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ANALYZING AND IDENTIFYING URBAN REGIONS WITH HIGH IMPACT OF WEATHER CHANGE ON TRANSPORT

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Abstract:

In this work, it focuses on two fundamental questions that are unprecedentedly important to urban planners to understand the functional characteristics of various urban regions throughout a city, namely, (i) how to identify regional weather-traffic sensitivity index throughout a city, that indicates the degree to which the region traffic in a city is impacted by weather changes; (ii) among complex regional features, like road structure with enclose of population density, how to dissect the most influential regional features that drive the urban region traffic to be more vulnerable to weather changes. On the way, these important queries are nontrivial to answer, because urban traffic changes dynamically over time and is essentially affected by many other factors, which may dominate the overall impact. It makes the initiate the study on these queries, by developing a Weather-Traffic Index (WTI) system. The system includes two important components: weather-traffic index establishment and key factor analysis. Further regional key factor analysis yields interesting results. For example, house age has significant impact on the weather-traffic index, which sheds light on future urban planning and reconstruction.

Key Words: Data Mining, Weather Traffic Index, Satellite, Weather & Climate

Introduction:

Data mining is the terminological science with technology of exploring data in order to discover unexplored patterns. Traditionally, data meteorological instruments were being redefined during the past centuries. Dependent related developments that are, theoretical, and technological developments, also contributed to our knowledge of the atmospheric weather conditions. Weather prediction is an important goal of climatic research. Since changes weather condition is risky for human society. It affects the human society in all the possible ways. Weather prediction is usually done using the information gathered by remote sensible satellites. More of it climate parameters like humidity, temperature, rainfall and raining cloud present conditions are important using pictures capture by meteorological satellites to access future trends actability. The satellite based systems are expensive and requires complete support systems. The non-constancies defining surface climate conditions varies continuously with time, prediction model can be developed either statistically or by using some other means like decision tree, ANN, regression, clustering techniques of data mining. Climate prediction is a one of the technique of data mining ideas, which is concerned with finding hidden patterns inside largely available meteorological data.

The disasters are the unwanted natural events that produce a significant amount of losses in way of human life and the revenue. In this context the disaster management techniques are deployed to reduce or control the loss. Accords to the disaster management techniques the entire process is handled in three major phases before disaster preparedness that helps to aware about the target disasters and their complexities. next of during the disaster relief, which provides the help to handle current situations of disasters finally the recovery in this phase the social, economic support based recovery is performed. Accorded to proposed hypothesis if the disasters are predicted before it's happening then a lot of losses can be prevented. Therefore in this presented work a new data mining based model is presented that helps to predict the unwanted natural events. Those the following intermediate objectives are included for work. Weather change is an identical and lasting move in the statistical analysing of climate patterns afford constraints ranging from centuries to millions of years. It may be a change in normal climate conditions or the distribution of events around that evenly. The term is most of it used to refer specifically to weather change caused by human behavioural, as against to changes in weather that may have distinct as part of global natural processes.

Weather change today is directly with anthropogenic global warming. Within research magazines, however, global warming should source to external temperature increases, while weather change includes global warming and all things else that improvement greenhouse gas amounts should affect. Evidence for weather change is taken from a variety of resources that can be used to reconstruct last climates. Reasonably complete overall records of external temperature are available intimate from the mid-late 19th century. As on earlier times, most of the proofs are indirect. Weather changes are inferred from changes in proxies, identifies that shows climate, like as vegetation, ice cores, dendrochronology, sea level change, and glacial geology.

The reference dependency problem in the effects of weather variables on travel behaviour is addressed. The results show that the reference point (indifference weather condition) in general corresponds to the historical mean of the thermal environment. There over, individuals with different socio demographic profiles have different subjective weather perception under even the same weather conditions, mainly due to individuals having different perceptions on short term variations of thermal environment (deviation against its historical mean value). Furthermore, the effect of subjective weather perception measure also shows heterogeneous effects on leisure activity participation for individuals with different socio-demographic profiles. These two kinds of heterogeneity in subjective weather perception can potentially contribute to spatial and temporal variations of the impacts of weather as discussed above. Understanding how individuals perceive weather is one step further towards a better understanding of how weather affects individuals' activity travel decision making process compared to empirical studies that directly link objective weather measures and travel behavior variables.

Existing System:

Climate change related shifts in weather patterns might also affect infrastructure disruptions. For road transport most studies focus on traffic safety and congestion. With respect to traffic safety by far the most important variable is precipitation, most studies finding that precipitation increases accident frequency, but decreases accident severity. The mediating effect in here is likely that precipitation reduces traffic speed, thereby reducing the severity of an accident when it occurs. Furthermore, most studies show a reduction in traffic speed due to precipitation and especially snow. Intimately, the effect is particularly large during peak hours and on congested roads. The few existing insights for rail transport show that high temperatures, icing, and strong winds, among others, may cause considerable delays. For the aviation sector, wind speeds, wind direction and visibility have clear effects on safety and delays and cancellations. This has large cost implications, both for airlines and travellers. That the way of, implications of climate change on wind speeds but especially on wind directions and developments with respect to mist, fog visibility are highly uncertain.

Drawbacks:

To enhance the resilience of, both transport and flood risk management infrastructures are difficult.

- ✓ How to identify regional weather-traffic sensitivity index throughout a city, that indicates the degree to which the region traffic in a city is impacted by weather changes.
- ✓ Among complex regional features, such as road structure and population density. How to dissect the most influential regional features that drive the urban region traffic to be more vulnerable to weather changes.

Proposed Work:

The aim is to solve a variety of emerging city problems, such as traffic congestion, energy consumption, and pollution, based on the data of traffic flow, human mobility, and geographical data, etc. In particular, many works have been done to investigate the impact of inclement weather to traffic. For example, a heavy rain may slow down the traffic and cause congestions due to low visibility and high demand of vehicles; the decreasing temperature in very chilled days will freeze the roads and influence the transport performance, etc. So here the investigation for both weather as of it traffic is done together and is brought up as one single desktop application so as the traveler gets indication of the weather and traffic condition changes at same time they could choose shortcuts to reach his destination earlier and also save his expenditure as well as his time of travel.

The Representation of Weather in Travel Behaviour Studies:

Weather Variables as Objective Measures: So far most of the previous studies have investigated the relationship between objective weather measures and travel behaviour variables. The spatial and temporal matching between the weather information and the observed trips is often the first research question aroused in the data preparation stage. Most studies assigned weather information to each trip by matching the meteorological indicators from the weather station closest to the departure point of the trip and selecting the weather variable with the measured time closest to the departure time. By doing this, it is implicitly assumed that each traveler would base his or her travel decision on the weather condition that is prevailing at the departure place and time.

Weather Variables as Subjective Perceptions: Despite the fact that the concept of perceived weather conditions have been used in many psychological studies subjective weather perception measures are rarely introduced in travel behaviour studies. It included a measure of perceived temperature and showed that weather-exposed cyclists experience thermal conditions as significantly colder than the more weather-protected users of motorised transport modes. Subjective weather measures have several theoretical advantages compared to objective weather measures. Weather is fundamentally a subjective perception that is perceived by an individual and used in his/her travel decision making process.

The Spatial and Temporal Variations of Weather Effects:

The Spatial Variation of Weather Effects: When objective weather measures are used in travel behavioural models, as in most empirical studies, it is often stated as "the results from this case study may not be transferrable to other countries, regions". This spatial variation of weather effects on travel behavioural can be

attributed to various reasons, such as geographical difference, climate difference and population difference, etc., for any two different locations. Weather conditions and built environment are intrinsically interrelated and together form the microclimate at a specific location.

The Temporal Variation of Weather Effects: Even for a given region, the weather effects may not be the same in different time of a year. For instance, 10°C in summer in a Nordic country may have a completely different effect as 10°C in winter in that country. The former may be interpreted as "cold in summer" while the latter may be interpreted as "warm in winter". This is because individuals have different weather adaptations and different standards (reference point) of "comfort" weather in different seasons. Hassan and Barker were among those who first tried to investigate the unseasonable weather impact on traffic. They defined the unseasonable weather as those with huge difference between observed and historically mean weather variables.

The Dynamic and Multi-Dimensional Nature of Travel Behaviour: The travel choices are often made jointly, which indicates a complicated travel decision making process. For instance, trip chaining choice is often made jointly with mode choice which is subject to the destination of each trip in the trip chain. Those who choose to drive a car are more likely to do complex trip chaining and visit distant destinations. Travel choices are often treated and modelled as conditional choices subject to the activity participation choices, including activity location choices, activity timing, and activity duration, etc.

Decomposing Direct and Indirect Effects of Weather: The analysis results shows the effects of weather can be even more extreme when considering indirect effects from other travel behavior indicators involved in the decision-making processes. Commuters are shown to be much less sensitive to weather changes than non-commuters. Variation of monthly average temperature is shown to play a more important role in influencing individual travel behavior than variation of daily temperature relative to its monthly mean, whilst in the short term, individual activity–travel choices are shown to be more sensitive to the daily variation of the relative humidity and wind speed relative to the monthly mean.

Learning Algorithm: As already explained, different data mining procedures were used in the proposed system which their conditions were follows. It contains of the optimal values of the momentum term and the knowledge rate, which are 0.077 and 1, respectively. The efficiency of Support Vector Machine (SVM) is monitored by parameter C and parameter γ. Kernel type restriction specifies the types of kernel purpose. Different types of kernels such as dot, radial, polynomial, Gaussian combination and multi-quadric can be designated. Gaussian combination types with set of examples were unsuccessful in calculations and the conclusion time was more than the anticipated time. In the neural kernel, the process was not caused in a final answer after 25 minutes yet. Two kernel types of dot and polynomial had an output for a dangerous state. The rest of the cases did not have any forecast or record return for a hazardous state.

Results:

- ✓ Characterize the ART alternative fuel public transit service and bus fleet, including tabulation of the annual miles operated for each vehicle in the ART revenue fleet.
- ✓ Compute the emissions generated for each vehicle in the ART revenue fleet using the most current ARB methodologies and emissions factors;
- ✓ Analyze the most and complete ART ridership demographic data to establish the automobile usage that is avoided by the availability of the ART transit system. This includes a quantity of automobile trips avoided as well as the miles associated with each avoided trip
- ✓ Using the most current ARB model, EMFAC 2014, calculate the automobile air pollutant emissions that are avoided by using ART. The difference in motor vechiles GHG emissions that would have occurred if not for the availability of ART, minus the emissions generated by the ART alternative fuel transit fleet, yield the net GHG emissions reduced.

Conclusion:

In this work, it is analyzed and studied the factors like road structure and population density of certain urban regions, so we come to know about how transport (human mobility is affected due to the impact of weather changes and traffic of that particular region. Also as human beings we cannot correctly predict both weather in traffic condition of any particular region as they vary from time to time as well as the traffic rate of any location varies from time to time and place to place. So we come to the conclusion that to create one single desktop application using Weather Traffic Sensitivity Index (WTSI) and based on the key factor analysis done i.e. both weather in traffic analysis is done in one single application so that the traveler gets information about weather and traffic status at the same time, so he can take shortcuts to reach his destination earlier to save his expenditure also save his time of travel.

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