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# ANALYSIS AND PREDICTION OF INDUSTRIAL ACCIDENTS USING MACHINE LEARNING

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***Abstract***— In this research, a conceptual system is made that utilizes low cost storage and process data in less time. It additionally utilizes Machine Learning, NLP and Random Forest calculation so as to comprehend and foresee mishaps in Industrial condition. The industrial data is procured from one of the largest industries in Brazil and the world which records the industrial accidents that took place in every nation. The information is investigated and prepared with Machine Learning algorithm so as to comprehend the reasons for such incidents and how the expectation of future accidents can be done. Subsequently, the framework can think about an assortment of parameters and decide future happenings with exactness.

## INTRODUCTION

In today's environment, there is a huge development in the measure of information being created from various sources. With this tremendous measure of information being generated day by day, there is a requirement for the information to be investigated and be managed methodically. There has been an increase in the number of accidents ever since the evolution of such industries. Even with the diverse industrial safety and accident prevention systems available, they haven't been efficient in managing a wide range of parameters and be able to effectively predict them by handling a large amount of data. Moreover, with the existing systems, the cost of planning and storing the data is soaring. Industries have become quite a vital part of today's world that without it, it would be difficult to sustain in the world. Industrial growth and development are significant as it plays a big role in our economy, development of the country as a whole and earns revenue. The requests and needs of

the individuals have been rising due to the populace upheaval too. To cope up and keep up to this, industries are required in the world. Not only that, but industries also provide various employment opportunities for people to work in them. Clearly, the more the businesses, the more the working individuals. It means that a solitary industry is answerable for an enormous number of working individuals just as its environment. The wellbeing of these laborer's is a need of great importance. In our endeavors to make out a living through various callings, we have disregarded numerous significant parts of life and committed a few errors. These are making undesirable states of work, expanding the danger of ailments, the danger of mishaps in the processing plants another mechanical establish-ments and ruining the earth, by making contamination and even by disregarding the wellbeing standards, which takes steps to make difficult issues of wellbeing, both physical and mental. Industrial accidents are quite fatal and can cause quite a loss. Those that occur in the workplace can cause harm to employees, environment and damage to the equipment. Industrial related accidents, injuries and fatality data demonstrate that continued efforts and effective measures are necessary to reduce the number of industrial accidents, illnesses and fatalities. A worker dies of occupational injury every three minutes and about every second at least four workers get injured according to the International Labor Organization (ILO). India happens to be one of the nations with the most elevated record of such Industrial accidents. When looking into Indian industrial accident data, it's found that about 47 factory workers are injured and a handful of them die every day. Data from the Labor and Employment Ministry reveal that in three years (2014-2016), 3,562 workers lost their lives while 51,124 were injured in accidents that occurred in factories across the country. Gujarat, Maharashtra and Tamil Nadu are the top three states when it comes to fatalities. All though neither the government nor the public has held Indian industry adequately account for the thousands of deaths each year.

## LITERATURE REVIEW

**Anuoluwapo et al** had proposed by introducing the big data framework in the occupational health system. The aim was to indulge into getting accurate results in determining production industry accidents using various Big Data platforms including Hadoop, Spark, and MapReduce. The data is

drawn from a leading power infrastructure company in the UK and was analyzed using the B-DAPP architecture.

**Ramli Adnan. Abd Manan Samad, Zainazlan Md Zain, Fazlina Ahmat Ruslan "5 hours flood prediction modeling using improved NNARX structure: case study Kuala Lumpur", IEEE 4th International Conference on System Engineering and Technology, 2014.**

Flood is one of natural disaster that has becomes major threat around the world. Flood disaster may damages people's life and property. Therefore, an accurate flood water level prediction is very important in flood modelling because it can give ample time to residents nearby flood location for evacuation purposes. However, due to the dynamics of flood water level itself is highly nonlinear, Artificial Neural Network (ANN) technique is a good modelling option because ANN was widely used to solve nonlinear problems. NNARX is one type of ANN model. Therefore, this paper proposed flood prediction modelling to overcome the nonlinearity problem and come out with advanced neural network technique for the prediction of flood water level 5 hours in advance. The input and output parameters used in this model are based on real-time data obtained from Department of Irrigation and Drainage Malaysia upon special request. Results showed that the Improved NARX model successfully predicted the flood water level 5 hours ahead of time and significant improvement can be observed from the original NNARX model.

**H Takata, H. Nakamura, T Hachino "On prediction of electric power damage by typhoons in each district in Kagoshima Prefecture via LRM and NN", SICE Annual Conference, 2004.**

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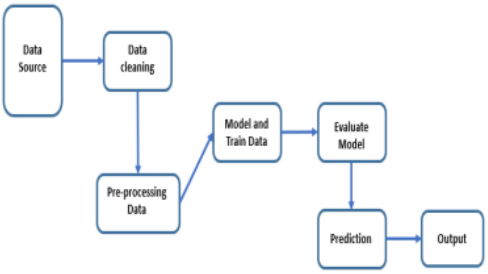
Kagoshima Prefecture has suffered from natural disasters by typhoons repeatedly. They hit power systems very badly and sometimes cut off electricity. To ensure the rapid restoration of electricity supply, one needs to predict the accurate amount of damage by typhoon in every region. This paper considers the damage prediction in each district in Kagoshima Prefecture by using a two-stages predictor. It consists of LRM (linear regression model) at the first stage and NN (neural networks) at the second stage. This predictor enables us to predict the number of damaged distribution poles and lines from weather forecasts of typhoon. Effectiveness of the approach is assured by applying it to the actual data.

## RELATED WORK

Industries have become quite a vital part of today's world that without it, it would be difficult to sustain in the world. Industrial growth and development are significant as it plays a big role in our economy, development of the country as a whole and earns revenue. The requests and needs of the individuals have been rising due to the populace upheaval too. To cope up and keep up to this, industries are required in the world. Not only that, but industries also provide various employment opportunities for people to work in them. Clearly, the more the businesses, the more the working individuals. It means that a solitary industry is answerable for an enormous number of working individuals just as its environment.




## PROPOSED WORK

The aim of the proposed system was to design a way to analyze multiple accident data, parameters involved and

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determine a way to ensure such fatalities don't occur in the future

**Impact on Environment**

*impact on environment (not OS or SW used), Examples – Reduction in global warming, reduce pollution, simplicity of usage, time reduction etc.,*

**Safety**

*Impact on various areas mentioned (but not limited to) Security (data, network, information), privacy etc.,*

**Ethics**

*General SW ethics for building an application or solution like (but not limited to) – does not harm any person (physically or virtually), securing privacy information of the resources using application (secure login, not exposing personal details in any form) etc.,*

**Cost**

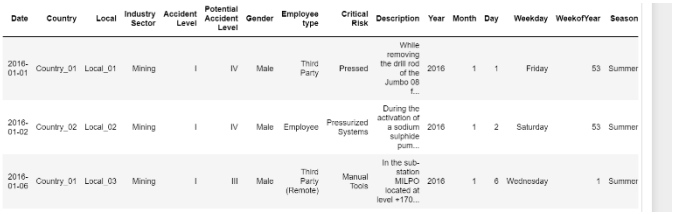
*Cost of development, usage, maintenance etc.,*

*Cost reduction due to implementation of the project in production*

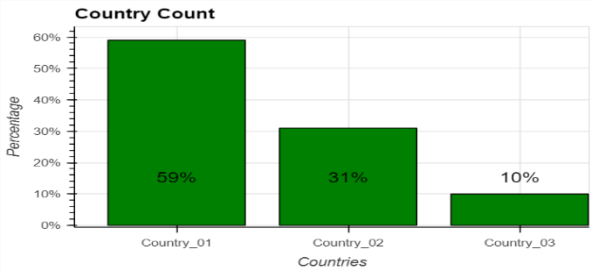
**Type**

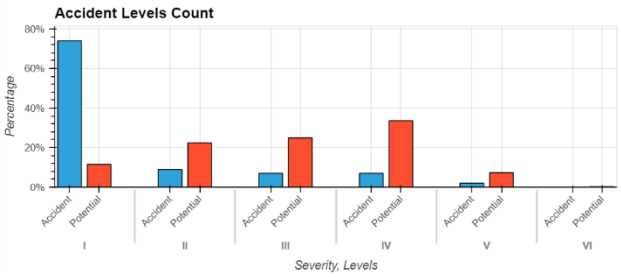
*Standalone*

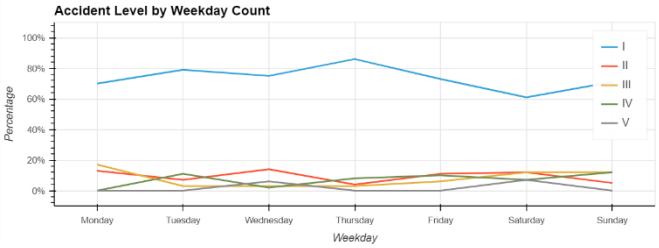
## SAMPLE SCREENSHOTS



| Date | Country | Local | Industry Sector | Accident Level | Potential Accident Level | Gender | Employee type | Critical Risk | Description | Year | Month | Day | Weekday | WeekofYear | Season |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016-01-01 | Country_01 | Local_01 | Mining | I | IV | Male | Third Party | Pressed | While removing the drill rod of the Jumbo 08 f... | 2016 | 1 | 1 | Friday | 53 | Summer |
| 2016-01-02 | Country_02 | Local_02 | Mining | I | IV | Male | Employee | Pressurized Systems | During the activation of a sodium sulphide pum... | 2016 | 1 | 2 | Saturday | 53 | Summer |
| 2016-01-06 | Country_01 | Local_03 | Mining | I | III | Male | Third Party (Remote) | Manual Tools | In the sub-station MILPO located at level +170... | 2016 | 1 | 6 | Wednesday | 1 | Summer |



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## CONCLUSION

In this paper, we propose a aim to analyze and create predictions of Industrial accidents from a publicly provided dataset. Using the dataset, the system was able to read the data, clean the data, produce various analyses and statistics along with making predictions based on the model it was trained with. With the use of Random Forest Classifier, it can be depicted that it is comparatively a better algorithm than by using single trees. The system can be used for any industry and this can also be mean to help industries in getting to know better about the fatalities that occur. Also, the system aids in understanding the data and result out a prediction so as to ensure in keeping the employees safer from any further happenings. 1. Lack of valuable data: A machine learning algorithm often requires tens of thousands of data [35] to be trained in order to get an effective model. The acquisition of these basic data often requires manual operations and the speed cannot be guaranteed..

## FUTURE SCOPE

In future enhancement we will add some more algorithms to predict efficiently

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**BIOGRAPHY**

**Mrs. MOUNIKA.S** completed her Bachelor of Technology in Computer Science and Engineering. She completed her Masters of Technology in Computer Science and Engineering from JNTU KAKINADA UNIVERSITY. Currently working as an Assistant Professor in the department of AI&IT at DVR & DR HS MIC COLLEGE OF TECHNOLOGY (Autonomous), Kanchikacherla (NTR Dist, AP). Her areas of interest are Data Mining, Cloud Computing and Machine Learning & Networks.

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