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**Comparative Analysis Between DenseNet and Alex Net in Predicting Working Employee Performance with Improved Accuracy**

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**ABSTRACT**

Aim: The main intention of this experimental study is to maximize the accuracy value of working people performance forecasting with an online Kaggle dataset using various DL (Deep Learning) classifiers like DenseNet and AlexNet. Introduction: The various issues that typical techniques have with their more false forecasting rate, relatively less accuracy rate, and minimal generalization capability are caused by the diversifying of the working people performance forecasting system. Materials and Methods: The developed model was issued to improve the accuracy value from the working people Kaggle online dataset using DenseNet and AlexNet. The online working people dataset is applied for an experimental stage, and the recommended model is processed with the support of a python programming tool. Results and Discussion: The outcome of the implemented working people performance forecasting system is assessed. The developed prediction model using DenseNet and Alexnet model’s classification accuracy rate is confirmed with 91.60%. DenseNet and AlexNet processing time is also calculated as 0.5 seconds. Conclusion: The outcome of this developed research process result says that it is finalized that the DenseNet model makes better outcomes in employee performance prediction from the online dataset than the AlexNet model

Keywords: Employee Dataset, DenseNet, AlexNet, Accuracy Rate, Python Programming, Prediction, Forecasting

**INTRODUCTION**

To prevent several detrimental effects on the firm, an effective forecast model for staff turnover is crucial[2]. HR practices, particularly performance appraisal, are now a significant strategy of businesses as the human factor plays a larger role in ensuring total company performance and therefore boosting their efficiency and competitiveness[7].

Over the past 5 years, nearly 300 research magazines were available on GS (Google Scholar) and more than 150 research magazines were offered in science-direct research journals with various DL concepts. Numerous publications on employee performance prediction using ML and DL methods have been published recently. Because of the rising likelihood of predicting employee performance prediction, current research utilizes cutting-edge IT techniques like DL algorithms, which can be used to predict working people's performance from the employee’s online dataset.

This study's primary objective is to examine how employee performance is related to an institution's expansion. To determine the significant commitment to the organization, a thorough qualitative analysis has been performed on the data that has been obtained as part of the study project. Workers are a company's most valuable and significant resource, and they have an unpredictable tendency to quit, which can result in significant financial loss. In general, psychological attributes affect a worker's activity and mindset, but a firm's environmental factors can also affect an employee's knowledge of their job happiness. The employment of a new worker may take more time and money [8].

To predict the performance in the employee dataset, this experimental study suggests a unique prediction model using DenseNet and Alexenet.

**MATERIALS AND METHODS**

This recommended research task was implemented at the DL(Deep Learning) Laboratory, Saveetha School of Engineering, SIMATS (Saveetha Institute of Medical and Technical Sciences). This developed working people prediction model consists of two types of groups Group 1 is taken as DenseNet and AlexNet is computed many times by 150 sample sizes. After gathering the employee dataset from an online site, repetitive and unwanted data from the dataset were eliminated during the data pre-processing techniques. Then, it is linked to the applicable data sets, and the accuracy value of the DenseNet and AlexNet is measured and evaluated.

The enterprise working people’s online dataset is obtained and applied in this research study on a trial basis. It uses Python programming for making a performance prediction model in the online Kaggle employee dataset. Among various software tools, Python software is one of the common tools for creating and evaluating the outcome of DL models. It contains a huge number of library built-in functions and different tools that are used for whole processes associated with the DL classifiers

**DenseNet**

A DenseNet model is a form of CNN that makes use of Dense-based Blocks to link all levels immediately to one another and create dense associations between them. Every layer receives extra inputs from across all previous layers and transmits its attribute to all following layers to maintain the FF(Feed Forward) nature[9]. Knowledge exchange and unrestricted intermediate connections are properties of DenseNet. The benefits of DenseNet include successfully lowering the gradient dissolution issue, which is challenging to solve in deep networks, attribute map reuse via dense interconnection, limiting interconnection among layers by repurposing attribute maps from various layers, supplying portable and distinguished input data, and supplying these characteristics through quick access links of variable length. To improve efficiency and model durability on a common dataset with lower target size and less computing energy, the prediction accuracy is to include characteristics from across all layers [10].

**AlexNet**

The AlexNet uses ReLU Nonlinearity, which is a key component. The standard method for training NN models used includes tanh or sigmoid-based activation methods. Deep CNNs might be formed significantly more quickly utilizing ReLU non-linearity than they can with overloading activation methods like tanh or sigmoid, according to AlexNet's research [11]. ReLu is written as:

ReLu has a benefit over sigmoid because it runs much faster than the former since the derivatives of sigmoid shrink dramatically in the maximal area, which causes changes to the parameters to almost cease to exist. This issue is known as the "vanishing gradient issue"[12]. Five convolutional layers make up Alexnet, starting with an 11x11 kernel. This was the earliest structure to use washout for the three massive linear type layers, Relu methods, and max-pooling levels[13].

**STATISTICAL ANALYSIS**

Statistical software tool IBM SPSS with the familiar version 26.0 to recognize the value of SD (Standard Deviation), mean deviation data, significance point data and also drawing the graphical demonstrations, etc. The SPSS tool was inclined in the current research process for investigating the concerned working people's performance online dataset. Group statistics practice and self-determining sample tests were directed at the experimental outcomes and the visual design was created for two different graphs with two various kinds of features under the specific investigational phase.

Datasets for training and testing are preferred for the online Kaggle employee dataset. The training dataset is recognized by reclaiming the test dataset from the real dataset as long as 400 records as a whole.

**RESULTS**

MATLAB software tool is used to observe the online employee Kaggle dataset and the accuracy value is measured among DenseNet and Alex Net network systems. For the given datasets, the proposed DenseNet offers more accuracy rate than the AlexNet. The accuracy value of the DenseNet and AlexNet is illustrated in Table 3. DenseNet and AlexNet classifiers' accuracy rates are 91.60 percent and 87.90 percent. Table 4 illustrates group statistics depending on the online working people Kaggle dataset of the developed research work.

# DISCUSSION

The AlexNet classifier is used in the earlier research work; with a mean rate value of accuracy, the rate is 87.90 %. DenseNet is developed, which has a mean accuracy value is 91.60 %.

A model for ensemble learning was created by P. Sujatha et al. in 2022 to determine personnel's prospective contributions to the company. Additionally, the authors used a real-time personnel dataset from a reputable Multinational firm in Chennai. The outcomes demonstrate that the XGBoot(Extreme Gradient Boosting) suggested ensemble learning technique produces superior outcomes[1].

A. Alamsyah et al.,  2018 goal is to identify the most effective model for predicting staff turnover. The study's results indicate that RF, with its astounding efficiency of 97.5%, is indeed the best categorization method. At 96.6% efficiency, naive Bayes is the second-best technique, and DT has the lowest error of any categorization algorithm. According to the report's findings, RF provides the most trustworthy and efficient classification method to forecast staff retention [2].

Huixia Kuang et al. 2022 adopt time series data decomposed model. PSO( Particle Swarm Optimization) methodology, an exponentially averaging forecast model with a time series deconstruction style, an adaptability coefficient predictive model, an evaluation topic, an evaluation system, etc., are all purposely suggested[3]. Jia Yuan builds a model of predictions that relies on an ML algorithm and big data from the company's current workforce to forecast the productivity of the workforce. According to the experimental study, both this technique and the performance forecasting model may forecast working people's performance with accuracy. The concentration of the data design phase is on data development and the gathering of people's information. The outcomes of the research demonstrate that using this kind of information to forecast job performance is both practical and effective[4].

Using the use of data mining categorization and forecasting approaches, M. Sharma et al. (2015) intend to develop a model for forecasting the performance of employees in colleges and universities. The model's goal is to make decision-making easier in the complex and developing HRM domain in educational institutions[5].

The two-tier working people model is created by Jia Yuan et al. in 2022 and consists of a social media platform and an action-type network. Based on the study of the systemic features of the worker system, Jia Yuan et al. 2022 also perform worker achievement evaluations and anticipate promotions and resignations. The examination and implementation of a sizable class of big data in HR with theoretical and applied value will begin with this article[6].

C**ONCLUSION**

The DenseNet and AlexNet used in this study offer a better method for identifying and predicting the performance of working people.

When compared to AlexNet classifier, the recommended DenseNet generates a better result with an accuracy value is 91.60 percent. The necessary execution time takes place in a quicker stage of 0.5 seconds

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The accuracy of Dense net is 95.8 and Alexnet is 91.89

