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|  | **Department of Computer Science and Engineering**  Bangladesh University of Business and Technology (BUBT) | BUBT |

**CSE 498: Literature Review Records**

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| **Student’s Id and Name** | **Name:** Sm Raziur Rahman Pushon, **ID:** 19202103214 |
| **Project Title** | Deep Learning in Healthcare: Breast Cancer Detection and Classification using Image Processing and CNN |
| **Supervisor Name & Designation** | **Name:** Khan Md. Hasib, **Designation:** Assistant Professor, Department of CSE, BUBT |
| **Course Teacher’s Name & Designation** | **Name:** Khan Md. Hasib, **Designation: :** Assistant Professor, Department of CSE, BUBT |

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| **Aspects** | **Paper # 05 (Title)** |
| **Title / Question**  (What is problem statement?) | Breast Cancer Diagnosis Using Deep Learning Algorithm. |
| **Objectives / Goal**  (What is looking for?) | This study aims to apply deep learning, in particular Convolutional Neural Networks (CNN), to the early identification and diagnosis of breast cancer. With an emphasis on the Wisconsin Breast Cancer dataset, it intends to demonstrate the effectiveness of deep learning, notably CNN, in evaluating medical data. In order to compare the performance of deep learning with that of other machine learning techniques, the article aims to achieve a high degree of accuracy in identifying breast cancer. In the end, it aims to showcase the potential of deep learning for medical data analysis, particularly with regard to the identification of breast cancer. |
| **Methodology/Theory**  (How to find the solution?) | The objective of this paper is to use a deep learning technique, more specifically a Convolutional Neural Network (CNN), on the Wisconsin Breast Cancer dataset to identify breast cancer. The solution entails the collection of data, preprocessing, Principal Component Analysis (PCA)-based feature selection, model implementation, model training, model testing, and performance evaluation. The proposed deep learning approach for breast cancer diagnosis is effective, as evidenced by the achieved accuracy rate of 99.67%. |
| **Software Tools**  (What program/software is used for design, coding and simulation?) | In particular, Convolutional Neural Networks (CNN), which are frequently built using programming languages like Python and deep learning frameworks like TensorFlow or PyTorch, are mentioned as being used with deep learning approaches. Depending on the project's technical needs and the author's preferences, the specific software tools and libraries used may change. |
| **Test / Experiment**  How to test and characterize the design/prototype? | The prototype/design was evaluated and characterized. To test and characterize a machine learning model, however, standard techniques including data slicing, model training, assessment, hyperparameter tuning, cross-validation, and visualization are frequently utilized in such projects. It's significant to highlight that the paper's description of the testing and characterisation methodology is incomplete. |
| **Simulation/Test Data**  (What parameters are determined?) | After preprocessing the dataset and using the PCA (Principal Component Analysis) algorithm, the research states that 11 features were employed to diagnose breast cancer. It does not offer any detailed information regarding the parameters chosen for the PCA transformation or the deep learning method, though. The report does not go into great depth on the particular parameters that were employed in the models. |
| **Result / Conclusion**  (What was the final result?) | The research says that they were able to diagnose breast cancer with an accuracy of 99.67% after applying the neural network method to the preprocessed dataset containing 11 features. This accuracy is regarded as being quite good, demonstrating how well the suggested deep learning strategy worked to identify breast cancer cases in the dataset utilized for the study. |
| **Obstacles/Challenges**  (List the methodological obstacles if authors mentioned in the article) | The article examines many methodological issues with deep learning and various image modalities for breast cancer diagnosis. These challenges include issues with data scarcity, the complex breast structure, the need for computational resources, data augmentation, radiologists' inter-observer variability, limitations on publicly accessible databases, the best threshold selection for image analysis, and the requirement for models to successfully generalize across different populations and breast densities. |
| **Terminology**  (List the common basic words frequently used in this research field) | Deep Learning, Convolutional Neural Network,Neural Network, Random Forest, Support Vector  Machine, MachineLearning, WDBCDataset. |
| **Review Judgment**  (Briefly compare the objectives and results of all the articles you reviewed) | The five publications all have various objectives, such as improving breast cancer detection accuracy rates and establishing diagnostic methods. Their outcomes match the goals they had in mind. |
| **Review Outcome**  (Make a decision how to use/refer the obtained knowledge to prepare a separate and new methodology for your own research project) | I may develop a new methodology for my research project using the knowledge I acquired from the publications and a methodical approach. It's crucial to understand the articles' objectives, methodology, findings, and conclusions before moving on to the next step. The application of the learned information to the objective of my project is then considered. I must apply my knowledge while taking the project's requirements and other aspects into consideration. |