HUDWAY: CAR NAVIGATION SYSTEM

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Abstract : *Heads up Display Car navigator app is the augmented-reality app that project driving direction onto the windshield for driving in low visibility conditions, especially during the night, in fog, snow or heavy rain. The origin of the name starts from a driver being able to view information with the head positioned up and looking upward, instead of angled down looking at lower instrument. A HUD is also having the advantage that the driver's eyes do not need to refocus to view the outside after looking at the optically nearer instruments. Heads up Display Car navigator app provides turn by turn directions and works off Google, Apple or any other Open Street maps. Distracted driving has become a real problem and Heads up Display Car navigator app has come up with a way to address it. Navigation systems available today are still proving to be unsafe, diverting driver attention and focus away from the most important task in driving – to keep eyes on the road. Now a days navigation systems require that drivers read and interpret data and/or listen to audio commands which has been shown to take an average time of 7 seconds for a typical adult driver. Not surprising, it is 4 seconds more than what is considered as "safe-time" by various safety studies.*
Heads-up display (HUD) based navigation technology has fastly become safer and more effective road guidance method. HUD navigation keeps driver visual attention on the road while being guided. It also eliminates audio distraction, which can force a driver to shift attention from paying attention to visual clues than simply listening to directions and back, a proven distraction factor. HUD-based system can be much more intuitive in delivering navigational information than the traditional navigation displaying system while keeping the driver safe. We made a universal vehicle navigation app that turns your smartphone into a Head-Up Display bringing comfort and safety to drivers all over the world. We did it because we're tired of waiting for others to implement this system. Because we believe that automotive HUD are safer than an instrument-panel display or a smartphone. And because other solutions are either costly, or stuck in the stage of a long and complicated development process. This is the application we want. It's simple and affordable and easy to use.

***Index Terms - Car Navigator, Heads up Display,* Advanced Driving Assistance System, Global Navigation Satellite System, Dynamic Active Display**

[1]. INTRODUCTION

Today'simportant components of passenger are vehicles and navigation map. Map is type of navigation system. Map provides guideline and context information to driver. Advanced Driving Assistance System (ADASs) can provid context information. [1] Navigation map to contain geometrical information which also essential for highly automated driving, path planning, decision making and control functions. In automotive industry map is central component in autonomous vehicles that are currently under development. Integrity is an important feature when navigation functions relay on information technology. The user-level integrity was introduced in GNSS.GNSS having problem with integrity monitoring for positioning vehicle. The authors presented new method for integrity monitoring of GNSS integrity with map complexity and map-matching solution integrity. By using map complexity and map –matching system providing only high level data such as calculated vehicle position before and after map-matching. After map-matching integrity evaluation is dependent on choice of road conditions.[4][5]\paragraph*{} The main information which is actually useful for the driver is limited to just 30 of the screen for the smartphone which results increase in distraction as the drivers needs to see the small indication and places closely instead of focusing on the road. It may confuse the user for taking correct turn. So Car Navigator we will show the correct turn and indication and more user friendly GUI. There are 600 million people in the world who get behind the wheel of a car every day. Researches says, approximately 77 of them get distracted while driving it could be just drinking coffee, talking to a co-passenger, reaching for the phone in compartment, changing a song on radio, and so on.. But the worst and most frequent distraction is our phone. We are always on the phone doing unnecessary task. We talk read, type, tweet, check, post, upload, click and search share pictures. We even do video conference calls while driving or watching an episode or song on YouTube. This is especially dangerous when driving in low visibility situation such as rain, fog, snow or just darkness. we are nearly driving blind and trying to multitask with checking directions on our smart phones. That is when bad things happen. Indeed, based on official reports, 22 of all auto accidents happen because of a driver multitasking and/or low visibility conditions that is 750 deaths a day worldwide.
In intelligent vehicles, the navigation function provides relevant contextual information to client systems in real time. This might be the distance to the next intersection, the curvature of the road ahead, or the current speed limit.

This function can be schematized as having three parts, namely the localization system, the map matching process and the navigation map. Map-matching consists in finding, within the navigation map, the road on which the vehicle is travelling, according to the position calculated by the localization system. While driver driving the car traffic rules not allow him to receive the call .So to overcome this problem our application rejects the call and automatically send reply message to caller that "I am driving. Call you back". Location tracker function continuously tracks location of car using GPS and send location to the car owner. If the owner gives his car to driver at that time hekept to track on his car using this function.

[2]. EXISTING SYSTEM

The main problem is google map app or any other competitor is that it doesn't show clearly indication for turn it more focus on map insist of indication for turn. The main information which is actually useful to the driver is limited to just 30% of the screen on the smartphone which results increase of distraction as the drivers needs to see the small indication and places closely instead of focusing on the road. It may confuse the user for taking correct them.

Sequential FDIA for Autonomous Integrity Monitoring of Navigation Maps on Board Vehicles ,Clément Zinoune, Philippe Bonnifait, and Javier Ibañez-Guzmán, Member, IEEEVOL. 17, NO. 1, JANUARY 2016 . The traveller vehicles navigation systems on board show fault detection, isolation, and adaptation (FDIA).The systems stop advanced driving help systems and autonomous driving functions vehicle position unceasingly monitored and assessed information provided by the navigation system. In system methodology to use for police work, isolating, and adapting geometrical errors in maps in orders to avoid dysfunctions in shopper systems. The fault observation comparison to estimates employing a consecutive applied math take a look at to detect discrepancies despite the presence of noise and fault isolation and adaptation is introduced to spot faulty estimates and to produce a correction. The FDIA framework bestowed here utilizes recurrent journeys on constant roads as a supply of redundancy. Relevant properties of this formalism and rule square measure given and verified vehicle in rural and concrete conditions and with varied map faults. .The planned approach estimate of auto} position that's freelance of the navigation system and supported information from commonplace vehicle sensors and to use the navigation map to show on car driver front glass through the movable and conjointly provided sound for left-right direction and this glass provided bit screen. Results show that consecutive FDIA performed well, even in difficult GNSS conditions and show bit screen navigation map on front of automobile driver glass.

Behind the Glass: Driver Challenges and Opportunities for AR Automotive Applications By Joseph L. Gabbard, Gregory M. Fitch, and Hyungil Kim, Vol. 102, No. 2, February 2014. The producing company Corning has developed a product it calls pongid Glass. the corporate designed the glass for our electronic lifestyles. As we feature around computers, tablets,smartphones, MP3 players and different devices, we tend to risk damaging them through everyday use. Corning's pongid Glass stands up to abuse with scratch- and impact-resistant qualities. And Corning's approach permits the glass to be implausibly skinny, that means it will not interfere with capacitance bit screens or add important weight to a tool.What's Corning's secret? what is therefore special concerning pong id Glass that sets it except for other forms of glass? the solution involves unbelievable temperatures, a special trough, robots and a melted salt tub. The finished product may be a skinny piece of glass which will stand up to loads of penalty. whereas you would possibly think about glass its factory-madetype, the reality is it is a material we discover in nature. this happens naturally on volcanic rock flows and places wherever lightning has hit the bottom. Humans are making glass for millennia. Furnaces capable of generating unbelievable heat soften the correct kind of rocks down into what we tend to decision a glass soften. At this stage, you'll be able to form the glass many ways, as well as employing a tube to push air into the mass. we tend to decision this method glass processing. business glass tends to come back from three main sources. the primary is sand, that we tend to seek advice from with chemicals as oxide. that is the kind of material Corning uses in its producing method. the opposite to varieties of materials in business glass embody rock and salsoda.

Localization confidence domains via set inversion on short-term trajectory, Drevelle and P. Bonnifait, *IEEE Trans. Robot.*, vol. 29, no. 5,pp. 1244–1256, Oct. 2013. This paper represents a booming estimation methodology that's ready to quantify the localization confidence supported interval analysis and constraint propagation. Localization or positioning is used for navigation in atmosphere. this paper considers navigation of intelligent vehicles in urban areas while not devoted beacons put in in infrastructure. This papers goal is to fulfill meter level accuracy with high availableness and integrity for navigation. For achieving availableness and integrity it uses dead-reckoning sensors, like odometers and gyros . odometers and gyros offers low latency create prediction with buffer management. Sensor's take position from tightly coupled GPS map fusion. due to frequent masking of the GPS satellites which will scale back drastically the amount of position fixes pseudoranges ar directly exploited in an exceedingly tightly coupled manner. Recent advances associated with mapping alter to use precise 3-D maps of the road network, surveyed in world coordinates with several details that permit the charting of the drivable house. If the vehicle perpetually remains placed within the drivable house of such a 3-D map, this data is exploited within the localization method as a foothold constraint. GPS positioning may be a time of arrival methodology, that involves pseudorange measurements from every visible satellite [1].Experimental validation was performed in terribly difficult GPS conditions, i.e., AN urban ravine with at the most to satellites visible ½ the time. A CPF has been enforced for comparison purpose. real-time operation tests showed the system's ability to supply full positioning availableness, create confidence domains that rapper ground truth, and positioning errors below five.1 m for ninety fifth of the time. underneath a similar conditions, the CPF yield comparable point-positioning results, , however solely 1/2 the arrogance domains were per ground truth.

The conception of user-level integrity observance has been with success applied to air transportation navigation systems, wherever the most focus is on the errors related to the worldwide Positioning System (GPS)-data-processing chain. very little effort has been dedicated to the study of integrity observance for the case of land vehicle navigation systems. the first distinction is that it's conjointly necessary to think about errors related to a spacial map and a map-matching (MM) method once observance the integrity of a land vehicle navigation system. Errors related to a spacial road map ar given special attention. To knowledge-based fuzzy reasoning systems were developed to live the integrity scale.

Microlens array-based high-gain screen design for direct projection head-up displays. & M. Kivanc Hedili, Mark O. Freeman, and Hakan Urey,published 20 February 2013. Here Author wants to display high probability of navigation. High gain output is totally depend on the very compact display system and it's uses along with display build material which cost money generally gorilla glass is used for this king which cost minimum with very effective output. Hence everywhere and every company used this glass for mobile system and also for our system like structure. Gorilla Glass is chemically strengthened glass.

A Prototype of Low Cost Heads Up Display for Automobiles Navigation System Siddhant Chouksey,Sumedha Sirsikar International Conference on Computing, Analytics and Security Trends (CAST) College of Engineering Pune, India. Dec 19-21, 2016. In this paper author wants to deliver low cost heads up display to the world. User can establish that data outsourced at untrusted servers remains intact over time that is Remote Data Checking (RDC) a technique. It is useful as a prevention tool, allowing clients to periodically check if data has been damaged, and as a repair tool whenever damage has been detected. In distributed storage systems that rely on replication and on erasure coding to store data redundantly at multiple servers it was later RDC technique which extended to verify data integrity. Recently, a technique was proposed to add redundancy based on network coding, which offers interesting trdeoffs because of its remarkably low communication overhead to repair corrupt servers, we take distributed systems that rely on network coding to minimize the combined costs of both the prevention and repair phases RDC schemes used. We propose RDC-NC, a novel secure and efficient RDC scheme for network coding-based distributed storage systems. RDC-NC mitigates new attacks that stem from the underlying principle of network coding.. We implement our scheme and experimentally show that it is computationally inexpensive for both clients and servers. This makes HUDWAYS more compatibles according to hardware.

[3]. PROPOSED SYSTEM

We build the project based on the assumption that users use their Android phones in the environment with wireless network and having the ability of getting GPS and data. GPS will be used for automatic localization since android phones are usually equipped with GPS. Map Activity in red is the core and the start of application. Map Activity imports Google Map as the map, and retrieves information of POIs from remote Server. Map Activity calls Map Overlay to add POIs mark to Google Map. Google Map is chosen as the map of navigation guide, as consider it is easy to be implemented on the platform of Android. Both Android and Google Map are released by Google. And we can provide navigation maps not only for a specific navigation but also almost all the cities in the world since Google Map show map of the whole world. Therefore, we can provide the service of navigation guide for many cities only if there is relevant database containing the information of points of interest in cities. We have built a project which projects direction on windshield of the car enabling user easy simple and hassle less navigation ensuring proper navigation with minimal user interface and controls hence less distraction of driver. In this system we have changed the traditional navigation displaying technique with elegant displaying mechanism. In traditional navigation system they show the entire map around the user which is rarely in use. This system shows the major navigation sign's in 3-5 % of the screen which is difficult for the user the look for while driving and which is actually important. The user has to stress eyes which distracts the user for few seconds in search of navigational signs where this few seconds plays important role while driving has the user cannot afford to lose them. This problem is overcome using Heads up display technique where the important navigational signs are displayed around 30-50 % of the screen, so that the user has easy understanding of the turns to take which requires less time for looking for the signs.

[4]. ALGORITHM

1.Dijkstra Algorithm to find Shortest path

Step 1:

Mark Vertex 1 as the source vertex. Assign a cost zero to Vertex 1 and (infinite to all other vertices).

Step 2:

For each of the unvisited neighbours (Vertex 2, Vertex 3 and Vertex 4) calculate the minimum cost as min (current cost of vertex under consideration, sum of cost of vertex 1 and connecting edge). Mark Vertex 1 as visited, in the diagram we border it black.

Step 3:

Choose the unvisited vertex with minimum cost (vertex 4) and consider all its unvisited neighbours (Vertex 5 and Vertex 6) and calculate the minimum cost for both of them.

Step 4:

Choose the unvisited vertex with minimum cost (vertex 2 or vertex 5, here we choose vertex 2) and consider all its unvisited neighbours (Vertex 3 and Vertex 5) and calculate the minimum cost for both of them. Now, the current cost of Vertex 3 is [4] and the sum of (cost of Vertex 2 + cost of edge (2, 3)) is 3 + 4 = [7]. Minimum of 4, 7 is 4. Hence the cost of vertex 3 won't change. By the same argument the cost of vertex 5 will not change. We just mark the vertex 2 as visited, all the costs remain same.

Step 5:

Choose the unvisited vertex with minimum cost (vertex 5) and consider all its unvisited neighbours (Vertex 3 and Vertex 6) and calculate the minimum cost for both of them. Now, the current cost of Vertex 3 is [4] and the sum of (cost of Vertex 5 + cost of edge (5, 3)) is 3 + 6 = [9]. Minimum of 4, 9 is 4. Hence the cost of vertex 3 won't change. Now, the current cost of Vertex 6 is [6] and the sum of (cost of Vertex 5 + cost of edge (3, 6)) is 3 + 2 = [5]. Minimum of 6, 5 is 45. Hence the cost of vertex 6 changes to 5.

Step 6:

Choose the unvisited vertex with minimum cost (vertex 3) and consider all its unvisited neighbours (none). So mark it visited.

Step 7:

Choose the unvisited vertex with minimum cost (vertex 6) and consider all its unvisited neighbours (none). So mark it visited. Now there is no unvisited vertex left and the execution ends. At the end we know the shortest paths for all the vertices from the source vertex 1. Even if we know the shortest path length, we do not know the exact list of vertices which contributes to the shortest path until we maintain them separately or the data structure supports it.

2.Algorithm to find Speed of the Vehicle

The geographical coordinates of the two points, as (latitude, longitude) pairs, are [(Ø1, ʎ1), (Ø2, ʎ2)] and time T taken to travel.

Process:

Distance D is calculated between two points P1 and P2. The geographical coordinates of the two points, as (latitude, longitude) pairs, are P1 (Ø1, ʎ1) and P2 (Ø2, ʎ2) respectively. Which of the two points is designated as P1 is not important for the calculation of distance.

Latitude and longitude coordinates on maps are usually expressed in degrees. In the given forms of the formulae below, one or more values must be expressed in the specified units to obtain the correct result. Where geographic coordinates are used as the argument of a trigonometric function, the values may be expressed in any angular units compatible with the method used to determine the value of the trigonometric function. Many electronic calculators allow calculations of trigonometric functions in either degrees or radians. The calculator mode must be compatible with the units used for geometric coordinates.

Differences in latitude and longitude are labelled and calculated as follows

Δ Ø= Ø2- Ø1;

Δ ʎ=ʎ2-ʎ1;

It is not important whether the result is positive or negative when used in the formulae below.

"Mean latitude" is labelled and calculated as follows:

Øm= (Ø2+ Ø1)/2

Colatitude is labelled and calculated as follows:

For latitudes expressed in radians:

ϴ= (π/2) - Ø;

For latitudes expressed in degrees:

ϴ=90- Ø;

Unless specified otherwise, the radius of the earth for the calculations below is:

R= 6,371.009 kilometres = 3,958.761 statute miles = 3,440.069 nautical miles.

D= Distance between the two points, as measured along the surface of the earth and in the same units as the value used for radius unless specified otherwise.

The relationship between distance, speed, and time is distance equals speed times time. Let the symbol d represent distance, the symbol r represent speed (or rate), and the symbol t represent the time. The relationship between the three can then be expressed algebraically.

d=rt or r=d/t

The net ground speed of the vehicle will be the ‘r’

Output: r be the Speed of Vehicle.

[5]. DESIGN

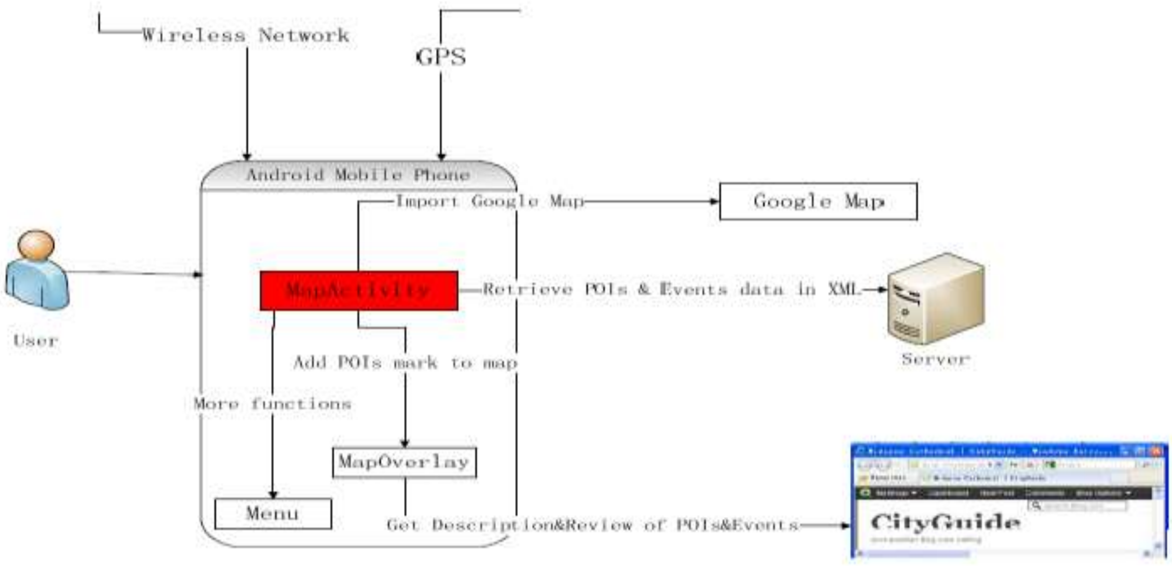

Fig-1: System Architecture

The diagram above presents the general architecture. We build our on the assumption that users use their Android phones in the environment with wireless network and having the ability of getting GPS location. GPS will be used for automatic localization since android phones are usually equipped with GPS. Map Activity in red is the core and the start of application. Map Activity imports Google Map as the map, and retrieves information of POIs from remote Server. Map Activity calls Map Overlay to add POIs mark to Google Map.

Google Map is chosen as the map of navigation guide, as consider it is easy to be implemented on the platform of Android. Both Android and Google Map are released by Google. And we can provide navigation maps not only for a specific navigation but also almost all the cities in the world since Google Map show map of the whole world. Therefore, we can provide the service of navigation guide for many cities only if there is relevant database containing the information of points of interest in cities.

[6]. MODULE DESCRIPTION

1.Heads up Display Navigation

The main problem is google map app or any other competitor is that it doesn't show clearly indication for turn it more focus on map insist of indication for turn. The main information which is actually useful to the driver is limited to just 30% of the screen on the smartphone which results increase of distraction as the drivers needs to see the small indication and places closely instead of focusing on the road. It may confuse the user for taking correct turn. So In HUDWAY: Car Navigator we will show the correct turn and indication and more user friendly GUI.

2.High Speed Alert

There's safety in numbers, protection in conformity. you'll incur the angry honks of your fellow drivers and Travel too slow. Travel too fast and you'll attract unwanted attention from robotic speed cameras and police officers wielding radar guns. In HUDWAY: Car Navigator we are going to check the speed limit for particular road or highway to that of the car by the standards mentioned by the government to that of the car. If the speed of the car exceeds the standards mentioned the user will get a speed alert which will help to maintain the speed and wallet-busting tickets is to stick to the car speed limit and lights to avoid flashing blue.

3.Battery Indicator

While navigating through long distances it is important to keep updates of the battery status of the user's phone. To help know the user about the battery status of the phone battery indicator is used. Navigating eats up a large amount of battery as the phone uses data and gps together coordinating to navigate.

[7]. RESULT

Fig-2 (a): Existing System Navigation Display

The above figure-2 (a) shows navigation system displays which are currently used by other navigation display applications where the navigation sign is limited to just the 30% of the screen and the main screen is occupied by the map which shows the direction in confusing way with other irrelevant or unimportant places which are of no use for navigational purpose. Moreover the devices has to be mounted on to the windshield with other mounting clamps which obstructs the viewing of the user while driving hence limiting the view from the windshield, if not so the user has to keep his phone in the cup holder or remove from the gloves compartment on timely basis to check for the navigation sign.

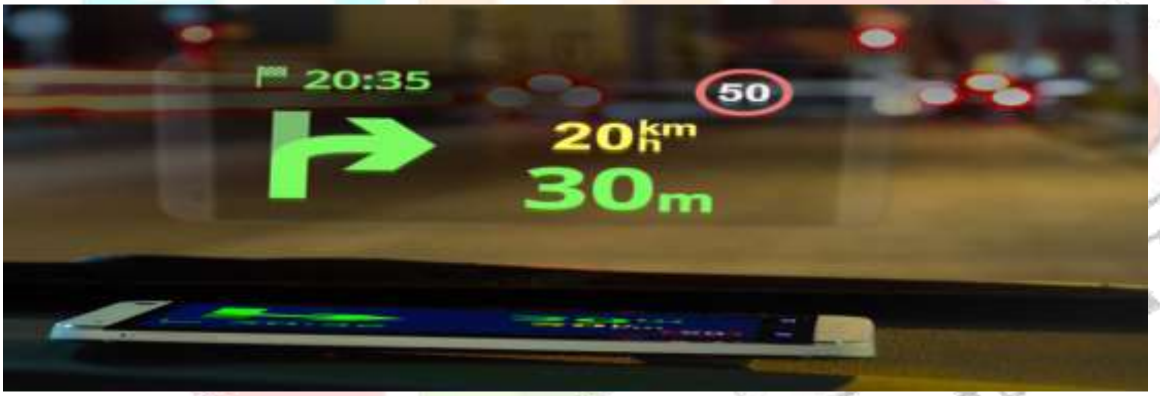

Fig-2 (b): Proposed System Navigation Display

The above figure-2 (b) shows the navigation of our project which is proposed by us. This is a similar representation of our project where the majority of the screen is used to help user guide through unknown roads reaching his destination. Here only the required information like the navigation sign, distance by which turn is to be made, speed of the vehicle, time is displayed which is required during the navigation. As the figure shows the directions are projected on to the windshield where the navigation is not restricting the viewing of the user driving. The user can clearly see through the windshield even during the day night and navigation. Another thing to consider is that the directions projected are directly in the view of the user driving on the road where the user does not need to shift his eyes else-where rather than road which helps to keep user to keep eye on the road and navigate easily.

[8]. CONCLUSION

We are realizing the navigation guide over Android. The system covers basic functions of navigation guide there are functions such showing map, showing POIs on map, showing direction, showing user's location on map and so on. Results were presented for a series of experiments conducted to discover the most effective and least distracting class of alerts using a HUD to assist a driver in maintaining speed. Head pose data were analyzed to determine the effects of the alerts on the driver's attention and focus .Moreover, we try to integrate current innovation technologies like DAD and ADS to help user navigate with safety, comfort, ease and simplicity. This will help less distraction of user while driving preventing any accidents by a minor percentage helping a world to be a much safer place to drive in. The DAD system has the potential to play a clear role in improving driver assistance systems.

[9]. ACKNOWLEDGEMENT

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