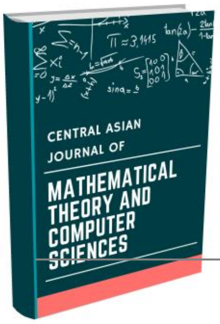

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Effect of Organic Ash on Rheological Properties on Drilling Fluid

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Abstract

Successful oil and gas extraction is the end goal of any drilling operation, which involves planning, drilling, evaluating, and finishing a well. Since drilling fluids serve so many purposes in making this possible, it is critical that they be carefully designed. An experiment was conducted in the lab for this investigation. To improve the qualities of drilling mud and lessen the harmful effect of organic ash on the environment and human health, this study examines the behaviour and properties of drilling mud with the addition of different concentrations by weight of local organic ash. Rheological studies were conducted in the lab to approximate the developed drilling mud systems' physical and rheological qualities. Laboratory analyses confirmed that organic ash improved the drilling mud's characteristics. It was determined how well organic ash performed in comparison to barite in a mud system. The results suggest that the mud systems with organic ash performed well in terms of l, gel strength, density, and pH, but poorly in terms of controlling filtering loss..

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Introduction

To keep the newly drilled borehole open until steel casing can be cemented in the hole, cool and lubricate the rotating drill string and bit, and clean the rock fragments from beneath the bit and carry them to the surface are all reasons why drilling mud is crucial to petroleum production. Bentonite and barite are the principal components of drilling mud, together with a water or oil basis and several additives. Materials like carboxymethyl cellulose (CMC), cement, lime, starch, graphite, lignite, and so on. These additives are expensive and might need to be imported. One of the less expensive additives that can boost the performance of drilling mud is fly ash. Since fly ash results from the burning of coal in power plants, it is considered a waste product.

Drilling engineers and operators are primarily concerned with the right selection of drilling fluids and the variation in their properties when subjected to the circumstances of the borehole. Wellbore instability, extra reaming, insufficient logging, pipe sticking, excessive torque, and pipe suck-up can occur while drilling sensitive formations such shales, shaly sandstones, and fractured and unconsolidated reservoirs due to borehole hydration and dispersion of cuttings. The drilling fluid's interaction with the sensitive formations causes the formations to inflate and spread, leading to the various kinds of hole instability. Clays absorb water by osmotic swelling of their surfaces and hydration of their surfaces. Crystalline swelling is present in all clays, but only some smectite clays. Due to their superior performance, non-aqueous drilling fluids are generally accepted. They reduce borehole environment sensitivity, provide superior lubricity, and boost overall drilling efficiency. However, their utility is constrained by concerns over fluid disposal and other associated environmental costs. However, these unwelcome consequences are not linked to the use of water-based drilling fluids in well drilling. However, they are extremely delicate to formation properties, therefore a universal drilling fluid is not possible. When compared to oil-based mud or synthetic drilling fluids, water-based fluids are preferred for environmental reasons. Costs associated with well construction can skyrocket when these drilling fluids cause clay to expand and absorb water.

When extracting any reservoir, operators will inevitably run into smectite clays. Different types of exchangeable cations in clay minerals result in varying degrees of swelling. In the clay structure, they compete with water molecules for the few reactive sites. More swelling occurs in clays with low valence exchangeable cations than in those with high valence cations. If you want to create an effective mud system, you need to know how clay expands. Inhibitors of clay swelling are used to reduce clay swelling. Still, the ever-tightening environmental regulations, especially in highly populated areas, slow the usage of some inhibitors. The engineer takes the conditions of the borehole into account while making the decision on the drilling fluid to use. Shear-thinning mud, as indicated by a high yield point/plastic viscosity ratio, is optimal for drilling fluid because it gels when circulation is shut off, holding the cuttings in suspension, but quickly reverts to a thin fluid when agitated by further drilling.

Many harmful substances, including lead, arsenic, mercury, and radioactive uranium, contribute to the expanding problem of fly ash waste. The most common and useful applications of fly ash nowadays are as a raw ingredient in construction materials like concrete, grout, and cement, or as a fill material in stabilisation projects and on roadbeds. Fly ash from coal power plants is a fine particulate matter collected in the bag houses and electrostatic precipitators. This is a common issue when constructing oil and gas wells. This results from the hydrostatic mud column's pressure being lower than the formation pressure. Fly ash is a byproduct of coal combustion used to generate electricity in industrial and power plant settings. In terms of raw material resources, fly ash ranks fifth globally. Over 130 Mt of Fly Ash is produced annually by India's energy industry, and this number is expected to rise as the country's coal consumption rises by 2.2% annually.

Wet fly ash is stored on a massive scale in ponds, which results in the loss of around (113 million m2). The consequences for India's environment could be catastrophic if this trend continues. Grey in appearance, fly ash is abrasive, typically alkaline, and refractory; these characteristics describe it well. Fly ash is composed primarily of silica (60-65%), alumina (25-27%), magnetite (6%-15%), and Fe_2O_3 (1%-2%). The inclusion of fly ash in the final mud system has a significant impact on its filtering capabilities. Fly ash is safe for the environment and causes no problems for the soil because it is compatible with it. The soil's physical qualities and nutrients are enhanced even further by the addition of fly ash, making it more suitable for plant growth. Since adding fly ash to drilling fluid won't increase the difficulty of disposing of the fluids, this industrial byproduct has a lot of potential for use in oil and gas well drilling. Using xanthan gum as a viscosifier, polyanionic cellulose as a fluid loss control agent, potassium chloride as a shale inhibitor, and fly ash as a bridging agent for the control of filtration properties of the drilling fluids, this experimental work aims to develop an environmentally friendly inhibitive and non-damaging water-based drilling fluid system. When compared to other particle bridging agents used in drilling fluids, including calcium carbonate, fly ash is both more affordable and more lightweight ($CaCO_3$). Calcium carbonate has a density of 2.7 g/cc, but fly ash is only 2.2 g/cc dense.

Fly ash, due to its tiny particle size and cement-like qualities, has been utilised as a cement component for quite some time. Fly ash's useful qualities make it a potential ingredient to drilling mud, where it could boost efficiency by replacing more costly additives. Fly ash in drilling mud not only reduces the cost of these processes, but it also prevents a growing harmful threat to the environment or the disposal of wastes. The removal of rock fragments from the wellbore, the application of necessary hydrostatic pressure, the cooling and lubrication of all systems, the maintenance of hole stability, and the prevention of crossflow of fluids between the borehole and the formation are all dependent on drilling mud or drilling fluid. Drilling operations are simplified and cost reduced as a result of better selection of practical drilling fluid and enhanced physical and chemical qualities of the mud.

With this goal in mind, scientists have been looking for ways to enhance the qualities of drilling fluids by using additives of varying composition and size. Water-based, oil-based, and air-based are the three broad categories into which drilling mud can be placed. In many fields, water-based mud is preferred. Water-based drilling muds have numerous additions including carboxymethylcellulose, polymers, etc., in addition to the base solutions of bentonite and barite. Drilling mud additives in the form of nano- and micro-sized particles have been utilised to reduce costly filtrate losses as of late. The loss of drilling mud due to filtration into holes and other small void formations has a negative impact on well stability and can be costly. To prevent groundwater contamination, fly ash is commonly employed as a stabilising agent in drilling fluid wastes in the petroleum sector. Fly ash is also used in deeper offshore well drilling as a foam-able drilling fluid addition.

Drilling fluids were combined with ultra-fine, micro-sized fly ash at varying concentrations, and the resulting changes in rheological and filtration properties were analysed. Drilling mud made from bentonite clay and water contains varying amounts of fly ash (percent w/v). As rheological qualities, the Fann Rotational Viscometer measures plastic viscosity, yield point, apparent viscosity, and gel strength, and as filtering properties, the API fluid loss testing equipment measures filtrate loss and filter cake thickness. Drilling mud with fly ash added is compared to bentonite suspensions made with water in terms of rheology and filtration. Because of its pozzolanic qualities, fly ash is widely used in the cement industry, and its bonding property helps regulate filtrate losses and guarantee solidity.

Most of the other nano and microparticles used for this purpose are imported at a higher cost than fly ash. Since fly ash is a byproduct of combustion, its availability has increased alongside the growth of Turkey's coal-fired thermal power plant industry. By 2020, experts predict that Turkey's yearly fly ash production would top 50 million tonnes. Coal type, combustion technique, and the system in place to deal with fly ash all contribute to its unique properties. The study of the qualities of materials that govern their reaction to mechanical force is known as rheology, which is also the definition of rheology. Rheology is a very recent branch of physics; the term itself did not appear until 1929. However, the origins of rheological concepts can be traced back to the 17th century, when Sir Isaac Newton defined the term "viscosity" to describe the resistance encountered when moving through a fluid, or "the resistance which arises from the lack of slipperiness originating in a fluid," which is directly proportional to the speed at which the fluid's components are being separated. Rheology researchers also benefited greatly from the later contributions of other well-known authors.

The introduction of the centipoise as the universal unit of viscosity marked the beginning of the deliberate creation of materials with controlled rheological characteristics. The term "yield stress" was first proposed by Bingham in 1922 to describe the behaviour of paints during flow. A yield value or a low "starting stress" was required in the experimental work of Schwedoff (1890), Trouton, and Andrews (1904) to produce linearity between flow rate and stress. The critical shear stress, or yield point, of a Bingham plastic fluid is the shear stress above which flow begins. Ostwald, better known for the Power Law, developed the equation of shear rate-dependent viscosities in 1925, and Herschel Bulkley followed suit the following year.

The Main Objective of This Study

The primary objective of this study is to examine the impact of organic ash on drilling mud's rheological qualities in an effort to improve the mud's performance.

The purpose of this study is to create and analyse rheologically active samples of inverted emulsion drilling fluid.

- The purpose of this study is to identify the optimum concentration of Vis Plus for drilling fluid rheology optimization.
- The goal of this research is to determine which rheological model best captures the behaviour of drilling fluid by analysing its rheology and rheological properties.

Literature Review

Understanding of water-based drilling mud and applications, drilling mud additives, fly ash characteristics, and API stand practise were all enhanced by a review of relevant issues and past research results. Drilling mud rheology is discussed in this chapter, as it has a significant impact on mud properties. Books, articles, dissertations, and studies were consulted for this article. The following is a brief synopsis of the study's findings.

At room temperature, these pozzolans, which are siliceous or siliceous and aluminous minerals, combine with water and calcium hydroxide to generate cementitious products. Fly ash can be used in construction because of its favourable geotechnical features (such as specific gravity, permeability, internal angular friction, and consolidation characteristics). Bituminous coal fly ash is mostly composed of silica, alumina, iron oxide, and calcium, with various levels of carbon as determined by the loss on ignition temperature (LOI). More calcium and magnesium oxide, less silica and iron oxide, and less carbon can be found in lignite and subbituminous coal fly ash compared to bituminous coal fly ash. There is a negligible amount of anthracite coal fly ash since so little of it is used in utility boilers.

Fly ash properties

It looked at the composition, mineralogy, surface chemistry, and reactivity of fly ash, all of which are crucial to the advancement of fly ash's many potential uses.

When it comes to its chemistry, fly ash is heavily impacted by the type of coal being burned and the methods employed in its management and storage. There are four different ranks of coal, each with its own unique heating value and chemical composition. Drilling mud qualities are enhanced by additives, which aid thickeners, lubricants, bacteria, corrosion inhibitors, viscosity control, clay stabilisation, formation damage, shale stabiliser, fluid loss, scavengers, and surfactants. Fly ash, dolomite, rice husk ash, lime, and starch are among the additions tested for this reason. The additives' chemical make-up suggests that they can be used to regulate pH, boost viscosity and density, and lessen evaporation. Below is a summary of research on additives;

To prevent harm to the marine environment from mud additives, we researched eco-friendly fluid loss additives. A frequently used modified starch in the mud business is shown to have static and dynamic fluid loss characteristics that are comparable to, or even better than, those of some starches. The newly discovered starch products can be employed as fluid loss additives for drilling boreholes with bottom hole temperatures up to 150oC, as measured by their static fluid loss qualities following thermal treatment at different temperatures. Starch was added to some treatments to see whether it would stabilise the coating and stop the slumping from happening vertically. The investigation also included a commercial fire prevention gel coating for purposes of comparison.

In contrast to the commercial gel and the SB foam, coatings made with starch showed minimal slumping during the burn test. In rheology tests, starch samples outperformed commercial gel and SB samples without starch in terms of G' (elastic modulus), G" (viscous modulus), and yield stress. Unexpectedly, the starch-containing samples heated more slowly than the control samples. The continuous boundary layer (crust) that developed throughout the burn test may have played a role in this phenomenon by protecting the substrate surface from the intense heat, reducing the amount of exposed area, and, initially, decreasing the water vapour flux. To find out how long the coatings could retain their moisture under extreme conditions, drying tests were run at 44 degrees Celsius.

Compared to SB foam samples, SB gel coatings maintained their moisture for significantly longer. Drying time (evaporation rate) was lengthened for both the SB foam and gel samples due to the addition of starch. Because of their high porosity and reactive surface functionalities including carboxyl, carbonyl, and methylene groups, adsorbents derived from rice husks that have been subjected to thermal processing are effective absorbers for heavy crude petroleum and petroleum derivatives. SEM analyses have found that thermal treatment is an effective way to enhance the porosity of husk particle structure in comparison to virgin samples. Microanalyses using XRD and SEM/EDAX reveal that thermally treated rice husks are predominantly composed of amorphous silica (SiO_2). Following are the conditions under which the treatment is most effective: Maximum sorption capacity of TRH700 was approximately 15 g petroleum per gramme of husks at a heating temperature of 700°C and a sorption period of 25 min in the case of heavy crude petroleum. In conclusion, this research shows that rice husks, which are typically discarded as agricultural waste, could be used to produce efficient petroleum adsorbents.

Drilling mud

Depending on whether the mud has a water or oil phase, it is classified as a water base mud (WBM) or an oil base mud (OBM). Water-bearing microbes (WBMs) and oil-bearing microbes (OBMs) are also possible. The liquid component is typically hydrocarbon oil, and other components such clays or colloidal asphalts, emulsifiers, polymers, and weighing agents are added to achieve the required viscosity. Water content may also be present, but it typically does not exceed 50% by volume. An inverted emulsion, or water-in-oil emulsion, describes mud that contains more than 5% water. They typically include things like salt, corrosion inhibitors, lubricants, emulsifiers, and pH adjusters in addition to the more common viscosities, fluid loss control agents, weighing agents, and lubricants. The mud's continuous phase is water, which typically accounts for at least half of the mud's total composition. In addition to water, oil is often contained in mud in trace proportions, but the oil content rarely exceeds the water content. Drilling mud qualities can be described by measuring its viscosity, specific weight, gel strength, and filtration, among other key criteria. A Marsh funnel is used to determine the viscosity. The dimensions of the funnel allow for 26 seconds of outflow time for 1 quart (926 ml) of fresh water at 70 degrees Fahrenheit (21 degrees Celsius). A rotational viscometer is also used to measure viscosity. Two concentric cylinders hold the mud in place. The spring-connected cylinder rotates at a steady rate, while the other is stationary. This cylinder's position is perturbed from equilibrium when torque is applied to it; this movement can be interpreted as a measure of viscosity. To find out if mud is suitable for making walls, it is put through a filter press.

The alkaline-proof press chamber is cylindrical in shape. The chamber floor is lined with filter paper. A pressure of 0.7 MPa is applied within the chamber once the mud has been added. The volume of the filtrate is given after 30 minutes. Filter cakes can be hard, soft, rough, rubbery, or firm depending on how they look upon inspection. Methyl orange or phenolphthalein are used as indicators in acid-base titrations to determine alkalinity. At a pH of 8.3, phenolphthalein becomes yellow, while at a pH of 4.3, methyl orange does the same. When the pH reaches 8, all of the strong alkaline substances, like NaOH, have been neutralised. The concentrations of carbonates and bicarbonates can be determined by further lowering the pH to 4. Determine pH with a colorimetric test or a glass electrode device. Under simulated circulating conditions, a roller over can shed light on how temperature and different chemical additions influence the rheological filtration and chemical properties of fluids and muds.

Drilling mud characteristics are enhanced by the use of additives. Bentonite is a thixotropic gel that forms when it absorbs water and expands. The micaceous sheet structure that gives these rocks their special quality. Bentonite is used as a viscosity enhancer or builder in a variety of applications, including drilling muds and fluids, concrete and mortar additives, foundry and moulding sands, compacting agents for gravel and sand, and even cosmetics, thanks to its high water retention capacity and high sintering temperature. Most naturally occurring bentonites are in their sodium or calcium form API, and an apparent viscosity of at least 15 cp, which is equivalent to a slurry yield of 90 barrels per tonne, is considered to be an acceptable value by the Turkish Institute of Standards (TSE). When drilling into permeable formations where the hydrostatic pressure is greater than the formation pressure, filtration control is a crucial quality of the drilling fluid. The formation of a filter cake from drilling fluid fast is crucial for the efficient reduction of fluid loss. However, it is thin and erodes easily enough to let product leak into the wellbore during production to API, and the Turkish Institute of Standards (TSE) restricted fluid loss to 15 ml or less.

Drilling mud improvement

Drilling mud characteristics enhanced by inexpensively incorporating dolomite powder and fly ash into the recipe. Particle size distribution, density, pH, viscosity, and mud dispersion were among the drilling parameters studied to see how dolomite and fly ash affected them. Drilling mud has been discovered to share characteristics with barite, dolomite, and fly ash. Drilling mud with an excellent suspension property has a barite to dolomite to fly ash ratio of either 70:10:20 or 70:30:0 and a bentonite content of 3% by weight. When 3% by weight bentonite and 0.6 g/l of CMC were added, the formulas of 70:5:25 and 70:0:30 produced similarly effective suspensions. The API standard for drilling mud has four different formulations.

The addition of carbon ash significantly raises the yield point (YP) of bentonite dispersion, which is especially helpful for bentonite dispersions with a low solid content. In addition to the density test, an API Filter Press is used for the filtration process. It was clear from the data that both filtrate loss and filter cake thickness were substantially increasing. In contrast, increasing amounts of carbon ash cause the bentonite dispersion to become slightly less dense. In addition, we assess the durability of a bentonite dispersion that has been reinforced with carbon ash.

Based on the experimental findings, carbon ash is preferable to RM instability. Carbon ash has been shown to have great promise as an addition for enhancing the rheological properties of water-based drilling fluids in this study. An extensive investigation was conducted to determine if gelation and filtration properties could be controlled by adding 3% w/w Greek lignite to 6.42 w/w water-bentonite solutions after they were exposed to high temperatures. A commercial lignite product was employed as the gold standard, along with two bentonites and eight lignites from various basins in Greece. The yield stress and yield point of lignite-free bentonite suspensions are significantly raised after being heated to 177 °C for 16 hours (thermal ageing). And some Greek lignites are better than the commercial product when it comes to filtering control of the water-bentonite suspensions after being heated to 177 °C. Both bentonites' suspensions' fluid loss was studied, with the identical lignite parameters used in the rheological control study.

Weak inverse relationships were found between the fluid loss volumes of the two bentonites and the humic and fulvic acid concentrations of two sets of lignites. The performance of the lignite did not appear to be correlated with any of the other characteristics.

Rheology, or the study of fluid flow and its modelling, is used to characterise drilling mud and its properties. The study of how and why materials change shape is known as rheology. It explains how stress and strain evolve over time. The rheological model establishes a mathematical connection between shear stress and shear rate to characterise the flow behaviour of a fluid. The Bingham plastic model and the Power law model are both commonly used to describe the rheology of drilling mud. In this analysis, we compare and contrast the two models.

Fluids fitting the Bingham plastic model have a finite yield stress before they begin to flow at zero shear stress and infinite strain rate. Drilling mud, clay suspensions, and other similar materials are a few examples. Once shear stress has been increased beyond the yield stress, the constant of proportionality between shear stress and shear rate is known as the plastic viscosity. Figure 1 is a diagrammatic depiction of this paradigm. Shear thinning is the reduction in plastic viscosity with increasing shear rate.

If n > 1, the fluid has phase Rheopectic fluids

If n<1, the fluid has phase thixotropic fluid

Shear rate (Ɣ), sec $^{-1}$ $=1.7023 \times \omega$ (2.1)

Shear Stress (Ʈ), Ib/100ft^2 $= 1.065 \times \phi$ (2.2)

Where:

ϕ = the dial reading, lb/100ft^2

ω = the rotor speed, rpm

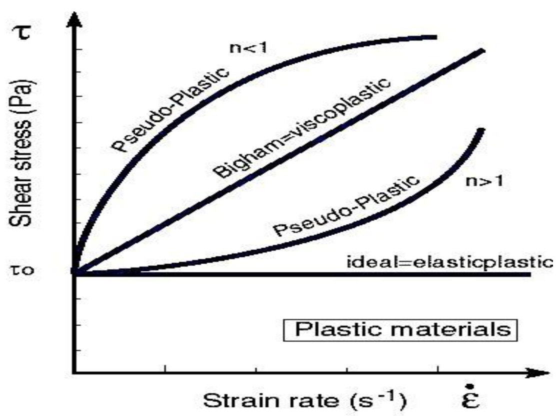

Figure 1: Flow curve for Bingham plastic model [148]

Power law model

Shear stress vs shear rate in a log-log plot The fluid acts like a Newtonian fluid with n = 1, and the Power law equation is the same as that of a Newtonian fluid. When n is more than 1, the fluid in question is considered a dilatant. The shear rate of dilatant fluids is crucial. As the shear rate rises, so does their apparent viscosities. Pseudoplastic fluids are those for which n is less than 1. Similar to real fluids, the apparent viscosity of pseudoplastic fluids decreases with decreasing shear rate. The graphical depiction of Power-law fluids is shown in Figure 2.

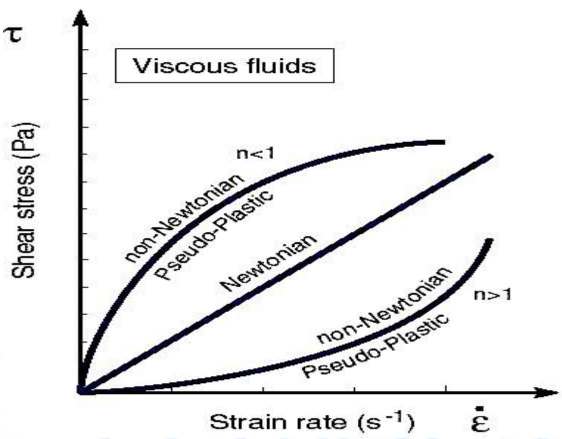

Figure 2: Flow curve of Power-law model [148]

The terms "modified power law" and "yield pseudoplastic" are also used to describe this concept. The model depicts the movement of stress-activated flow in pseudoplastic drilling muds. Shear stress minus yield stress versus shear rate on log-log axes yields a straight line.

In addition to describing the flow behaviour of most drilling fluid, this model also includes a yield stress value that is relevant to a number of hydraulic concerns and accommodates the Bingham plastic and Power law models as special instances, therefore it has found widespread application. In an API Drilling Fluid report, the plastic viscosity and yield point calculated using the Bingham plastic model are noted as rheological parameters. Other rheological models' essential parameters can be computed using these two terms.

Drilling muds, according to the Department of Primary Industries and Mines, tend to be quite pricey. They're necessary for figuring out how much different types of well-drilling mud systems will set you back. It was also determined how the filtration qualities of solutions compared to API (American Petroleum Institute) standard filter press machinery. After subjecting the fluid column to 100 psi of pressure for 30 minutes, data on filtrate loss and mud cake thickness were collected. The mud balance, which consists of a base and a balance arm with a cup for counterweight, was used to determine the thickness of the mud cake in increments of 1/32".

Result and Discussion

There are 10 grammes of barite and 15 grammes of bentonite in the base mixture, which is 350 cc of water. The sole type of ash included in the addition is organic. Four different concentrations of organic ash are added to the water-based drilling mud. It's the right number to use. Therefore, the new drilling mud consists of four percent organic ash and additional chemicals. Parameters and rheological characteristics: All six results from a drilling mud viscometer based on water, including shear stress and shear rate data. Shear stress and shear rates can be computed from the average viscometer value using the appropriate equations.

Shear rate (γ), $sec^{-1} = 1.7023 \times \omega$ (2.1)

Shear Stress (τ), $Ib/100ft^2 = 1.065 \times \phi$ (2.2)

As shown in Figure 3, a linear adjustment is applied to the plot of shear stresses vs shear rates in order to select the best-fit curve for the Bingham Plastic model. The consistency plot of water-based drilling mud containing organic ash addition suggests that the fluid has the properties of a Bingham Plastic fluid.

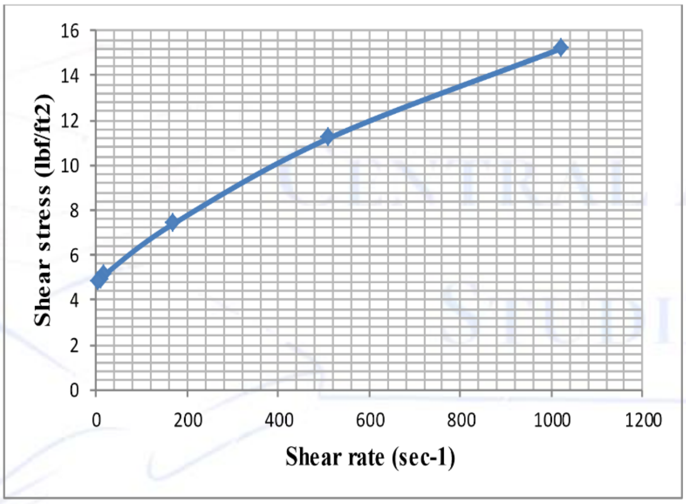

Figure 3: Shear stress vs. shear rate plot of water-based drilling mud with a linear correction

For various samples of drilling mud, the Bingham Plastic model shows the correct rheological model to use. In Figure 4, we see a breakdown of the samples of water-based drilling mud into two distinct classes.

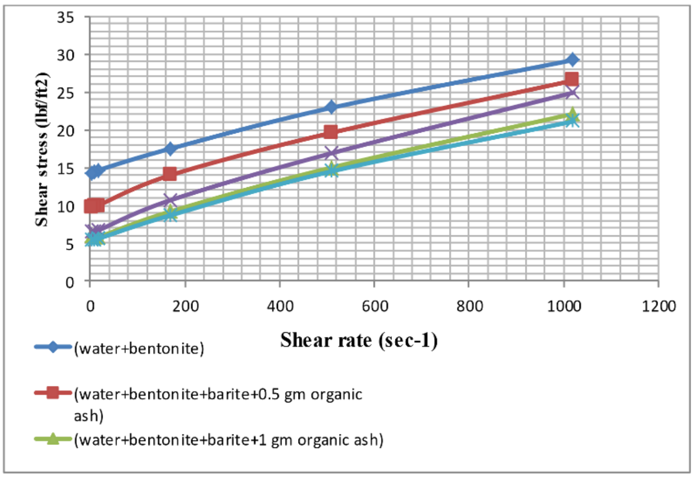

Figure 4: Shear stress vs. shear rate plot of water-based drilling mud ((water +bentonite +barite) with organic ash

Drilling mud samples show an increase in their preferred plastic viscosity with increasing amounts of fly ash. Bentonite's internal friction rises steadily as its plastic viscosity rises (plastic viscosity is proportional directly with solid concentration)

Water-based drilling fluids' rheological and filtration qualities as affected by the fly ash ratio. Different ratios of fly ash to drilling fluid were tested in the current investigation, from 1% to 7% w/v. The rheological properties of water-based drilling mud were studied as a result of their addition. The variation in both the acoustic and plastic viscosities versus. The cp ratio of the mud was shown to increase up to a concentration of 6% fly ash, after which it tended to decrease. Drilling mud with 6 percent fly ash added had an increase in rheological parameters of 13 percent cP of apparent viscosity and 39 percent of plastic viscosity, according to the analysis. This suggests that incorporating up to 6% fly ash into the drilling fluid can improve flowability and mitigate issues including surge, swab pressure, differential sticking, and sluggish penetration rate. Choosing the pump and pressure to flow the mud from stationary places also relies heavily on the yield point.

Conclusions

Phase Bingham plastic fluids are present in the drilling fluid, and the addition of organic ash raises the plastic's viscosity, density, and fluid loss. Changes in yield point, apparent viscosity, and gel strength (10 seconds) are some of the rheological parameters that are disrupted by the addition of organic ash (10 minutes). A higher fly ash concentration enhanced the material's filtration capabilities. The refined drilling fluid system now offers a wider range of particle sizes. This improved the particles' ability to bridge gaps, leading to thinner cakes and less filter loss. After incorporating fly ash into the refined drilling fluid system, the particle size was significantly diminished. The developed drilling fluid system benefits from the incorporation of nanoparticles because of the enhanced qualities they provide. Preparing homogeneous solutions requires careful attention to the order in which the polymers are added and mixed. Fly ash has almost no impact on the rheological characteristics. Fly ash is comparable to other bridging agents in terms of effectiveness, accessibility, environmental impact, and cost. As a byproduct of many different sectors, it should be put to good use if at all possible.

Reference

1. K. Venkata Ramana and K. Venugopal Rao, "Investigation of source code mining using novel code mining parameter matrix: Recent state of art," International Journal of Latest Trends in Engineering and Technology, vol. 7, no. 3, 2016.
2. K. Venkata Ramana and K. Venugopla Rao, "A novel automatic source code defects detection framework and evaluation on popular java open source APIs," International Journal of Advanced Research in Computer Science, vol. 8, no. 5, pp. 1741–1746, 2017.
3. K. Venkata Ramana and K. Venugopala Rao, "An evaluation of popular code mining frameworks through severity based defect rule," International Journal of Emerging Technology and Advanced Engineering, Vol.7, No.6, PP.375-380.
4. K. Venkata Ramana and Dr. K. Venugopal Rao, "A severity based source code defect finding framework and improvements over methods," International Journal of Applied Engineering Research Vol.7, No.3, PP.15202-15214.
5. J. Aswini, B. Yamini, K. Venkata Ramana, and J. Jegan Amarnath, "An efficient liver disease prediction using mask-regional convolutional neural network and pelican optimization algorithm," IETE J. Res., pp. 1–12, 2023.
6. K. V. Ramana, A. Muralidhar, B. C. Balusa, M. Bhavsingh, and S. Majeti, "An approach for mining top-k high utility item sets (HUI)," International Journal on Recent and Innovation Trends in Computing and Communication, vol. 11, no. 2s, pp. 198–203, 2023.
7. B. Yamini, V. Ramana Kaneti, M. Nalini, and S. Subramanian, "Machine Learning-driven PCOS prediction for early detection and tailored interventions", SSRG International Journal of Electrical and Electronics Engineering, Volume 10, Issue No 9, PP 61-75.
8. Venkata Ramana K., Hemanth Kumar Yadav G., Hussain Basha P., Lankoji Venkata Sambasivarao, Balarama Krishna Rao Y.V., M.Bhavsingh, "Secure and Efficient Energy Trading using Homomorphic Encryption on the Green Trade Platform", International Journal of Intelligent Systems and Applications in Engineering, Vol. 12 No. 1S (2024), PP 345-360.
9. R. Siva Subramanian; K. Sudha; K.Venkata Ramana; S. SivaKumar; R. Nithyanandhan, and M. Nalini, "Hybrid Variable Selection Approach to Analyse High Dimensional Dataset", 2023 7th International Conference on Computing Methodologies and Communication (ICCMC), PP.1489–1495, 2023.

10. K. Venkata Ramana, C Sowntharya, K Jithesh, Poli Lokeshwara Reddy, M C Apoorva, and Ashok Kumar, “DWT Algorithm for Macro & Micro Block based Multiple Histogram Shifting for Video Data Hiding”, 2022 International Conference on Automation, Computing and Renewable Systems (ICACRS), PP. 1121-1127, February 2023.
11. K. Venkata Ramana, Yuvasri. B, Sultanuddin Sj, P. Ponsudha, Sowmya Pd; A. Visva Sangeetha, “Applying Cost-Sensitive Learning Methods to Improve Extremely Unbalanced Big Data Problems Using Random Forest”, 2023 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), 04 August 2023, Publisher: IEEE.
12. K. Venkata Ramana, S. Arulkumar, Asmita Marathe, Kedir Beshir, V Jaiganesh, K. Tamilselvi, and M. Sudhakar, “Design and Implementation of Renewable Energy Applications Based Bi-Directional Buck-Boost Converter”, 2023 3rd International Conference on Innovative Practices in Technology and Management (ICIPTM), 10 May 2023, Publisher: IEEE
13. F. Mary Harin Fernandez, I. S. Hephzi Punithavathi, T. Venkata Ramana and K. Venkata Ramana “Semantic-Based Feature Extraction and Feature Selection in Digital Library User Behaviour Dataset”, Part of the Lecture Notes on Data Engineering and Communications Technologies book series (LNDECT, volume 141), 5th International Conference on Computer Networks and Inventive Communication Technologies (ICCNCT 2022).
14. Maashi, M., Alamro, H., Mohsen, H, Negm, N., Mohammed, G., Ahmed, N., Ibrahim, S. and Alsaid, M. Modelling of Reptile Search Algorithm with Deep Learning Approach for Copy Move Image Forgery Detection (2023), IEEE Access.
15. Maashi, M,Al-Hagery,M., Rizwanullah, M & Osman, A.,(2023 (Automated Gesture Recognition Using African Vulture Optimization with Deep Learning for Visually Impaired People on Sensory Modality Data, Journal of Disability Research, 1-12.
16. Maashi, M., Ali, Y., Motwakel, A., Aziz, A., Hamza, A. and Abdelmageed, A. (2023) Anas Platyrhynchos Optimizer with Deep Transfer Learning based Gastric Cancer Classification on Endoscopic Images, Electronic Research Archive, 31(6) 3200-3217.
17. Alshareef, H, and Maashi. M, (2022). Application of Multi-Objective Hyper-Heuristics to Solve the Multi-Objective Software Module Clustering Problem, Applied Sciences, 12(1).5649.
18. Maashi, M. (2022). A Comprehensive Review of Software Testing Methodologies Based on Search-based Software Engineering, Webology ,19(2) 5716- 5728.
19. Ben Zayed, H, and Maashi, M. (2021) Optimizing the Software Testing Problem Using Search-Based Software Engineering Techniques, Intelligent Automation & Soft Computing .29(1),307-317.

20. Albalawi. F., and Maashi, M. (2021) A Methodology for Selection and Optimization the Software Development Life Cycles based on Genetic Algorithm, Intelligent Automation & Soft Computing. ,28(1), 39-52.
21. Maashi, M., Almanea, G., Alqurashi, R., Alharbi, N., Alharkan, R., Alsadhan, F. (2019) A greedy linear heuristic to solve Group-Project allocation problem: A case study at SWE-KSU". International Conference on Communication, Management and Information Technology- ICCMIT'19, Vienna, Austria, March.
22. Maashi, M., Kendall, G., and Özcan, E. (2015). Choice function based hyper-heuristics for multi-objective optimization, Applied Soft Computing,28, 312-326.
23. Maashi, M., Özcan, E. and Kendall, G. (2014). "A multi-objective hyper-heuristic based on choice function", Expert Systems with Applications, 41(9) 4475-4493.
24. MD.Mobin Akhtar, Abdallah Saleh Ali Shatat, Shabi Alam Hameed Ahamad, Sara Dilshad & Faizan Samdani,"Optimized cascaded CNN for intelligent rainfall prediction model: a research towards Statistic based machine learning," Theoretical Issues in Ergonomics Science, Taylor & Francis Volume 24,no. 5 p. 564 2022.
25. Md. Mobin Akhtar, Abu Sarwar Zamani, Shakir Khan, Abdallah Saleh Ali Shatat, Faizan Samdani, Sara Dilshad. "Stock market prediction based on statistical data using machine learning algorithms", Journal of King Saud University – Science, Vol.34, no.2, 2022
26. MD. Mobin Akhtar, Raid Saleh Ali, Abdallah Saleh Ali Shatat, Shatat,Shabi Alam Hameed, Sakher (M.A) Ibrahim Alnajdawi. "IoMT-based smart healthcare monitoring system using adaptive wavelet entropy deep feature fusion and improved RNN", Multimedia Tools and Applications, Springer Nature.
27. MD. Mobin Akhtar, Danish Ahamad, Abdallah Saleh Ali Shatat & Alameen, Eltoum M. Abdalrahman."Enhanced heuristic algorithm-based energy-aware resource optimization for cooperative IoT", International Journal of Computers and Applications, Taylor & Francis, Vol.44,no.10, 2022.
28. MD Mobin Akhtar, Danish Ahamad, Alameen Eltoum M. Abdalrahman, Abdallah Saleh Ali Shatat,| Ahmad Saleh Ali Shatat, " A novel hybrid meta-heuristic concept for green communication in IoT networks: An intelligent clustering model", International journal communication systems, wiley, Vol.35,no.6,2021.
29. Abu Sarwar Zamani, Md. Mobin Akhtar, Abdallah Saleh Ali Shatat, Rashid Ayub, Irfan Ahmad Khan, Faizan Samdani, "Cloud Network Design and Requirements for the Virtualization System for IoT Networks", IJCSNS International Journal of Computer Science and Network Security. Vol.22,no.11,2022.

30. Alarood, A. A., Faheem, M., Al- Khasawneh, M. A., Alzahrani, A. I., & Alshdadi, A. A. (2023). Secure medical image transmission using deep neural network in e- health applications. Healthcare Technology Letters, 10(4), 87-98.
31. Markkandeyan, S., Gupta, S., Narayanan, G. V., Reddy, M. J., Al-Khasawneh, M. A., Ishrat, M., & Kiran, A. (2023). Deep learning based semantic segmentation approach for automatic detection of brain tumor. International Journal of Computers Communications & Control, 18(4).
32. Al-Khasawneh, M. A., Alzahrani, A., & Alarood, A. (2023). Alzheimer's Disease Diagnosis Using MRI Images. In Data Analysis for Neurodegenerative Disorders (pp. 195-212). Singapore: Springer Nature Singapore.
33. Al-Khasawneh, M. A., Alzahrani, A., & Alarood, A. (2023). An Artificial Intelligence Based Effective Diagnosis of Parkinson Disease Using EEG Signal. In Data Analysis for Neurodegenerative Disorders (pp. 239-251). Singapore: Springer Nature Singapore.
34. Al-Khasawneh, M. A., Faheem, M., Aldhahri, E. A., Alzahrani, A., & Alarood, A. A. (2023). A MapReduce Based Approach for Secure Batch Satellite Image Encryption. IEEE Access.
35. K. Peddireddy, "Streamlining Enterprise Data Processing, Reporting and Realtime Alerting using Apache Kafka," 2023 11th International Symposium on Digital Forensics and Security (ISDFS), Chattanooga, TN, USA, 2023, pp. 1-4.
36. Kiran Peddireddy. Kafka-based Architecture in Building Data Lakes for Real-time Data Streams. International Journal of Computer Applications 185(9):1-3, May 2023.
37. Anitha Peddireddy, Kiran Peddireddy, "Next-Gen CRM Sales and Lead Generation with AI," International Journal of Computer Trends and Technology, vol. 71, no. 3, pp. 21-26, 2023.
38. Peddireddy, K., and D. Banga. "Enhancing Customer Experience through Kafka Data Steams for Driven Machine Learning for Complaint Management." International Journal of Computer Trends and Technology 71.3 (2023): 7-13.
39. S. Rangineni and D. Marupaka, "Data Mining Techniques Appropriate for the Evaluation of Procedure Information," International Journal of Management, IT & Engineering, vol. 13, no. 9, pp. 12–25, Sep. 2023.
40. S. Rangineni, "An Analysis of Data Quality Requirements for Machine Learning Development Pipelines Frameworks," International Journal of Computer Trends and Technology, vol. 71, no. 9, pp. 16–27, 2023.
41. S. Agarwal, "Unleashing the Power of Data: Enhancing Physician Outreach through Machine Learning," International Research Journal of Engineering and Technology, vol. 10, no. 8, pp. 717–725, Aug. 2023.

42. S. Agarwal, "An Intelligent Machine Learning Approach for Fraud Detection in Medical Claim Insurance: A Comprehensive Study," Scholars Journal of Engineering and Technology, vol. 11, no. 9, pp. 191–200, Sep. 2023.
43. Bhanushali, K. Sivagnanam, K. Singh, B. K. Mittapally, L. T. Reddi, and P. Bhanushali, "Analysis of Breast Cancer Prediction Using Multiple Machine Learning Methodologies", Int J Intell Syst Appl Eng, vol. 11, no. 3, pp. 1077–1084, Jul. 2023.
44. S. Parate, H. P. Josyula, and L. T. Reddi, "Digital Identity Verification: Transforming Kyc Processes In Banking Through Advanced Technology And Enhanced Security Measures," International Research Journal of Modernization in Engineering Technology and Science, vol. 5, no. 9, pp. 128–137, Sep. 2023.
45. K. Peddireddy and D. Banga, "Enhancing Customer Experience through Kafka Data Steams for Driven Machine Learning for Complaint Management," International Journal of Computer Trends and Technology, vol. 71, no. 3, pp. 7-13, 2023.
46. K. Peddireddy, "Kafka-based Architecture in Building Data Lakes for Real-time Data Streams," International Journal of Computer Applications, vol. 185, no. 9, pp. 1-3, May 2023.
47. R. Kandepu, "IBM FileNet P8: Evolving Traditional ECM Workflows with AI and Intelligent Automation," International Journal of Innovative Analyses and Emerging Technology, vol. 3, no. 9, pp. 23–30, Sep. 2023.
48. R. Kandepu, "Leveraging FileNet Technology for Enhanced Efficiency and Security in Banking and Insurance Applications and its future with Artificial Intelligence (AI) and Machine Learning," International Journal of Advanced Research in Computer and Communication Engineering, vol. 12, no. 8, pp. 20–26, Aug. 2023.
49. Rina Bora, Deepa Parasar, Shrikant Charhate , A detection of tomato plant diseases using deep learning MNDLNN classifier, , Signal, Image and Video Processing, April 2023.
50. Deepa Parasar, Vijay R. Rathod, Particle swarm optimization K-means clustering segmentation of foetus Ultrasound Image, Int. J. Signal and Imaging Systems Engineering, Vol. 10, Nos. 1/2, 2017.
51. Parvatikar, S., Parasar, D. (2021). Categorization of Plant Leaf Using CNN. (eds) Intelligent Computing and Networking. Lecture Notes in Networks and Systems, vol 146. Springer, Singapore.
52. Naufil Kazi, Deepa Parasar, Yogesh Jadhav, Predictive Risk Analysis by using Machine Learning during Covid-19, in Application of Artificial Intelligence in COVID-19 book by Springer Singapore. ISBN:978-981-15-7317-0.
53. Naufil Kazi, Deepa Parasar, Human Identification Using Thermal Sensing Inside Mines, 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2021, pp. 608-615.

54. Yogesh Jadhav, Deepa Parasar, Fake Review Detection System through Analytics of Sales Data in Proceeding of First Doctoral Symposium on Natural Computing Research by Springer Singapore. Lecture Notes in Networks and Systems book series (LNNS, volume 169), ISBN 978-981-334-072-5.
55. Parasar, D., Jadhav, Y.H. (2021). An Automated System to Detect Phishing URL by Using Machine Learning Algorithm. In: Raj, J.S. (eds) International Conference on Mobile Computing and Sustainable Informatics. ICMCSI 2020. EAI/Springer Innovations in Communication and Computing. Springer, Cham.
56. Parasar, D., Jadhav, Y.H. (2021). An Automated System to Detect Phishing URL by Using Machine Learning Algorithm. In: Raj, J.S. (eds) International Conference on Mobile Computing and Sustainable Informatics. ICMCSI 2020. EAI/Springer Innovations in Communication and Computing. Springer, Cham.
57. Deepa Parasar, Preet V. Smit B., Vivek K., Varun I., Aryaa S., Blockchain Based Smart Integrated Healthcare System, Frontiers of ICT in Healthcare, April 2023 Lecture Notes in Networks and Systems, vol 519. Springer, Singapore, EAIT 2022.
58. Deepa Parasar., Sahi, I., Jain, S., Thampuran, A. (2022). Music Recommendation System Based on Emotion Detection. Artificial Intelligence and Sustainable Computing. Algorithms for Intelligent Systems. Springer, Singapore.
59. Mishra, S., & Samal, S. K. (2023). An Efficient Model for Mitigating Power Transmission Congestion Using Novel Rescheduling Approach. Journal of Circuits, Systems and Computers, 2350237.
60. Samal, S. K., & Khadanga, R. K. (2023). A Novel Subspace Decomposition with Rotational Invariance Technique to Estimate Low-Frequency Oscillatory Modes of the Power Grid. Journal of Electrical and Computer Engineering, 2023.
61. A. B. Naeem, B. Senapati, M. S. Islam Sudman, K. Bashir, and A. E. M. Ahmed, “Intelligent road management system for autonomous, non-autonomous, and VIP vehicles,” World Electric Veh. J., vol. 14, no. 9, p. 238, 2023.
62. A. M. Soomro et al., “Constructor development: Predicting object communication errors,” in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
63. A. M. Soomro et al., “In MANET: An improved hybrid routing approach for disaster management,” in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
64. B. Senapati, J. R. Talburt, A. Bin Naeem, and V. J. R. Batthula, “Transfer learning based models for food detection using ResNet-50,” in 2023 IEEE International Conference on Electro Information Technology (eIT), 2023.

65. B. Senapati and B. S. Rawal, “Quantum communication with RLP quantum resistant cryptography in industrial manufacturing,” Cyber Security and Applications, vol. 1, no. 100019, p. 100019, 2023.

66. B. Senapati and B. S. Rawal, “Adopting a deep learning split-protocol based predictive maintenance management system for industrial manufacturing operations,” in Lecture Notes in Computer Science, Singapore: Springer Nature Singapore, 2023, pp. 22–39.

67. S. Venkatasubramanian, Jaiprakash Narain Dwivedi, S. Raja, N. Rajeswari, J. Logeshwaran, Avvaru Praveen Kumar, “Prediction of Alzheimer’s Disease Using DHO-Based Pretrained CNN Model”, Mathematical Problems in Engineering, vol. 2023, Article ID 1110500, 11 pages, 2023.

68. S.Venkatasubramanian, A.Suhasini, S.Hariprasath, “ Maximization Of Network Lifetime Using Energy Efficient Super Clustering Protocol Based On Ldha-Tsro In MANET”, Journal of Data Acquisition and Processing, 2023, 38 (3), pp. 523-537 .

69. S. Venkatasubramanian et al., “An Advanced Ticket Manager - Fuzzy Logic Based Aodv Routing Protocol (Tm-Flaodv) In Manet”, Skybold report, Vol 18, No 3 (2023),| pp. 233-249

70. Venkatasubramanian, S., Hariprasath, S., “Aquila Optimization-Based Cluster Head Selection and Honey Badger-Based Energy Efficient Routing Protocol in WSN”, Proceedings of the International Conference on Intelligent Computing, Communication and Information Security. ICICCIS 2022. Algorithms for Intelligent Systems. Springer, Singapore, pp 273–290.

71. S. Venkatasubramanian, Jaiprakash Narain Dwivedi, S. Raja, N. Rajeswari, J. Logeshwaran, Avvaru Praveen Kumar, “Prediction of Alzheimer’s Disease Using DHO-Based Pretrained CNN Model”, Mathematical Problems in Engineering, vol. 2023, Article ID 1110500, 11 pages, 2023.

72. Venkatasubramanian, Suhasini, and Vennila, "Cluster Head Selection using Spotted Hyena Optimizer for Energy-Efficient Routing in MANET," IAENG International Journal of Computer Science, vol. 50, no.3, pp1122-1129, 2023

73. S.Venkatasubramanian, “The Role Of Machine Learning In Optimizing Hrm Processes: Challenges And Opportunities”, International Journal of Creative Research Thoughts, Volume.11, Issue 8, pp.g372-g378, 2023.

74. Veena, A., Gowrishankar, S. An automated pre-term prediction system using EHG signal with the aid of deep learning technique. Multimed Tools Appl (2023).

75. A. Veena and S. Gowrishankar, “Context based healthcare informatics system to detect gallstones using deep learning methods,” International Journal of Advanced Technology and Engineering Exploration, vol. 9, (96), pp. 1661-1677, 2022.

76. Veena, A., Gowrishankar, S. (2021). Healthcare Analytics: Overcoming the Barriers to Health Information Using Machine Learning Algorithms. In: Chen, J.IZ., Tavares, J.M.R.S., Shakya, S.,

Iliyasu, A.M. (eds) Image Processing and Capsule Networks. ICIPCN 2020. Advances in Intelligent Systems and Computing, vol 1200. Springer, Cham.

77. A. Veena and S. Gowrishankar, "Processing of Healthcare Data to Investigate the Correlations and the Anomalies," 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), Palladam, India, 2020, pp. 611-617,
78. A. Veena and S. Gowrishankar, "Applications, Opportunities, and Current Challenges in the Healthcare Industry", 2022 Healthcare 4.0: Health Informatics and Precision Data Management, 2022, pp. 27–50.
79. K. Bhardwaj, S. Rangineni, L. Thamma Reddi, M. Suryadevara, and K. Sivagnanam, "Pipeline-Generated Continuous Integration and Deployment Method For Agile Software Development," European Chemical Bulletin, vol. 12, no. Special Issue 7, pp. 5590–5603, 2023.
80. S. Rangineni, D. Marupaka, and A. K. Bhardwaj, "An examination of machine learning in the process of data integration," International Journal of Computer Trends and Technology, vol. 71, no. 6, pp. 79–85, Jun. 2023.
81. T. K. Behera, D. Marupaka, L. Thamma Reddi, and P. Gouda, "Enhancing Customer Support Efficiency through Seamless Issue Management Integration: Issue Sync Integration System," European Chemical Bulletin, vol. 12, no. 10, pp. 1157–1178.
82. S. Rangineni and D. Marupaka, "Analysis Of Data Engineering For Fraud Detection Using Machine Learning And Artificial Intelligence Technologies," International Research Journal of Modernization in Engineering Technology and Science, vol. 5, no. 7, pp. 2137–2146, Jul. 2023.
83. L. Thamma Reddi, "Transforming Management Accounting: Analyzing The Impacts Of Integrated Sap Implementation," International Research Journal of Modernization in Engineering Technology and Science, vol. 5, no. 8, pp. 1786–1793, Aug. 2023.
84. M. Suryadevera, S. Rangineni, and S. Venkata, "Optimizing Efficiency and Performance: Investigating Data Pipelines for Artificial Intelligence Model Development and Practical Applications," International Journal of Science and Research, vol. 12, no. 7, pp. 1330–1340, Jul. 2023.
85. D. Marupaka, S. Rangineni, and A. K. Bhardwaj, "Data Pipeline Engineering in The Insurance Industry: A Critical Analysis Of Etl Frameworks, Integration Strategies, And Scalability," International Journal Of Creative Research Thoughts, vol. 11, no. 6, pp. c530–c539, Jun. 2023.
86. S. Rangineni, A. K. Bhardwaj, and D. Marupaka, "An Overview and Critical Analysis of Recent Advances in Challenges Faced in Building Data Engineering Pipelines for Streaming Media," The Review of Contemporary Scientific and Academic Studies, vol. 3, no. 6, Jun. 2023.
87. B. Nemade and D. Shah, "An IoT based efficient Air pollution prediction system using DLMNN classifier," Phys. Chem. Earth (2002), vol. 128, no. 103242, p. 103242, 2022.

88. B. Nemade and D. Shah, "An efficient IoT based prediction system for classification of water using novel adaptive incremental learning framework," J. King Saud Univ. - Comput. Inf. Sci., vol. 34, no. 8, pp. 5121–5131, 2022.
89. B. Nemade, "Automatic traffic surveillance using video tracking," Procedia Comput. Sci., vol. 79, pp. 402–409, 2016.
90. Khan, S. (2021). Data Visualization to Explore the Countries Dataset for Pattern Creation. International Journal of Online Biomedical Engineering, 17(13), 4-19.
91. Khan, S. (2021). Visual Data Analysis and Simulation Prediction for COVID-19 in Saudi Arabia Using SEIR Prediction Model. International Journal of Online Biomedical Engineering, 17(8).
92. Khan, S. (2022). Business Intelligence Aspect for Emotions and Sentiments Analysis. Paper presented at the 2022 First International Conference on Electrical, Electronics, Information and Communication Technologies (ICEEICT).
93. Khan, S. (2021). Study Factors for Student Performance Applying Data Mining Regression Model Approach. International Journal of Computer Science Network Security, 21(2), 188-192.
94. Khan, S., & Alshara, M. (2019). Development of Arabic evaluations in information retrieval. International Journal of Advanced Applied Sciences, 6(12), 92-98.
95. Fazil, M., Khan, S., Albahlal, B. M., Alotaibi, R. M., Siddiqui, T., & Shah, M. A. (2023). Attentional Multi-Channel Convolution With Bidirectional LSTM Cell Toward Hate Speech Prediction. IEEE Access, 11, 16801-16811.
96. Khan, S., Siddiqui, T., Mourade, A. et al. Manufacturing industry based on dynamic soft sensors in integrated with feature representation and classification using fuzzy logic and deep learning architecture. Int J Adv Manuf Technol (2023).
97. Khan, S., & AlSuwaidan, L. (2022). Agricultural monitoring system in video surveillance object detection using feature extraction and classification by deep learning techniques. Computers and Electrical Engineering, 102, 108201. S. Khan, V. Ch, K. Sekaran, K. Joshi, C. K. Roy and M. Tiwari, "Incorporating Deep Learning Methodologies into the Creation of Healthcare Systems," 2023 International Conference on Artificial Intelligence and Smart Communication (AISC), Greater Noida, India, 2023, pp. 994-998.
98. Gupta, G., Khan, S., Guleria, V., Almjally, A., Alabduallah, B. I., Siddiqui, T., Albahlal, B. M., et al. (2023). DDPM: A Dengue Disease Prediction and Diagnosis Model Using Sentiment Analysis and Machine Learning Algorithms. Diagnostics, 13(6), 1093.
99. I. K. Gupta, A. Choubey, and S. Choubey, "Salp swarm optimisation with deep transfer learning enabled retinal fundus image classification model," Int. J. Netw. Virtual Organ., vol. 27, no. 2, p. 163–180, 2022.

100. Gupta, I.K., Choubey, A. and Choubey, S., 2022. Mayfly optimization with deep learning enabled retinal fundus image classification model. Computers and Electrical Engineering, 102, p.108176.
101. Gupta, I.K., Choubey, A. and Choubey, S., 2022. Artifical intelligence with optimal deep learning enabled automated retinal fundus image classification model. Expert Systems, 39(10), p.e13028.
102. Mishra, A.K., Gupta, I.K., Diwan, T.D. and Srivastava, S., 2023. Cervical precancerous lesion classification using quantum invasive weed optimization with deep learning on biomedical pap smear images. Expert Systems, p.e13308.
103. Gupta, I.K., Mishra, A.K., Diwan, T.D. and Srivastava, S., 2023. Unequal clustering scheme for hotspot mitigation in IoT-enabled wireless sensor networks based on fire hawk optimization. Computers and Electrical Engineering, 107, p.108615.
104. Mishra, S., & Kumar Samal, S. (2023). Mitigation of transmission line jamming by price intrusion technique in competitive electricity market. International Journal of Ambient Energy, 44(1), 171-176.
105. B. Subudhi, S. K. Sarnal and S. Ghosh, "A new low-frequency oscillatory modes estimation using TLS-ESPRIT and least mean squares sign-data (LMSSD) adaptive filtering," TENCON 2017 - 2017 IEEE Region 10 Conference, Penang, Malaysia, 2017, pp. 751-756.
106. P. K. Sahu, S. Maity, R. K. Mahakhuda and S. K. Samal, "A fixed switching frequency sliding mode control for single-phase voltage source inverter," 2014 International Conference on Circuits, Power and Computing Technologies [ICCPCT-2014], Nagercoil, India, 2014, pp. 1006-1010.
107. Mishra, S., & Samal, S. K. (2023). Impact of electrical power congestion and diverse transmission congestion issues in the electricity sector. Energy Systems, 1-13.
108. Sahoo, A. K., & Samal, S. K. (2023). Online fault detection and classification of 3-phase long transmission line using machine learning model. Multiscale and Multidisciplinary Modeling, Experiments and Design, 6(1), 135-146.
109. A. Patel, S. Samal, S. Ghosh and B. Subudhi, "A study on wide-area controller design for inter-area oscillation damping," 2016 2nd International Conference on Control, Instrumentation, Energy & Communication (CIEC), Kolkata, India, 2016, pp. 245-249.
110. Santoso, L.W., Yulia, and Widjanadi, I. (2016), "The application of New Information Economics Method on distribution company to improve the efficiency and effectiveness of performance", International Journal of Engineering and Manufacturing, Vol. 6. No. 5, Sept 2016.
111. Santoso, L.W., Wilistio, A., Dewi, L.P. (2016), "Mobile Device Application to locate an Interest Point using Google Maps", International Journal of Science and Engineering Applications, Vol. 5 No. 1.
112. Santoso, L.W. Yulia (2014), "Analysis of the Impact of Information Technology Investments – A Survey of Indonesian Universities", ARPN JEAS, Vol. 9 No. 12.

113. Santoso, L.W. (2020) "Adaptive Educational Resources Framework for eLearning using Rule-Based System," The 4th Int. Conf. on Information and Communication Technology for Intelligent Systems (ICTIS), Ahmedabad, India, 15-16 May 2020.
114. Santoso, L.W. (2019) "Cloud Technology: Opportunities for Cybercriminals and Security Challenges," The 12th International Conference on Ubi-Media Computing, Bali Indonesia, 6-9 August 2019.
115. Awais, M., Bhuva, A., Bhuva, D., Fatima, S., & Sadiq, T. (2023). Optimized DEC: An effective cough detection framework using optimal weighted Features-aided deep Ensemble classifier for COVID-19. Biomedical Signal Processing and Control, 105026.
116. D. R. Bhuva and S. Kumar, "A novel continuous authentication method using biometrics for IOT devices," Internet of Things, vol. 24, p. 100927, 2023.
117. D. Bhuva and S. Kumar, "Securing Space Cognitive Communication with Blockchain," 2023 IEEE Cognitive Communications for Aerospace Applications Workshop (CCAAW), Cleveland, OH, USA, 2023, pp. 1-6.
118. Sharma, Praveen Kumar. "Some common fixed point theorems for sequence of self mappings in fuzzy metric space with property (CLRg)." J. Math. Comput. Sci., Vol.10, No.5 (2020): pp 1499-1509.
119. Sharma, Shivram, and Praveen Kumar Sharma. "On common α-fixed point theorems." J. Math. Comput. Sci., Vol.11, No.1 (2020): pp 87-108.
120. Sharma, Praveen Kumar. "Common fixed point theorem in intuitionistic fuzzy metric space using the property (CLRg)." Bangmod Int. J. Math. & Comp. Sci., Vol. 1, No.1 (2015): pp 83-95.
121. Sharma, Praveen Kumar, S. Chaudhary, and Kamal Wadhwa. "Common Fixed Points For Weak Compatible Maps In Fuzzy Metric Spaces." International Journal of Applied Mathematical Research, Vol.1, No. (2012): pp 159-177.
122. Sharma, Praveen Kumar, and Shivram Sharma. "Results on Complex-Valued Complete Fuzzy Metric Spaces." Great Britain Journals Press, London Journal of Research in Science: Natural and Formal, Vol 23, Issue 2 (2023), Page No. 57-64.
123. D. K. Sharma, B. Singh, R. Regin, R. Steffi, and M. K. Chakravarthi, "Efficient Classification for Neural Machines Interpretations based on Mathematical models," in 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021.
124. F. Arslan, B. Singh, D. K. Sharma, R. Regin, R. Steffi, and S. Suman Rajest, "Optimization technique approach to resolve food sustainability problems," in 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), 2021.

125. G. A. Ogunmola, B. Singh, D. K. Sharma, R. Regin, S. S. Rajest, and N. Singh, "Involvement of distance measure in assessing and resolving efficiency environmental obstacles," in 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), 2021.
126. D. K. Sharma, B. Singh, M. Raja, R. Regin, and S. S. Rajest, "An Efficient Python Approach for Simulation of Poisson Distribution," in 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021.
127. K. Sharma, B. Singh, E. Herman, R. Regine, S. S. Rajest, and V. P. Mishra, "Maximum information measure policies in reinforcement learning with deep energy-based model," in 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), 2021.
128. D. K. Sharma, N. A. Jalil, R. Regin, S. S. Rajest, R. K. Tummala, and Thangadurai, "Predicting network congestion with machine learning," in 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021
129. Prince, Ananda Shankar Hati , Prasun Chakrabarti , Jemal Hussein , Ng Wee Keong , "Development of Energy Efficient Drive for Ventilation System using Recurrent Neural Network", Neural Computing and Applications , 33 : 8659 , 2021.
130. Ashish Kumar Sinha, Ananda Shankar Hati , Mohamed Benbouzid , Prasun Chakrabarti , "ANN-based Pattern Recognition for Induction Motor Broken Rotor Bar Monitoring under Supply Frequency Regulation", Machines , 9(5):87, 2021.
131. Chakrabarti P., Bhuyan B., Chaudhuri A. and Bhunia C.T., "A novel approach towards realizing optimum data transfer and Automatic Variable Key(AVK)" , International Journal of Computer Science and Network Security, 8(5), pp.241-250, 2008.
132. Chakrabarti P. , Goswami P.S., "Approach towards realizing resource mining and secured information transfer", International Journal of Computer Science and Network Security, 8(7), pp.345-350, 2008.
133. Chakrabarti P., Choudhury A., Naik N. , Bhunia C.T., "Key generation in the light of mining and fuzzy rule", International Journal of Computer Science and Network Security, 8(9), pp.332-337, 2008.
134. Chakrabarti P., De S.K., Sikdar S.C., "Statistical Quantification of Gain Analysis in Strategic Management" , International Journal of Computer Science and Network Security,9(11), pp.315-318, 2009.
135. Chakrabarti P. , Basu J.K. , Kim T.H., "Business Planning in the light of Neuro-fuzzy and Predictive Forecasting", Communications in Computer and Information Science , 123, pp.283-290, 2010.
136. Prasad A. , Chakrabarti P., "Extending Access Management to maintain audit logs in cloud computing", International Journal of Advanced Computer Science and Applications ,5(3),pp.144-147, 2014.

137. Sharma A.K., Panwar A., Chakrabarti P. ,Viswakarma S., "Categorization of ICMR Using Feature Extraction Strategy and MIR with Ensemble Learning", Procedia Computer Science, 57,pp.686-694,2015.
138. Patidar H. , Chakrabarti P., "A Novel Edge Cover based Graph Coloring Algorithm", International Journal of Advanced Computer Science and Applications , 8(5),pp.279-286,2017.
139. Patidar H., Chakrabarti P., Ghosh A., "Parallel Computing Aspects in Improved Edge Cover based Graph Coloring Algorithm", Indian Journal of Science and Technology ,10(25),pp.1-9,2017.
140. SS Priscila, M Hemalatha, "Improving the performance of entropy ensembles of neural networks (EENNS) on classification of heart disease prediction", Int J Pure Appl Math 117 (7), 371-386, 2017.
141. S Silvia Priscila, M Hemalatha, " Diagnosisof heart disease with particle bee-neural network" Biomedical Research, Special Issue, pp. S40-S46, 2018.
142. S Silvia Priscila, M Hemalatha, " Heart Disease Prediction Using Integer-Coded Genetic Algorithm (ICGA) Based Particle Clonal Neural Network (ICGA-PCNN)", Bonfring International Journal of Industrial Engineering and Management Science 8 (2), 15-19, 2018.
143. Sharma A.K., Panwar A., Chakrabarti P. and Viswakarma S., "Categorization of ICMR Using Feature Extraction Strategy and MIR with Ensemble Learning" In Proc. 3rd International Conference on Recent Trends in Computing (ICRTC) India. Mar 12-13(2015) p.41.
144. Garg A. , Ghosh A. and Chakrabarti P., "Gain and bandwidth modification of microstrip patch antenna using DGS," In Proc. International Conference on Innovations in Control, Communication and Information Systems (ICICCI-2017), India. Aug 12-13,(2017)p.204.
145. P. Kumar, A. S. Hati, S. Padmanaban, Z. Leonowicz and P. Chakrabarti, "Amalgamation of Transfer Learning and Deep Convolutional Neural Network for Multiple Fault Detection in SCIM," 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), Madrid, Spain, 2020, pp. 1-6.
146. Hung, B.T. and Chakrabarti, P. (2022) , "Parking Lot Occupancy Detection Using Hybrid Deep Learning CNN-LSTM Approach", In Proc. 2nd International Conference on Artificial Intelligence: Advances and Applications. Algorithms for Intelligent Systems. Springer, Singapore.
147. S. Rajeyyagari, B. T. Hung and P. Chakrabarti, "Applications of Artificial Intelligence in Biomedical Image Processing," 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 53-57.
148. P. Korsinwattana, "Efficiency enhancement of drilling mud by using fly ash as an additive," Sut.ac.th:8080. [Online]. Available: http://sutir.sut.ac.th:8080/jspui/bitstream/123456789/5328/2/Fulltext.pdf. [Accessed: 18-Sep-2023].