Traffic Accident System Analysis: Optimization and Interpretation of traffic using Pattern Search Recognition Case Studies

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Abstract - Traffic management and control utilising roadside controllers and intelligent cars is an innovative method for designing a roadway. In order to improve highway safety, efficiency, and many other aspects for vehicles and users alike, the Intelligent Transportation Highway System (ITHS) is a new design idea. Improved highway design has been made possible by this notion, as well as a reduction in the environmental impact of automobiles on the roadways.

This analysis is essential from a global business perspective as well as a project one. As a result of today's worldwide economic environment, any firm must compete against other businesses from across the world. In a circumstance like this, maximising the use of resources in accordance with a pre-planned timetable is absolutely essential. A method for evaluating resource productivity within the constraints of the project must be in place before this can be done. The primary goal of this project is to investigate the resources needed for highway building and to boost Resource Productivity under various conditions. For any team or group to accurately forecast their output rate and that of the entire project team, it is imperative that the productivity of the resources used in highway projects be thoroughly studied and analysed. To make the planning process move more smoothly, it is necessary to identify the elements that influence the productivity of each resource and to create graphs, formulae, and charts that estimate production.

Keywords -Traffic, Pattern Search, Resource Productivity, Planning, Material Management, Cost, Accident

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1. INTRODUCTION

Any large construction business must maintain an arsenal of varied machines and equipment, as well as a professional and semi-skilled workforce, in order to carry out such varying work during the course of a project. Sections and sub-sections are commonly used in highway projects for convenience of working and resource allocation. "

A team's productivity and total workload are taken into consideration when allocating resources to the various teams. Any discrepancy between the planned output and the actual output might lead to an overrun in the project's completion time and cost, as well as a miscalculation of the production rate. For the reasons stated above, it is critical that the productivity of various resources in the roadway sector be thoroughly studied. Because the same equipment and often even the same people are utilised for many tasks, it is critical to conduct thorough studies, categorizations, and evaluations of resource productivity. For planning purposes, it is important to identify the elements that determine the productivity of each resource, as well as

create graphs, formulae, and charts to estimate production.

The goal of the project was to reduce the amount of time and money spent on the project by distributing the available resources evenly. In Case 1, the entire project was treated as though it were being completed in the same sequence as the WBS, and the costs associated with resource use were estimated. How much money would be spent on resources if the entire project was split into two parts? A three-phase breakdown of the project was employed in Case 3 to account for the costs of resources utilised.

Construction operations cannot be carried out effectively without careful planning and time management. To assist managers better manage their time and resources, project management software is becoming increasingly popular. An example of software that can boost project efficiency is Microsoft Project. More than half the work is done by equipment in road construction, which means that their costs and productivity are critical to making

the project viable for the firm. A case study of two road construction sites is presented in this paper. In order to save costs, Project Management techniques are used to increase the productivity of equipment.

Planning and Gathering of Materials Constructing equipment is required for a wide range of manufacturing operations such as digging trenches for pipelines and wires, moving and carrying heavy loads of earth and other materials, grading, filling, compacting, and lifting. The project site's supporting equipment includes generators, transmission lines, pumping units, and other utility service equipment. It is essential for the successful completion of today's high-cost, time-sensitive, enormous construction projects to use construction equipment. It is able to create a large amount of output in a short period of time. It saves money, which is getting more and more expensive and difficult to come by. In addition to increasing productivity and quality, it also creates a sense of urgency in the workplace. Acquisition of large amounts of equipment requires an upfront expenditure, but in the long run, it contributes to profitability by lowering total operating expenses.

To be productive, one must be able to generate anything. In popular use, productivity refers to the ratio of output to input. Measuring input and output can be done in terms of either physical quantities or monetary values. Many people connect productivity to the average output capacity of employees, expressing it as the amount of work produced per hour of man-hour input. It is also described as the ratio of output to input hours. Some think of productivity as the ratio of output to input in rupees. When it comes to resource management, the term "productivity" is used to describe how well a project's resources perform.

2. PROBLEM STATEMENT

Studies of diverse resources, such as the needed equipment and manpower for a highway project and productivity under various situations. Material etc... As part of a comprehensive investigation of the elements that influence the productivity of each resource and a comparison with other resources, the Intelligent Transportation System is developed.

3. LITERATURE REVIEW

"Jing Gan ,Linheng Li , Dapeng Zhang , Ziwei Yi , and Qiaojun Xiang", 21 December 2020 "*An Alternative Method for Traffic Accident Severity Prediction: Using Deep Forests Algorithm***", Journal of Advanced Transportation,**

For the purpose of verifying the superiority of our algorithm, we used the same dataset to implement other machine learning algorithm-based perdition models to predict the severity of traffic accidents. The predictions show that the Deep Forests algorithm has

good stability, fewer hyper-parameters, and the highest accuracy at various levels of training data volume. Results from this study are predicted to be valuable for developing or improving a sustainable transportation system's traffic safety system, which will enable government officials develop proactive methods to reduce traffic accidents and enhance road traffic safety.

"Yanjun Qin, HaiyongLuo, Fang Zhao, Zhongliang Zhao and Mengling Jiang", 2018 "*A traffic pattern detection algorithm based on multimodal sensing Advances in Data Fusion of Multi-Sensor Architecture: Algorithm and Applications***" - Research Article**

The findings of transportation mode recognition can help commuters get to work faster and help cities better manage their transportation systems. There has been a lot of effort on the mode of conveyance problem, but the precision isn't good enough. A multimodal sensing-based approach for accurately detecting traffic patterns is presented in this study. To begin, our system takes four different types of sensors and extracts numerous sensory and semantic data (i.e. accelerator, gyroscope, magnetometer, and barometer). Commodity smartphones commonly include these sensors. Using a convolutional neural network, all of the retrieved characteristics are used to predict traffic patterns.

"Salahadin Seid Yassin, Pooja", 28 August 2020 "*Road accident prediction and model interpretation using a hybrid K-means and random forest algorithm approach***" Research Article, and Springer**

The findings of this study show insights and the most significant target-specific contributing factors to the severity of road accidents. The most important aspects of road accidents were discovered using a hybrid K-means/random forest (RF) approach. A novel feature in the training set is created using K-means using data from traffic accident reports, which uncovers previously unobserved information.

"VahidNajafiMoghaddamGilani , Seyed Mohsen Hosseinian", 27 May 2021 "*Data-Driven Urban Traffic Accident Analysis and Prediction Using Logit and Machine Learning-Based Pattern Recognition Models Mathematical Problems in Engineering***", Research Article,**

Rasht city will collect data on urban accidents from March 2019 to March 2020 in order to determine parameters that impact the severity of injury, fatality,

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and property damage only (PDO) events in Rasht. As a machine learning solution, multiple logistic regression and pattern recognition types of artificial neural networks (ANN) are used to discover the most significant variables affecting the severity of accidents and the best approach for accident prediction.

"Camilo Gutierrez-Osorio, Cesar Pedraza", 7 July 2020 "*Modern data sources and techniques for analysis and forecast of road accidents***": A review Journal of Traffic & Transportation Engineering, Science Direct**

Road accident prediction study aims to improve the safety of the transportation system and eventually save lives by identifying and implementing preventative measures. This study aims to provide an overview of the current state of the art in traffic accident prediction by utilising machine learning algorithms and sophisticated information processing techniques such as convolutional neural networks and long short-term memory networks. In addition, the most often utilised data sources for predicting traffic accidents are compiled and studied in this article. According to its origins and qualities, including open data, measuring methods, on-board equipment and social media data, a categorization is suggested.

"MilhanMoomen, Mahdi Rezapour, Mustaffa N. Raja, KhaledKsaibati", 25 October 2019 "*Predicting injury severity and crash frequency: Insights into the impacts of geometric variables on downgrade crashes in Wyoming***", Journal of Traffic & Transportation Engineering, Science Direct**

An investigation on the causes of truck accidents in Wyoming's lower-elevation districts. Severe injury collisions have been studied extensively, however the research have largely concentrated on level parts. Three accident prediction negative binomial models were estimated in this study to determine the geometric parameters that contribute to truck crashes on downgrades. The severity of the injuries sustained in the collisions was taken into consideration by these models. There was a correlation between the frequency of truck-related accidents and injuries on downgrades in Wyoming and descent length, shoulder width, horizontal curve length, number of lanes, number of access points, and the volume of truck traffic on the highway, according to the research. Downgrade truck collisions can be reduced with better road design in the future, thanks to the findings of this study.

"Alice Gonzaga de Oliveira, Amanda Diniz Barros", 26 March 2020 "*Evaluation of calcined textile sludge as a stabilizing material for highway soil***",**

Journal of Traffic & Transportation Engineering, Science Direct

Use of chemical stabilisation using sludge and additives such as lime, cement, and asphalt sludge in the base and subbase of pavements will be studied. Based on the results of the second phase, the scope of this study was divided into four phases: (1) characterization tests; (2) physical stabilisation; (3) chemical stabilisation; and (4) adding 3 percent, 5 percent, or 7 percent of soil-stabilizing chemicals (lime, cement, or asphalt emulsion) to a mix with 10 percent textile waste Stabilizing soil mixtures with textile sludge is a viable option for pavement layers, according to test results (base and sub-base). Cementing the sludge is the greatest way to achieve chemical stability. Given the faults and issues that inappropriate waste disposal can cause to the environment, the adoption of textile sludge stabilisation offers more environmental benefits.

"Mariana Bosso, Kamilla L. Vasconcelos, Linda Lee Ho, Liedi L.B. Bernucci", 15 September 2019, "*Use of regression trees to predict overweight trucks from historical weigh-in-motion data***", Journal of Traffic & Transportation Engineering, and Science Direct**

Overloaded truck weight and travel patterns are the focus of this paper's investigation into the creation of a system based on currently available weigh-in-motion (WIM) data. Regression trees, a simple and easy-to-understand analytical tool, is used to generate prediction models from a vast quantity of data. Overall, the overloaded truck regression tree model demonstrates that the vehicle type is the most essential variable for classifying and predicting overloading.

The most influential factor in axle overloading is the time of day. Truck enforcement actions may be better planned based on the more essential cases, according to the regression tree findings. Additionally, the findings increase our understanding of truck load characteristics, which might lead to more efficient pavement management systems and more aggressive pavement structure designs.

"Raffaele Mauro, Andrea Pompigna", 18 May 2020 "*State of the art and computational aspects of time-dependent waiting models for non-signalised intersections***", Journal of Traffic & Transportation Engineering, Science Direct,**

If you want results that are as close to the real world as possible, you'll need models with closed-form

expressions for time-dependent analyses, models that can take the place of the formulas currently in use, models that are simple to calculate but can handle critical points, and models that can show great versatility when appropriately adapted. Innumerable aspects of life will be changed forever as a result of this study's findings. Queue lengths, for example the quantification of transport networks for traffic demand assignment in transport planning, the reconfiguration and management of junction design; more generally, as a help for making implementation decisions in cost-benefit analyses, for instance.

"David A. Hensher", November 2014 "*Integrating Accident and Travel Delay Externalities in an Urban Speed Reduction Context, Transport"* Reviews: A Transnational Trans-disciplinary Journal,

With an eye on risk-compensating behaviour in places with higher accident risks, this study examines the empirical link between accidents and travel delay externalities. the input elements are quantified empirically for the driver's choice between a free and tolled route in Sydney, Australia, taking into account that levels of risk in an urban setting are largely a function of traffic densities and the latter can be approximated by the mix of free and non-free flow travel time (for a given total travel time).

"Marco Bassani, Lorenzo Mussone", 26 September 2019 "*Experimental analysis of operational data for roundabouts through advanced image processing*", Journal of Traffic & Transportation Engineering, & Science Direct

As a result of a complete video image analysis system, the origin/destination (O/D) matrix, vehicle categorization, and tracking individual vehicle trajectories and accelerations along courses may be deduced in an investigation of vehicle movements at roundabouts In order to do this, the researchers gathered video sequences that were evaluated using a specific piece of software. There were a variety of camera set-ups implemented in order to reduce the impacts of perspective distortion and environmental factors, as well as obstacles. Permanent fittings such as elevated working platforms were used to place equipment on central or exterior poles.

"MdMehediHasan, A.S.M. AsifurRahman, Rafiqul A. Tarefder", 18 May 2019 "*Investigation of accuracy of pavement mechanistic empirical prediction performance by incorporating Level 1 inputs*" Journal of Traffic & Transportation Engineering, & Science Direct

We are primarily interested in characterising the pavement materials in order to create Level 1 inputs for the M-E analysis and to assess the accuracy of performance predictions for New Mexico pavements. International roughness index and rutting projected distress quantities for the field collected data and the three design levels were compared. According to the findings, M-E overestimates IRI and pavement rutting when compared to actual field performance. Rutting was determined to be lowest at Level 1, with the most rutting recorded at Level 3.

"Tatiana Tambouratzis, Dora Souliou, MiltiadisChalikias and Andreas Gregoriades", 2014 "*Maximising accuracy and efficiency of traffic accident prediction combining information mining with computational intelligence approaches and decision trees*", JAISCR

The prevention of traffic accidents (TAP) is critical to maintaining traffic flow and being able to track its progress. By dispatching police1 to "interested" places for traffic surveillance and/or diversion, as well as for casualty management if necessary, TAP is able to accurately forecast the location and severity of accidents within a short time frame. There is a need to gather a wide range of accident-related data because of the importance of the TAP. Using information mining (IM) techniques, relevant accident-related information is extracted and combined with appropriate prediction models that provide the most accurate and efficient prediction of accident location and severity. This study is an important step in the development of universal approaches for the categorization and prediction of accident location and severity that are as precise, efficient, and timely as possible. the best combinations of – sets of key TAP-related parameters from the database that can predict the location and severity of accidents via IM (including statistical and feature selection/extraction techniques); – classification/prediction models deriving from existing and customarily used statistical, mathematical, machine learning techniques were determined by RCP using the 2005 accident dataset.

"Nawaf O. Alsrehin, Ahmad F. Klaib, AndAwsMagableh", April 25, 2019 "*Intelligent Transportation and Control Systems Using Data Mining and Machine Learning Technique: A Comprehensive Study*" IEEE

Only data mining and machine learning methods were used to detect and anticipate traffic as part of

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this research investigation. Findings from this study show that there is no one-size-fits-all solution to traffic management. The traffic research community, traffic software businesses, and traffic officials will benefit greatly from this study. As a result, new ideas for traffic management will have an easier time finding traction. As far as data mining and machine learning are concerned, this is one of the most comprehensive studies to date. In addition, the results of this research will help popularise a brand-new method to traffic management.

"Dr. Neeta Saxena" August 2017 "*Analysis of Road Traffic Accident using Causation Theory with Traffic Safety Model and Measures*", International Journal for Research in Applied Science & Engineering Technology (IJRASET),

The rapid growth of urbanisation and the resulting increase in vehicle traffic in India's cities has led to an increase in the number of traffic accidents. A variety of activity management strategies have been implemented in an effort to reduce traffic congestion and improve travel safety. According to MORTH-2015, India has the highest global accident rate. The severity of accidents is steadily rising, making road safety an increasingly pressing concern. The impact of automobile wrecks on Indian culture cannot be overstated. From 4,89,400 in 2014 to 5,01,423 in 2015 there was an increase of 2.5 percent in total traffic collisions, thus a thorough investigation of the causes of these incidents is necessary. Risk Homeostatic Theory (RHT) and an accident prevention model, together with necessary measures to decrease traffic accidents, are both used in this study to investigate road crashes. the Domino's theory, the risk homeostatic theory, road traffic accidents (RHT).

"Madeline Balaam, Virginia Dignum, Sami Domisch"2020 "*The role of artificial intelligence in achieving the Sustainable Development Goals*", IEEE

The writers' point of view is reflected in the offered analysis. The authors may have overlooked some material on how AI could effect certain SDGs, or there may not yet be published evidence on such interconnections. Despite this, the approaches adopted were designed to reduce the subjective nature of the evaluation. Numerous papers were evaluated to see how AI may effect the implementation of each of the 17 Sustainable Development Goals (SDG). A subset of writers worked together to determine the nature of each inters connection, as stated in the Methods section. Finally, this research is based on an examination of the Sustainable Development Goals. Human rights, social cohesion, environmental stewardship, and economic progress are all represented in the SDGs, which are an improvement over the Millennium Development Goals in terms of their inclusion of all aspects of sustainable development.

"Rikiya Yamashita, & Mizuho Nishio& Richard KinhGian Do", 22 June 2018 "*Convolutional neural networks: an overview and application in radiology*", Springer

An artificial neural network known as a convolutional neural network (CNN) is becoming increasingly popular in a number of fields, including radiology. Using several building pieces, such as convolution, pooling, and fully linked layers, CNN learns spatial hierarchies of data automatically and adaptively. An overview of CNN ideas and their application to diverse radiological tasks is presented in this review paper, as well as its problems and future directions. We'll talk about how to deal with the problems of short datasets and overfitting while using CNN for radiology jobs in this post. To help radiologists perform better and provide better treatment to their patients, it is critical for them to have a solid understanding of CNN's principles, benefits, and drawbacks.

Literature Paper

"UthayasankarSivarajal, Muhammad Mustafa Kamal, ZahirIrani, VishanthWeerakkody", 2019 "*Critical analysis of Big Data challenges and analytical methods*" Journal of Business Research, Science Direct

With the goal of assisting others in making sound investment decisions, this article gives a comprehensive assessment of BD issues and BDA techniques that have been theorized/proposed/used by businesses. A comprehensive review and syntheses of the existing literature on BD and BDA

"R EmilianNecula", 2017 "*Analyzing traffic patterns on street segments based on GPS data using Transportation*" Research Procedia, Science Direct

We will utilise R software and a set of libraries in this research. Statisticians use these tools to help us gather and present data, while graphic artists use them to illustrate the findings. Our goal is to find the most statistically important road segments and time intervals that constitute traffic patterns. New Haven's whole population can be accounted for by the number of drivers who reported their routes, and a 2-3 percent penetration rate of smart phones is

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sufficient to produce reliable traffic flow data and identify traffic trends.

"**Emmanuel GbengaDada, Opeyemi Emmanuel Ajibuwa**", "*Machine learning for email spam filtering: review, approaches and open research problems*",Springer

Anti-spam filters need to be more reliable and resilient in order to keep up with the increasing number of spam emails. It has recently been possible to identify spam emails using machine learning approaches. Some of the most common machine learning-based email spam filtering algorithms are reviewed in this paper. Among the topics covered in our study are the most essential principles, attempts, efficiency, and the current research trend in spam filtering Machine learning techniques are being used to improve email spam filtering at major internet service providers (ISPs) including Gmail, Yahoo! and Outlook.com in the study's background discussion. Various academics discussed their attempts to tackle spam using machine learning techniques as part of the general email spam filtering process. For spam filtering, we analysed the merits and weaknesses of existing machine learning algorithms in comparison to open research challenges. We suggested deep learning and deep adversarial learning as potential future strategies for dealing with spam emails successfully.

4. AIM OF PROJECT

The goal of this research is to use a mathematical model to recognise and interpret traffic accident system analysis on road accidents.

5. OBJECTIVES

This study will be conducted based on several objectives which are:

- To reduce costs in dense traffic conditions as well as handling networked intersections
- To investigate the practical Issues of on-going Projects to resolved efficiently.
- This approach was implemented in real life with low cost; however, involves an error probability in data acquisition and use of sensory equipment.
- To precisely understand the advantages and disadvantages of the proposed design principle and of those of the model for route selection with the estimated personality
- Study identified the following challenges: need to place greater emphasis and study on core characteristics development efficient methods,

- To examine aspects of City VRP such as traffic control, noise pollution, rapid response, and ITS, create efficient techniques, conduct further research that focuses on stakeholders' interests, and identify the need for new City VRP benchmark data sets or challenges.

6. METHODOLOGY

- To categorise traffic signals based on a pattern search of the vertices of candidate objects with typical traffic sign forms.
- Because just the vertices of the candidate object were examined instead of checking each and every pixel for recognition, the approach is quick.
- It is invariant to translation, and a simple approach is introduced to make it scale invariant. The approach has a high classification rate and is quite robust.
- Efficient road-transportation systems have recently sparked a lot of interest in the scientific community. One of the most critical difficulties addressed by ITS is the efficient movement of people to and from crowded locations.
- To investigate the effects of network correlations at crossing sites, and to give case-study evacuation scenarios that are studied under various conditions and flow needs within each segment of the simulated network.
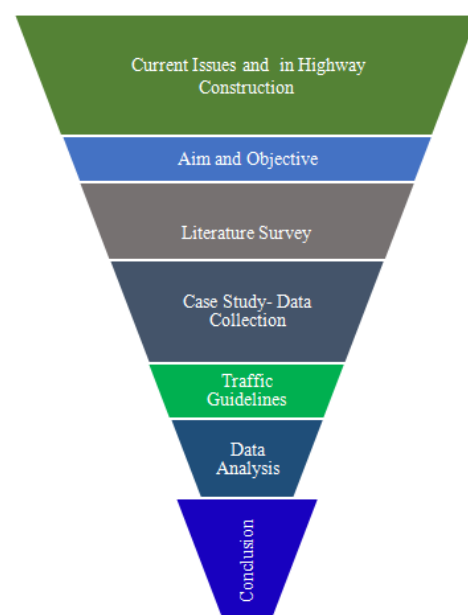

Figure 1: Flowchart of Methodology

In the course of site inspections, essential information about the costs and production rates of various resources was gathered. It was discovered

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that many factors had a direct impact on the production rate of those resources, and their impacts were discovered. Collected information was put through a thorough comparison analysis to see how the various variables are related to one another geographically.

Environmental circumstances, construction materials, activity type, operator efficiency, and other such elements are predicted to have an impact on the equipment production rate. Other elements such as working and housing situations, social-economic considerations and so on might have a negative effect. A series of charts and graphs depicting patterns in productivity were created following an in-depth analysis of the data. Finally, graphs, charts, and other visual aids have formed a trend for measuring a resource's production under various conditions.
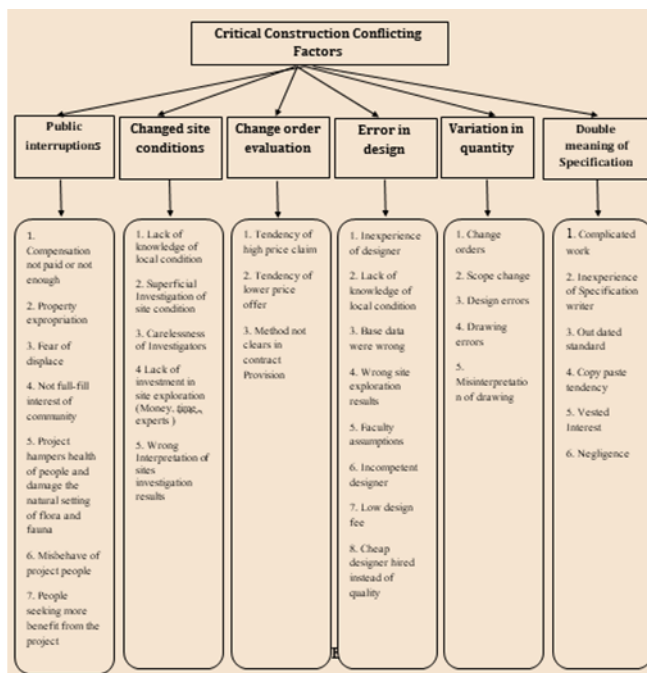
The best way to deal with a dispute is to avoid it altogether, rather than using avoidance as a method to avoid conflict in the first place. The three most important areas to keep an eye on are:

Clear specifications

Developing the ability to write a specification that can be understood by a wide range of individuals requires years of practise. Only the terms of the contract are relevant in a legal dispute.

Uncertainties in the specification can be clarified with the help of an independent review. It is unfortunately the case that many firms do not carry out such assessments and only discover that the specification could have been considerably more clear after the contract has already been implemented.

Clear communication protocols

Contractual provisions requiring the parties to adhere to specific internal rules and processes governing communication, approvals, and signoffs have no effect on disputes. Be aware of the amount of individuals who may have communication with the other party and assume that they have the ability to act on your behalf, and you may be committing your company unwittingly. Assemble a list of all your company's internal procedures and make them enforceable by including them into the contract.

Proactive issue management

Many contracts include up to 300 outstanding concerns at any given moment, which can easily turn into a dispute if the conditions are perfect. Before labelling a problem a disagreement, try to resolve it as an issue first.

Rather than referring to a problem as a "dispute," it's better to call it a "issue." You may use the same project management methods to handle issues. Establish a system for anybody to report a problem, keep track of and assign responsibility for all concerns, and have frequent meetings aimed at resolving them.

Attributes

1	Lack of surveillance
2	Failure of contributors to instantly handle changes
3	variations in legislation and guidelines
4	Lack of understanding
5	Incompetent designer
6	Poor communications among project contributors
7	Lack of cooperation among contributors
8	Indistinct contract documents
9	Impracticable expectations by the parties
10	The impact of local culture.
11	Misinterpretation of contracts
12	Lack of resources
13	Poor communication and documentation
14	Late involvement of lawyers in the construction projects
15	Tendency of lower price offer
16	Working relations and Supervision
17	Circumstances produces a model based on project uncertainty
18	Dispute in construction contracts: Alterations
19	Lack of effective communication among project contributors
20	Delayed payments
21	Design insufficiency
22	Lack of necessary proficiency and experience
23	Poor site management
24	Poor planning and programming
25	Project hampers health of people and damage the natural setting of flora
26	Disputes with subcontractors
27	Late imbursement to subcontractors
28	Harmonization of subcontractors
29	Alterations to standard conditions of contract
30	People seeking more benefit from the project
31	Inappropriate contract type
32	Accident due to moving traffic adjacent to project site
33	Disputes due to discrepancy in contract document
34	Lack of professionalism of participants
35	Weather Conditions
36	Availability of health and safety training
37	Inappropriate in salary, poor wages, Lack of Financial motivations
38	Inaccurate design information and incomplete tender Information
39	Inappropriate Contractor Selection
40	Lack of training sessions, lack of labour recognitions programs, lack of place for eating & relaxation, Lack of team spirit
41	Decisiveness of the agreement
42	The location and implementation of work
43	Minimized costs in attaining settlement
44	Sustained business relations
45	Control of the result and procedure

7. DATA COLLECTION & EXPERIMENTATION

The primary objectives of this field experiment were to

> ➢ Determine if the system can be used to measure construction productivity.
> ➢ Conduct a case study to determine the system's benefits and limits.

A variety of approaches and the WRITE system were used to collect productivity data simultaneously in order to meet the goal.

The stopwatch method is a well-established technique for gauging production. Time spent on each human movement is recorded using a timer and categorised as either direct, supporting, or non-working. Direct work, support work, and time spent not working are all taken into account when calculating productivity. For this study, we used statistical tools to examine whether or not the stopwatch method and the WRITE system differed significantly. These forms were used to collect data, and an example dataset was used for statistical analysis in this project. Three asphalt paving projects and one bridge rehabilitation project served as the sites for the field trial. Two projects involving hot-in-place recycling and hot-mix asphalt overlay were chosen as equipment-intensive, while a rehabilitation of a bridge was found to be labor-intensive.

The progress of the economy and the environment may be gauged by measuring the efficiency of resources and the efficiency of labour and capital. Even though socioeconomic and environmental processes are strongly interconnected, the available facts, judgement of specialists and public awareness are often disputed. Accordingly, rather than a comprehensive comprehension, the criteria of policy relevance from this study relates to a reduction in this complexity instead. To put it another way, it refers to the ability to reduce this complexity and

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provide relevant, usable information for making decisions and engaging in public debate.

For analysing the impact of resource productivity on employment, this scoping research shows that data availability and quality are critical.

As a result of these requests, RMC has become the EU's primary resource efficiency metric. In order to achieve this goal, it is necessary to complement country-level data34. To compile RME estimates at the nation level, Eurostat released the 'Country RME tool' recently. Calculating RME of product flows at sectoral levels for all EU Member States would be difficult due to the difficulty of RMC/RME-based national estimates. However, it is critical to look at resource productivity on a sectoral level since various industries have varied patterns of material usage.

Some governments may be able to focus on specific industries. A time series can take a lot of resources and effort to put together. Another possibility is to do case studies on certain Member States' experiences, which may be helpful to other countries in the Union. For example, the European Union's building industry is a major player. It contributes roughly ten percent of the nation's gross domestic product and aids in the expansion of jobs in associated industries. In addition, the Netherlands' high resource productivity in agriculture and construction make it an intriguing case study.

Multi-regional Environmentally Extended Supply/Use/Input Output (MREE SUT/IOT) database Exiobase36 is an established and often updated project. 200 sectors in 44 nations and 5 areas of the rest of the globe will be included in Version 3. Sectoral statistics may be available in 2016, according to parties participating.

Using just direct extraction data from all across the globe in monetary models, we can assess the influence of policy on extraction on growth and employment. Even though productivity numbers are not explicitly supplied, the relative impacts on labour, capital, and resources at regional and global levels are shown, which can be used to further examine the productivities in question.

There is also a lack of accurate measurement of labour input quality that takes into consideration aspects like the worker's skill level, gender, educational attainment, and employment position. Eurostat and the JRC-IPTS are collaborating on a project to publish time series of productivity indicators for Member States so that labour productivity indices can be improved. This spring, the

first dataset for future years will be made accessible to the public. Capital productivity data is expected to be released at a later date.

As an alternative, an improved knowledge of the link between factors like R&D and energy consumption might be gained by the application of more complete econometric analysis. A sector-by-sector study would reveal which industries receive the most R&D funding and which nations have the greatest gains in productivity as a result of this association between investigated factors and resource productivity. A subsequent econometric analysis will have to take into account or examine a greater number of potential factors.

In our study, like in many others, we relied on correlations rather than causality in our analyses. Identifying causal links is a tough endeavour that falls outside the scope of the current investigation. After conducting a thorough literature analysis, we were able to identify the linkages between resource productivity gains and a variety of socioeconomic and environmental indices.

The empirical component of this scoping study was designed to give a preliminary statistical and empirical examination of resource, labour, and capital productivity, as well as to open up possibilities for further research if data were available. Conclusion: Among the possibilities for further research are the following:

- Examining the industries most likely to suffer employment losses as a result of EU policies aimed at increasing resource efficiency, or the shift toward a more resource efficient economy in general.
- Examining which members of society's workforce are most vulnerable to job changes (which skill level, age group).
- An examination of the most and least resource- and labor-productive sectors in industries with high levels of capital investment. In the most and least resource-productive industries, it's important to consider if capital is replacing labour.
- Insights on the sectoral effects of R&D on resource productivity; comparisons among Member States; identification of any discrepancies;

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8.   DATA ANALYSIS & EXPERIMENTATION

Surveys were disseminated among construction crews of various sizes, including site engineers, painters, steel binder, plasterers, meson bricklayers (a type of bricklayer), carpenters, landscape gardeners, and many more.

Gathering and validating correct data was a critical step in the survey process, which included sending out questionnaires and receiving replies. This figure exceeds the sample size required, indicating that the data obtained fulfils quality criteria. According to the author of this study, seven components have been identified as having an impact on the productivity of construction employees on the working site.

Ranking of factors on workers themselves

Factors	RII	Impact	Ranking
Experience of workers	4.29	Very high	5
Labour Discipline	4.12	Very high	5
Physical ability	4.01	High	4
Psychophysiology ability	3.78	High	4
Labour Intensity	3.52	Mid	3
Age	3.41	Low	2
Gender	3.19	Extreme Low	1
Level of training	3.09	Extreme Low	1

People's physiological and psychological difficulties will impair job efficiency and, as a result, production when labour intensity is low. The more experience one has accrued with age, but physical strength might deteriorate, which has a significant impact on productivity at work.

Ranking of operational and managerial factors

Factors	RII	Impact	Rank
Ability to organize Production	4.23	Very high	5
Construction supervision	4.20	High	4
Application of technology	3.92	Mid	3
Workers' arrangement	3.73	Low	2
Labours Communication	2.89	Extreme low	1

Ranking of factors that motivate employees

Factors	RII	Impact	Ranking
Types of salary payment	4.27	Very high	5
Staff Support	4.05	High	4
Reward Mechanism	3.69	High	4
Spiritual Life	3.58	Mid	3
Training and improving skills	3.32	Low	2
Initiative at work	3.18	Extreme low	1

When it comes to increasing labour productivity, variables like education, certification, and new technologies all play a significant role. Workplace happiness and a sense of personal accountability are two of the most important aspects that contribute to the motivation of construction workers.

Ranking of factors of working tools and object

The RII value of 3.78 indicates a high impact factor, whereas RII = 3.22 indicates a high impact factor for material transport systems. According to the paper, these elements have an impact on the performance of the task, which has an impact on labour productivity as well. Organizations must use machines, equipment, and tools that are compatible with products and technologies in order to achieve and grow labour productivity. They must also verify that raw materials and semi-finished goods entering production have identifiable origins and qualifications throughout the working shift. All of these aspects must be taken into account.

Ranking of natural environmental factors

Factors	RII	Impact	Ranking
Weather conditions	4.82	Very High	5
Regulations,	3.42	High	4
Geological and	3.27	Mid	3
hydrological conditions	3.12	Low	2
laws on construction	3.02	Extreme Low	1

RII of 3.82 ranks weather as the most influential factor on labour productivity. In many cases, building projects are located in areas that are directly influenced by the weather. The productivity of workers is adversely affected when the weather does not cooperate or even worsens. The impact of environmental factors on labour productivity is undeniable and objective. As a result, construction companies need to foresee the issues that may arise due to natural environment circumstances in order to reduce risks in the manufacturing process. With RII = 3.42, rules on building are the second most important element. Regulators and national policies affecting construction businesses' production objectives and direction, altering organisational policies for employees on pay, investment in science and technology, etc. therefore impacting productivity.

Highway Details:

More than 45 places on National Highway have been designated as high-accident risk zones by the State Highway Traffic Police. In 2016, there were

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1,169 documented incidents on the Mumbai-Banglore route, resulting in 307 fatalities.

✓ According to statistics, traffic lights were to blame for 15,125 accidents, 432 deaths, and 12,995 injuries.

✓ Every minute, a catastrophic traffic accident happens in India, and every hour, 16 people die on Indian roadways.

✓ About 1214 road crashes occurs every day on India.

Name of Project	"Four Laning of Solapur to Yedeshi Section of NH-211 from Km 0.000 to Km 100.000 (Design Length - 98.717 Km) in the State of Maharashtra to be executed as BOT (Toll) on DBFOT Pattern under NHDP Phase - IV"
Total Length of Project	98.717 Km
Contract / Phase	Phase NHDP Phase – IV
Client / Authority	National Highways Authority of India. (Ministry of Shipping, Road Transport & Highways).
Concessionaire	M/s. Solapur Yedeshi Toll way Private Limited
Independent Engineer	M/s. SA Infrastructure Consultants Pvt. Ltd. In Association with Dhruv Consultancy Services Pvt.Ltd.
Project Management Assistant	M/s. Sowil Limited
EPC Contractor	M/s. IRB / MRM Pvt. Ltd. Design
Consultant	M/s. STUP Consultants Private Limited
Bankers	IDBI Bank
Total Project Cost	INR 972.50 Crore.
Date of Signing of Concession Agreement	03rd March 2014
Appointed date	21st January 2015
Scheduled Four-Laning Date	910th (nine hundred and tenth) day from the Appointed date (18.07.2017).
Concession Period	29 Years Commencing from the Appointed Date.

Site photos:

SR.NO.	TYPES OF STRUCTURES	NO. OF STRUCTURES
1	Major Bridges	2
2	Minor Bridges	24
3	ROB	1
4	Pipe Culverts	115
5	Slab Culverts/Box Culverts	6
6	Vehicular Overpasses	1
7	Vehicular and Non-Vehicular Underpasses	1

Following are the Proposed Structures in the Project Site:

SR.NO.	TYPES OF STRUCTURES	No. of Struct.
1	Major Bridges	2
2	Minor Bridges	25
3	ROB	1
4	Flyover / Vehicular Underpasses	7
5	Pedestrian / Cattle Underpasses	11
6	Box Culverts	11
7	Pipe Culverts	123

9. CONCLUSION

• The purpose of our investigation was to see if the GPS traffic data set obtained through the Map My Run web service is sufficient for

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inferring temporal usage patterns of street segments in relation to traffic flow.

- Our findings demonstrate that such an analysis is doable, but only within certain parameters.
- According to the GPS data set's permanent traffic counting stations, our findings provide a suitable basis for the planned research.
- A temporal study allowed us to evaluate the city's traffic and congestion in great depth, and we were able to emphasise this.
- We discovered various consumption groups that changed over time. Shopping and leisure activities were shown to have diverse patterns of use based on the visual analysis of these clusters.
- Use of access roads, for example, demonstrates that temporal patterns cannot effectively distinguish between sequential activities, as individual journeys commonly begin and end in residential districts.
- It was shown that weekends are the most unique time period for differentiating usage patterns, according to the clustering.
- We were able to identify groups with similar traffic patterns by modifying our clustering algorithm, and we evaluated the results using both temporal and spatial context.
- Consequently, we were able to conduct an in-depth analysis that allowed us to pinpoint traffic patterns connected with certain road segments.
- A major traffic route service and a digital map provider were able to connect and provide data to us.

10.   ACKNOWLEDGMENT

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