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**Accuracy Analysis in Predicting Working Employee Performance using DenseNet over GoogleNet with Improved Accuracy**

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**ABSTRACT**

**Aim:** The main goal of this investigational study is to enhance the accuracy rate of working employee performance prediction with an online dataset using various DL (Deep Learning) concepts like DenseNet and Googlenet. **Introduction:** The issues that conventional techniques have with their more false prediction rate, relatively lower accuracy rate, and minimal generalization ability are caused by the diversifying of the working employee performance forecasting model. **Materials and Methods:** The suggested model was issued to enhance the accuracy rate from the working employee online dataset using DenseNet and Googlenet. The online working people dataset is applied for an investigational stage, and the suggested model is processed with the help of a python programming tool. **Results and Discussion:** The outcome of the implemented working people performance forecasting model is measured. The recommended DenseNet and Googlenet classification accuracy rate is confirmed with 91.60%. DenseNet and Googlenet 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 Googlenet model

**Keywords:** Employee Dataset, DenseNet, Googlenet, Accuracy Rate, Python Programming, Prediction, Forecast

**INTRODUCTION**

Whenever the corporation fails to deliver adequate fulfillment, it is among the main reasons for employee transfer. The pleasure of employees is a key factor in their productivity. The capacity of staff performance for every work is performed by the working people, according to [1], and this links to the employee's pleasure. Performance increases the value of the organization with each employee [2]. The effectiveness of workers at work is influenced by a variety of factors. These elements include learning, incentive, and leadership [3]. In many industries, it is crucial to assess, monitor, and forecast worker productivity since businesses depend on their staff's output and performance [4].

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.

Finding a highly skilled and effective person who would be a good fit for the work is becoming extremely difficult in today’s hyper world. Employers and managerial staff are worried about such individuals' performance in certain employment fields. Companies will need to anticipate job performance because it is essential to their success [5]. Because manual examination of job satisfaction is a tedious job, it is essential to the expansion of an organization. With the aid of technology, this incredibly difficult and monotonous procedure can be made easier [6]. HR  and cognitive science studies have prioritized acquisition. Personality in terms of achievement can be predicted with the use of themes and linkages found in the personal information of people [11].

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

**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 Googlenet were computed many times by 150 sample sizes. After gathering the employee dataset from an online site, repetitive and unwanted data from the dataset were removed during the data pre-processing techniques. Then, it is connected to the applicable data sets, and the accuracy rate of the DenseNet and Googlenet is measured and analyzed.

The enterprise employee’s online dataset is gathered and applied in this research study on an experimental basis. It uses Python programming for making a performance prediction model in the online employee dataset. Among various software tools, Python software is one of the common software 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

DenseNet was created primarily to enhance the decreased reliability brought on by high-level NNs' highest derivative. In plainer terms, the knowledge disappears before getting there because of the long journey between the output and the input layer. By applying the composite type functional method, an output from the first level serves as an input for the subsequent. The convolution level,  pooling level,  bulk normalization, and non-linear activation level make up this combined process. The system has L(L+1)/2 deep links as a result of these linkages. L is how many layers there are in the framework[8].

**Googlenet**

The Inception Network, a Deep CNN created by Google developers, is a forerunner to GoogleNet, a 22-layer DCNN network. Vision-based challenges like object recognition and image categorization were addressed using the GoogLeNet framework.  Nowadays, GoogleNet has been utilized for a variety of computer vision-related applications, including supervised learning, face identification, and classification[9]. The majority of the issues that huge networks had were resolved by the GoogleLeNet architecture, primarily through the use of the Inception part. The Inception part is a NN design that uses dimensional compression to lower the computing cost of developing a large network while leveraging feature identification at various sizes using convolution layers with filters.

**STATISTICAL ANALYSIS**

Statistical software tool IBM SPSS with the familiar version 26.0 to identify the value of SD (Standard Deviation), mean deviation data, significance point data and also drawing the graphical representations, etc. The SPSS tool was inclined in the current research process for investigating the concerned working people performance dataset. Group statistics practice and self-determining sample tests were directed at the experimental outcomes and the graphical 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 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 dataset and the accuracy value is measured among DenseNet and Googlenet network systems. For the given datasets, the proposed DenseNet offers more accuracy rate than the Googlenet. The accuracy value of the DenseNet and Googlenet is illustrated in Table 3. DenseNet and Googlenet classifier’s accuracy rates are 91.60 percent and 87.90 percent. Table 4 illustrates group statistics depending on the online working people dataset of the developed research work.

# DISCUSSION

The Googlenet 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 %.

Benefits offered, the industry in which individuals work, hours worked, day — as individuals routinely think it has a significant effect, the group they are functioning in, and numerous other elements play an important role in influencing the efficiency of employees. Organizations must evaluate and start taking care of these aspects since they require their employees to be productive[4].

The aim of Aditya Poddar et al., 2021 is to use ML to determine the performance of the employee. Two ML classifiers—the RF(Random Forest) Classifier and KNN—were used to develop the model and identify the key elements that significantly affect the results ( K-Nearest Neighbor). The Kaggle dataset was used to develop the system for the forecasting of the worker's performance. The HR team may easily locate the most competent, experienced, and effective employee using this system's current and planned, which effectiveness of the control and takes into account several variables[5].

A computerized system that predicts staff turnover based on several prognostic analytical methodologies is presented by Fahad Kamal Alsheref et al. in 2022. These methods have been used to choose the best winner model from various processing topologies. To develop the winning model, the optimum pair of hyper-attributes also was calculated using an auto-tuning method. Lastly, they suggest an ensemble method for choosing the best effective model based on various evaluation metrics. The presented model's findings demonstrate that no paradigm has ever been flawless and optimal for any commercial context case [7].

In P. Sujatha et al., 2021, the implementation of several machine learning classifiers, including SVM, KNN, DT, RF, and LR, is focused on making the most accurate forecast of a staff job. As previously noted, the quality of the classifier is assessed using assessment measures including precision, reliability, F1-score, and log losses. According to the empirical evidence, RF offers superior accuracy, a higher F1 score, a higher precision score, and a lower log loss (0.33). So, versus other models, the RF predictor is more accurate at estimating job performance using the provided set of data[10].

A method to forecast sales consultant effectiveness in a call center only focused on sales and advertising operations is presented by Mauricio A. Valle et al. (2012). This strategy is founded on a simplistic Bayesian model. The goal is to determine which degrees of the traits are representative of those that achieve well [11].

C**ONCLUSION**

The DenseNet and Googlenet used in this study offer a better method for identifying and forecasting employee performance.

When compared to Googlenet 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 Google Net is 91.89

