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Machine Learning and Deep Learningapplications-a vision using the SPSS Method

Kamra Komal Bhagwandas
SSt College of Arts and Commerce, Maharashtra, India.
*Corresponding Author Email: komalkamra@sstcollege.edu.in

Abstract

AI can be categorised as either machine learning or deep learning. Machine learning, in essence, is AI that can adjust automatically with little human involvement. Artificial neural networks are used in deep learning, a subclass of machine learning, to simulate the educational process of the human brain. Deep learning is more effective with vast amounts of data than other methods. Traditional machine learning methods, however, do better with smaller amounts of data. In order to train deep learning techniques in a timely manner, a high-quality infrastructure is needed. The lengthy training process for a deep learning system is caused by the numerous parameters.It takes two weeks to properly train from scratch the well-known ResNet algorithm. Conventional machine learning algorithms can train in a matter of seconds or hours. The scenario is entirely turned around during the experimentation phase. The deep learning method runs quickly while being tested. When the amount of data increases, the testing time for k-nearest neighbours (a type of machine learning technique) increases. Certain machine learning algorithms also have brief test times, however this is not true of all of them. For many industries to apply other methods utilized in deep learning, interpretation is a major problem.Use this as a case study. Let's say we compute a document's relevance score using deep learning. It delivers very good performance that is comparable to human performance. Nevertheless, there is an issue. The rationale behind that score's award is unknown. Actually, it is mathematically possible to determine which nodes of a sophisticated neural network are active, but we are unsure of the expected appearance of the neurons and the function of these layers of neurons as a whole. As a result, we misinterpret the findings. For machine learning techniques like logistic regression and decision trees, this isn't the actual case.We may directly process photos using DL models, which are displayed as multi-layer chemically synthesized neural networks. The part on data curation covers picture labelling, annotation, data synchronisation, association learning, and segmentation, which is a crucial stage in radiomics and causes interference in non-AI imaging investigations due to variances in imaging procedures. Following that, we devote parts to sample size calculation and various AI techniques. Take into account tests, techniques for enhancing data to deal with limited and unbalanced datasets, and descriptions of Ai techniques (the so-called black box problem). advantages and disadvantages of using ML and DL to implement AI.In a synaptic fashion, applications towards medical imaging are eventually shown. Data science, which also encompasses statistics and predictive modelling, contains deep learning as a key component. Deep learning helps to make this process quicker and simpler for data scientists who are gathering, analysing, and interpreting enormous amounts of data. Simply defined, machine learning enables users to submit huge amounts of information to a computer algorithm, which then SPSS statistics is a multivariate analytics, business intelligence, and criminal investigation data management, advanced analytics, developed by IBM for a statistical software package. A long time, spa inc. Was created by, IBM purchased it in 2009. The brand name for the most recent versions is IBM SPSS statistics. Medical Images, Deep Feature Extraction, Predictive Modelling and Prediction. The Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .860which indicates 86% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis. Emotional Intelligence the Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .860which indicates 86% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.

Keywords: Medical Images, Deep Feature Extraction, Predictive Modelling and Prediction

Introduction

Thus according Arthur Samuel in 1959, the topic of machine learning in computer science "gives learn and improve from experience without ever being explicitly programmed. Machine learning, which has its roots in artificial intelligence's study of recognizing patterns and learning computational theory, analyses the study and design of models by starting with sampled inputs. algorithms that use historical data to forecast the future while rigorously adhering to predefined programming instructions [1].With unprocessed, high-dimensional data, computer vision, deep learning, and techniques that describe gradients for vanishing effects work well. As a product of information and computationally demanding studies, machine intelligence has thus advanced to a different extreme in drug discovery. Here, we evaluate the most recent, cutting-edge deep learning experiments conducted with regard to drug development and give a succinct overview of their benefits and potential applications in the future [2].As the volume of data grows, both deep learning and conventional machine learning become increasingly effective. Because algorithms based on deep learning need a lot of data to effectively grasp the data, they cannot be used with little amounts of data. In contrast, performance is heavily reliant on hardware when a standard machine learning algorithm applies pre-established rules in this situation. There are various matrix operations needed by the DL method. The GPU is a powerful tool for efficiently optimising matrix operations. Thus, the hardware needed for DL to function correctly is the GPU. Compared to conventional machine learning techniques, DL makes greater use of high-performance computers with GPUs [3].A research focus is deep learning, a subfield of machine learning with exceptional performance. This study suggests an IDS nomenclature that uses attribute values as a major dimension to categorise and compile the literature on IDS that is based on deep learning and machine learning. This kind of taxonomic approach, in our opinion, is appropriate for cybersecurity researchers. The survey begins by delineating the taxonomy and notion of IDSs. The introduction of machine learning methods that are widely applied to IDS, metrics, and reference datasets follows. Then, using the proposed categorization as a foundation and the relevant literature, we show how to use deep learning as well as machine learning approaches to solve important IDS problems. After examining recent representative research, problems and potential developments are highlighted [4].convolutional neural networks (CNNs), which are non - linear and non artificial neural networks, machine learning (ML) and deep learning (DL) models, specialised AI difficulties for estimating sample size, methods for data augmentation to deal with finite and unbalanced datasets, data collecting; AI model description (the "black box" issue). Important technical procedures including image labelling, picture referencing (with segmentation as a key step in radiomics), and data synchronisation are all covered in the section on data curation (compensating for differences in imaging protocols that typically create noise in non-AI imaging studies). Learning by association [5].In order to distinguish crowds of terrorists from regular attendees at convention centres, airports, and other major events, facial recognition technology based on machine learning is being deployed. This technique is now particularly beneficial for secure contactless communication in the COVID-19 pandemic condition. As a result, numerous firms increasingly make use of it. Moreover, recognition software for security purposes uses computer vision. A person's face can be recognised by an algorithm, which can then authorise more access. In professional groups, testing is also done using an automatic attendance system. Keys, ID cards, and other items can now be stolen by traditional ways with easeintroduces the Tonic sophisticated reinforcement learning library for quicker research implementations. To recognise faces and operate cars, many applications are employed, like FacePRO and Waymo [6].Often, business knowledge is based on data interpretation and specified search formulae. 2. The data provided but also its documentation are the foundation for understanding the data. 3. Feature extraction, exploratory data analysis (EDA), and feature engineering are all parts of data preparation. Each of them can be divided into smaller processes; for instance, feature engineering entails feature extraction and feature selection. 4. Several ML algorithms can be utilised in the modelling phase with variable parameter calibrations.The model airplane cycle may need to be thoroughly reexamined if data and parameter change are combined. The modelling stage may be laborious and computationally demanding if the amount of data is significant. 5. Several criteria can be used during the evaluation phase to thoroughly test ML models and select the best model for the deployment phase [7].Medical image analysis using deep learning and machine learning approaches. We want to summarise current clinical imaging approaches for researchers, point out the benefits and drawbacks of these strategies, and talk about where research is headed in the future. Machine and deep learning offer a potential method for classification and automatic strategic planning for the examination of multidimensional clinical data. This study provides an overview of deep learning techniques for discrete illness characterization and machine learning medical imaging. It takes into account a collection of these technologies that can be applied to conduct automated judgements and detect illnesses [8].The foundation of artificial intelligence is machine learning. It is an interdisciplinary course that spans several disciplines, including formal logic, statistics, approximation interpretation, convergent analysis, and algorithmic complexity theory. a field of study that focuses on how computers replicate or apply human learning behaviour to pick up new skills or knowledge and rearrange knowledge acquisition structures to enhance their own performance. In summary, machine learning consists of creating predictions or judgements based on fresh samples of data, learning like people, and inferring laws from vast volumes of past data using relational algorithms. A recent development in machine learning is deep learning [9].Deep learning (DL) and machine learning (ML) methods. Both machine learning (ML) and deep learning (DL), which are subsets of artificial intelligence (AI), seek to extract knowledge from enormous amounts of data. 7 Over the past ten years, these methods have become quite prominent in the business of network security. efficient graphics processors (GPUs). 8 Both machine learning (ML) and deep learning (DL) are potent methods for extracting

relevant features from network data and forecasting anomalous activity based on patterns discovered. Feature engineering plays a significant role in ML-based IDS's ability to extract relevant data from network traffic. Because of its deep structure, DL-based IDS is superior at automatically learning complicated features from raw data without having to rely on feature engineering [10].In the past ten years, machine learning has helped us develop self-driving cars, usable speech recognition, effective web searches, and a better knowledge of the human genome. In the industrial field, ML algorithms are widely used. They can be categorised as either supervised or unsupervised depend according to how they learn from either the data. The examined ML algorithms utilised in industry are presented in the following paragraphs [11].The proposed model was developed using deep learning and machine-learning techniques. In order to decrease internet backbone output error for the categorization of skin lesions, suggested an optimization approach for the best weight selection. A feature extraction network named DSNet was proposed by Hassan et al. [200] to segment skin lesions. They minimised the amount of parameters that compensate a lightweight network by using a depth-wise separable curve. suggested a diagnostic framework that included segmentation of lesion margins with various classification levels for input image classification methods. The suggested method classified lesions using four CNNs and a full-resolution method of solving (FrCN) to segment lesions. Three major datasets were used to assess and test the system [12].The documents are categorised using machine learning methods as Naive Bayes, Bayesian Network, a Support Vector Machine Random Forest Classifier, and Multi-Layer Perceptron. Application of classifiers to both initial and modified data independently and evaluation of their accuracy are done. Convolution neural networks, a deep learning technique, are also employed in conjunction with this to classify the data, and the accuracy of these methods is contrasted with that of conventional machine learning methods. For the categorization of classes and subclasses, we are also looking into hierarchical classifiers. Data is classified by a machine more quickly and accurately than by a human. The Findings and Review section discusses the findings[13].models for deep learning and machine learning. The current study advances our understanding by contrasting and confirming ML and DL techniques. This was accomplished by fusing historical accident information with contemporaneous traffic and weather forecasts from either the Athenian Tollway in Greece. The complete data set was split into subgroups for training/evaluation (75%), validation (25%), and standardization.Then, the training data set was used to train and test the Milliliters and DL prediction models. The models were then contrasted on the test set using their respective performance indicators (accuracy, sensitivity, specificity, and area under the curve or AUC). K-Nearest Neighbor, Naive Bayes, Reptree, Random Forest, a Support Vector Machine, a Shallow Neural Network, and Deep Neural Network are the models that were taken into consideration. Overall, this same DL model fared better than all other potential models, suggesting that it is the most appropriate [14].Machine learning methods are used to predict bankruptcy. Machine learning models like decision trees, neural networks, and machines with support vectors have been employed as methods for predicting company bankruptcy since the 1990s. In classification-related issues like auto mobility, computer vision, speech recognition, and processing of natural language, as well as in business and management-related issues like financial forecasting and credit scoring, it has had considerable success. By examining standard literature [15]. we will analyse deep learning and machine learning techniques used throughout bankruptcy prediction in order to explain their unique processes, traits, benefits, and drawbacks.Network slicing operations can be organised using machine learning (ML) techniques. The four components of machine learning (ML) are recognition prediction (e.g., forecasting user or traffic trends), recognition logic (e.g., system parameter configuration for adaptation), and realisation (e.g., Anomaly detection) In particular, it has the ability to quickly analyse enormous quantities of data in order to adapt the technology to time-varying settings, accurately forecast future events, and provide immediate dynamic solutions. Consequently, these kinds of issues can be resolved using algorithms that draw inspiration from biology. Because they are straightforward yet efficient, reliable, self-organizing, largely parallel, and non-deterministic, nanoparticle algorithms are gaining popularity in the field of machine learning (ML) [16].On two major datasets, machine learning and deep learning techniques are validated. The next contributions are more specific. (1) We perform in-depth analysis and data cleaning using the traditional NSL-KDD and the upgraded CSECIC-IDS2018 as standard datasets. (2) The class imbalance issue in intrusion detection is resolved by this work's innovative DSSTE technique, which decreases the majority samples and increases the minority samples in the hard set [17]. The classifier is hence more equipped to comprehend the discrepancies during training. Only 14 of the more than 250 publications we found (limited to 2000–2019 and focused on either machine learning or deep learning) were pertinent to our topic. We specifically eliminated works including imaging, educated and trained, radiomics, and various other sorts of data and concentrated on works utilising omics data. We also omit work that forecasts where metastatic cancer originates from or when clinical metastasis will occur because our focus is primarily on research that forecasts whether a disease is in its fundamental (nonmetastatic) or metastatic condition [18].To recognise a person as stressed or not stressed, reinforcement learning and deep learning approaches are applied (normal or happy or stressed). In order to accomplish this goal, a number of actions are taken, including comprehending the organization and design of the publicly accessible WESAT dataset, cleaning and reshaping the information into an array satisfactory for developing machine learning, deep learning, and classification methods, and investigating and creating various classification models. In contrast [19].The best classifier in several BC classifications is identified using computer learning techniques. BC is & Exchange Learning. To assess the likelihood of information transfer from video sequences to histopathology images, a multi-classification is applied. A proposed technique and even a base model are two separate applications of transfer learning [20].

Material and Method

Medical Images: The counting and identification of cells in a small picture are two processes that can be automated or streamlined using medical image analysis. For instance, you can examine cells and find malignant aberrations. Approaches to medical image processing contain valuable diagnostic and prognostic data that can increase the precision of cancer treatment. Therefore, it is rational to suppose that image-based communication may convey multilayer pathophysiology information given that it is a combination of biological systems. Medical visualization deals with the analysis, visualization and analysis of medical image data. Major Application Areas: Diagnostics. Diagnostic benefits of radiographic data from interactive 2D and 3D visualizations.

Deep Feature Extraction: Deep learning and machine learning feature extraction. The technique of turning raw converted into numerical features that can be handled while keeping the knowledge contained in the initial data set is known as feature extraction. Compared to using machine learning on the raw data directly, this produces better outcomes. Machine learning techniques like deep learning are employed to find features in photos. It makes use of a neural network, a multi-layered computer system created to mimic the functioning of the human brain. Each stratum can extract three or more distinctive properties from the image. According to the extraction principle, the extraction procedures include solvent extraction, filtration, pressing, and sublimation. The technique with the highest usage is solvent extraction.

Predictive Modelling: Predictive modeling uses collections of historical data, results, and cues to create predictions of future outcomes. There are two types of forecasting models namely parametric and non-parametric models. Decision trees, second - order polynomial models, as well as boosting models are the three types. In this post, we define predictive models, outline the three basic types with examples of how they function and the advantages they offer, and offer advice for professionals regularly implement them in everyday workplace. Decision trees to forecast the creditworthiness of a loan. Curve as well as surface fitting, time series classification, or machine learning techniques are frequently used in predictive modelling.

Prediction: What someone predicts is what they believe will occur. Any forecast, not merely one regarding the weather, is a forecast. Pre refers to speaking and diction meaning "before." A forecast is thus a proclamation about the future. It is a judgment, occasionally supported by data or proof. Say anything about what you anticipate happening in the upcoming years: Don't ask me to forecast the outcome of the meeting tomorrow. [+ that] Nobody took her prediction that the world will end in November seriously 12th. More examples. The forecast of 4 million unemployed now seems horrifyingly realistic.

Method: SPSS Statistics is a statistical control Advanced Analytics, Multivariate Analytics, Business enterprise Intelligence and IBM a statistic created by a software program is a package crook research. A set of generated statistics is Crook Research is for a long time SPSS Inc. Produced by, it was acquired by IBM in 2009. Current versions (after 2015) icon Named: IBM SPSS Statistics. The name of the software program is to start with social Became the Statistical Package for Science (SPSS) [3] Reflects the real marketplace, then information SPSS is converted into product and service solutions Widely used for statistical evaluation within the social sciences is an application used. pasted into a syntax statement. Programs are interactive Directed or unsupervised production Through the workflow facility. SPSS Statistics is an internal log Organization, types of information, information processing and on applicable documents imposes regulations, these jointly programming make it easier. SPSS datasets are two-dimensional Have a tabular structure, in which Queues usually form Events (with individuals or families) and Columns (age, gender or family income with) to form measurements. of records Only categories are described: Miscellaneous and Text content (or "string"). All statistics Processing is also sequential through the statement (dataset) going on Files are one-to-one and one-to-one Many can be matched, although many are not in addition to those case-variables form and by processing, there may be a separate matrix session, There you have matrix and linear algebra on matrices using functions Information may be processed.

Results and Discussion

TABLE 1. Descriptive Statistics

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance
Medical Images	80	4	1	5	245	3.06	.153	1.372	1.882
Deep Feature Extraction	80	4	1	5	243	3.04	.184	1.642	2.695
Predictive Modelling	80	4	1	5	212	2.65	.170	1.519	2.306
Prediction	80	4	1	5	238	2.98	.182	1.630	2.658
Valid N (listwise)	80								

Table 1 shows the descriptive statistics values for analysis N, range, minimum, maximum, mean, standard deviation Medical Images, Deep Feature Extraction, Predictive Modelling and Prediction this also using.

TABLE 2. FrequenciesStatistics

		Medical Images	**Deep Feature Extraction**	**Predictive Modelling**	**Prediction**
N	Valid	80	80	80	80
	Missing	0	0	0	0
Mean		3.06	3.04	2.65	2.98
Std. Error of Mean		.153	.184	.170	.182
Median		3.00	3.00	2.00	3.00
Mode		2	5	1	5
Std. Deviation		1.372	1.642	1.519	1.630
Variance		1.882	2.695	2.306	2.658
Skewness		.247	.062	.373	.113
Std. Error of Skewness		.269	.269	.269	.269
Kurtosis		-1.216	-1.620	-1.346	-1.638
Std. Error of Kurtosis		.532	.532	.532	.532
Range		4	4	4	4
Minimum		1	1	1	1
Maximum		5	5	5	5
Sum		245	243	212	238
Percentiles	25	2.00	1.00	1.00	1.00
	50	3.00	3.00	2.00	3.00
	75	5.00	5.00	4.00	5.00

Table 2 Show the Frequency Statistics in Machine Learning and Deep LearningMedical Images, Deep Feature Extraction, Predictive Modelling and Prediction curve values are given.

TABLE 3. Reliability Statistics

Cronbach's Alpha Based on Standardized Items	N of Items
.860	4

Table 3 shows The Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .860which indicates 86% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.

TABLE 4. Reliability Statistic individual

	Cronbach's Alpha if Item Deleted
Medical Images	.907
Deep Feature Extraction	.839
Predictive Modelling	.758
Prediction	.770

Table 4 Shows the Reliability Statistic individual parameter Cronbach's Alpha Reliability results. The Cronbach's Alpha value forMedical Images - .907, Deep Feature Extraction - .839, Predictive Modelling -.758 and Prediction - .770this indicates all the parameters can be considered for analysis.

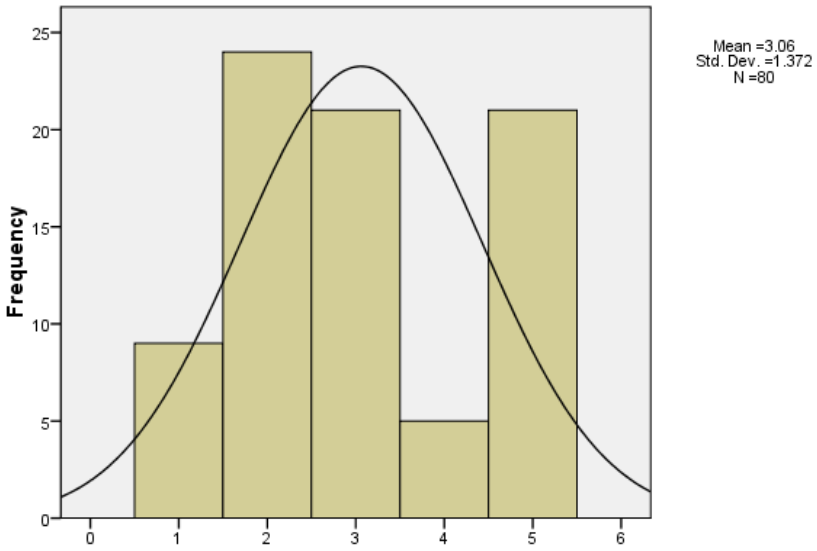

FIGURE 1. Medical Images

Figure 1 shows the histogram plot for Medical Images from the figure it is clearly seen that the data are slightly Left skewed due to more respondent chosen 2 for Medical Images except the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

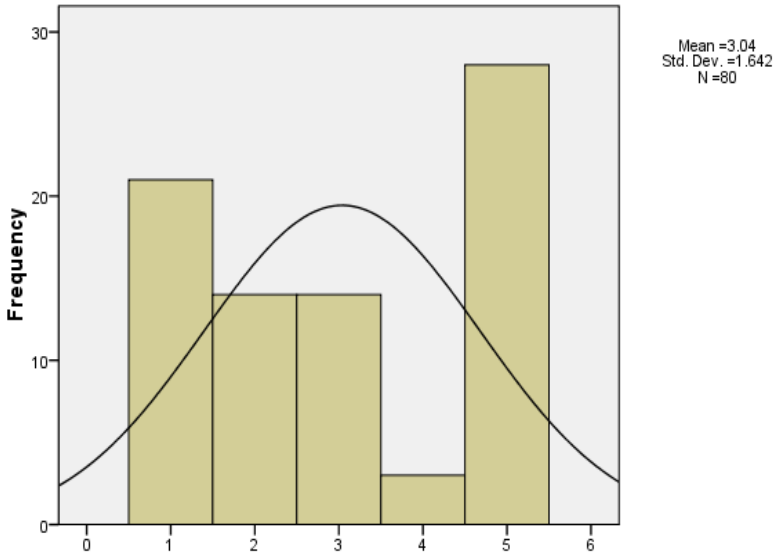

FIGURE 2. Deep Feature Extraction

Figure 2 shows the histogram plot for Deep Feature Extraction from the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 5 for Deep Feature Extraction except the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

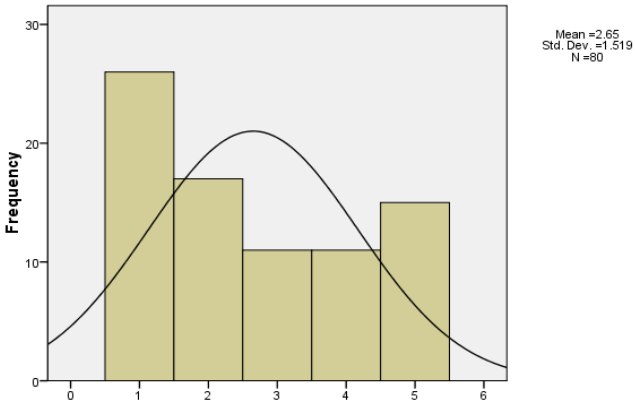

FIGURE 3. Predictive Modelling

Figure 3 shows the histogram plot for Predictive Modelling from the figure it is clearly seen that the data are slightly Left skewed due to more respondent chosen 1 for Predictive Modelling except the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

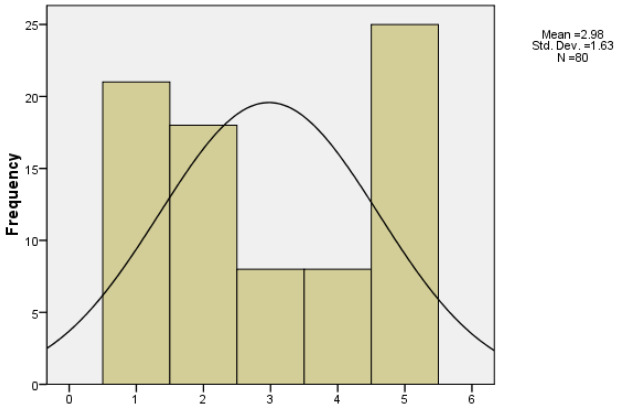

FIGURE 4. Prediction

Figure 4 shows the histogram plot for Prediction from the figure it is clearly seen that the data are slightly Left skewed due to more respondent chosen 3 for Prediction except the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

TABLE 5. Correlations

	Medical Images	**Deep Feature Extraction**	**Predictive Modelling**	**Prediction**
Medical Images	1	.331**	.545**	.459**
Deep Feature Extraction	.331**	1	.701**	.719**
Predictive Modelling	.545**	.701**	1	.881**
Prediction	.459**	.719**	.881**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 5 shows the correlation between motivation parameters for Medical Images. For Predictive Modelling is having highest correlation with Deep Feature Extraction and having lowest correlation. Next the correlation between motivation parameters for Deep Feature Extraction. For Predictionis having highest correlation with Medical Images and having lowest correlation.Next the correlation between motivation parameters for Predictive Modelling. For Prediction is having highest correlation with Medical Images and having lowest correlation.Next the correlation

between motivation parameters for Prediction. For Predictive Modelling is having highest correlation with Medical Images and having lowest correlation.

Conclusion

AI can be categorised as either machine learning or deep learning. Machine learning, in essence, is AI that can adjust automatically with little human involvement. Artificial neural networks are used in deep learning, a subclass of machine learning, to simulate the educational process of the human brain. Deep learning is more effective with vast amounts of data than other methods. Traditional machine learning methods, however, do better with smaller amounts of data. In order to train deep learning techniques in a timely manner, a high-quality infrastructure is needed. The lengthy training process for a deep learning system is caused by the numerous parameters. It takes two weeks to properly train from scratch the well-known Res Net algorithm. Conventional machine learning algorithms can train in a matter of seconds or hours. The scenario is entirely turned around during the experimentation phaseThus according Arthur Samuel in 1959, the topic of machine learning in computer science "gives learn and improve from experience without ever being explicitly programmed. Machine learning, which has its roots in artificial intelligence's study of recognizing patterns and learning computational theory, analyses the study and design of models by starting with sampled inputs. algorithms that use historical data to forecast the future while rigorously adhering to predefined programming instructions The counting and identification of cells in a small picture are two processes that can be automated or streamlined using medical image analysis. For instance, you can examine cells and find malignant aberrations. Approaches to medical image processing contain valuable diagnostic and prognostic data that can increase the precision of cancer treatment. Therefore, it is rational to suppose that image-based communication may convey multilayer pathophysiology information given that it is a combination of biological systems. Predictive modeling uses collections of historical data, results, and cues to create predictions of future outcomes. There are two types of forecasting models namely parametric and non-parametric models. Decision trees, second - order polynomial models, as well as boosting models are the three types. In this post, we define predictive models, outline the three basic types with examples of how they function and the advantages they offer, and offer advice for professionals regularly implement them in everyday workplace. What someone predicts is what they believe will occur. Any forecast, not merely one regarding the weather, is a forecast. Pre refers to speaking and diction meaning "before." A forecast is thus a proclamation about the future. It is a judgment, occasionally supported by data or proof. Say anything about what you anticipate happening in the upcoming years: Don't ask me to forecast the outcome of the meeting tomorrow SPSS statistics is a multivariate analytics, business intelligence, and criminal investigation data management, advanced analytics, developed by IBM for a statistical software package. A long time, spa inc. Was created by, IBM purchased it in 2009. The brand name for the most recent versions is IBM SPSS statistics. Medical Images, Deep Feature Extraction, Predictive Modelling and Prediction. The Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .860which indicates 86% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.

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