cell-phone users to receive instant, personalized traffic warnings, will likely be available in a year or two and cost about $4 or $5 per month.

Tagging

To supplement cell-phone tracking systems like Cellocate, transportation agencies are also installing additional **electronic toll tag readers** along major highways. In some cities where toll booths are common, **radio-frequency tags** are attached to cars. As cars pass the reader, it detects the tag and subtracts a set amount of money from a prepaid account.

These radio tags, or **transponders**, can be used to time vehicles between points in a freeway system. Unlike with a toll booth, drivers would not have to slow down for the reading device. They would

merely drive past it. By analyzing a particular car's time between two points, a computer can determine the car's location and speed.

These tags and the cell-phone tracking systems will make it almost impossible for someone to travel undetected, which has raised **privacy** concerns about this new technology. Cell-Loc has said that it would not sell information about motorists' locations to advertisers. Other companies have said that they are considering selling the information.

You never want to be stuck on a toll road without a pocket full of change. It can be a bit nerve-racking to dig through the car seats, trying to find something to give to the toll booth attendant while drivers behind you honk and yell for you to move on. These are the kinds of situations that cause delays at toll plazas.

Today, most toll roads are equipped with an **electronic toll-collection system**, like E-ZPass, that detects and processes tolls electronically. E-ZPass is used by several U.S. states, but most other electronic toll systems are very similar to E-ZPass. Basically, E-ZPass uses a vehicle-mounted **transponder** that is activated by an **antenna** on a toll lane. Your account information is stored in the transponder. The antenna identifies your transponder and reads your account information. The amount of the toll is deducted and you're allowed through.

Electronic toll collection is designed to make traffic flow faster, as cars don't have to stop to make a transaction.

Talking Tags

When scientists are able to increase the range and lower the price of RFID tags, it will lead to a ubiquitous network of smart packages that track every phase of the supply chain. Store shelves will be full of smart-labeled products that can be tracked from purchase to trash can. The shelves themselves will communicate wirelessly with the network. The tags will be just one component of this large product-tracking network to collect data.

The other two pieces to this network will be the **readers** that communicate directly with these smart labels and the **Internet**, which will serve as the communications lines for the network. Readers could soon be everywhere, including home appliances and gadgets. In fact, readers could be built directly into the walls during a building's construction becoming a seamless, unseen part of our surroundings.

Let's look at a real-world scenario of how this system might work:

- On a typical trip to the grocery store, one of the items on your shopping list is milk. The milk containers will have a smart label that stores the milk's expiration date and price. When you pick up the milk from the shelf, the shelf may display that milk container's specific expiration date or the information

could be wirelessly sent to your personal digital assistant or cell phone.

- The milk and all of the other items you've picked up at the store are automatically tallied as you walk through the doors that have an embedded tag reader. The information from the purchases you've made are sent to your bank, which deducts the amount of the bill from your account. Product manufacturers know that you've bought their product and the store's computers know exactly how many of each product that need to be reordered.
- Once you get home, you put your milk in the refrigerator, which is also equipped with a tag reader. This smart refrigerator is capable of tracking all of your groceries stored in it. It can track the foods you use, how often you restock your refrigerator and can let you know when that milk and other foods spoil.
- Products are also tracked when they are thrown into a trash can or recycle bin. At this point, your refrigerator could add milk to your grocery list, or you could program it to order these items automatically.

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