**Anushka Shelke (Batch 2)**

**Literature Survey:**

Prepare below table after reading and analysing IEEE Papers:

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| **Sr. No** | **Title of Paper** | **Name of Authors** | **Published Year** | **Remarks** |
| 1 | Handwritten Digit Recognition Using Convolutional Neural Network | Dhruv Sharma, Ishaan Singh, Upendra Pandey | **2022** | **Methodology -** The MNIST dataset is an acronym that stands for the Modified National Institute of Standards and Technology dataset. It is a dataset of 60,000 small square 28×28 pixel grayscale images of handwritten single digits between 0 and 9.  **Convolutional Neural Network (CNN)** “CNN (Convolutional Neural Network or ConvNet) is a type of feed-forward artificial network where the”“connectivity pattern between its neurons is inspired by the organization of the animal visual cortex. The visual” “cortex has a small region of cells that are sensitive to specific regions of the visual field.” |
| 2 | A Machine Learning and Deep Learning Approach for Recognizing Handwritten Digits | Ayushi Sharma,  Harshit Bhardwaj,  Arpit Bhardwaj,  Aditi Sakalle | **2022** | **Methodology-** 1. Dataset2. Support Vector Machine3. Decision Tree4. Random Forest5. K-Nearest Neighbour6. Gaussian Naive Bayes7. Genetic Programming8.CNN **Conclusion-** They used keras as the backend and tensorflow as the software library. The CNN classifier outperforms the other classifier with a classification accuracy of 98.83% for the recognition of handwritten digits. |
| 3. | HDSR-Flor: A Robust End-to-End System to Solve  the Handwritten Digit String Recognition  Problem in Real Complex Scenarios | 1.Arthur Flor De Sousa Neto  2.Byron Leite Dantas Bezerra | 2020 | **Methodology-**  1.The ORAND-CAR dataset  2.The Computer Vision Lab (CVL) Handwritten Digit  String (HDS)  3.The two metrics (hard and soft), proposed by the ICFHR  2014 competition on HDSR  4.To compose the methods and models of the experiment,  they used the same protocol presented at the ICFHR 2014 competition on HDSR  **Conclusion-**  The proposed optical model proved to be effificient in rec  ognizing sequences in images with high noise, discarding  irrelevant information around the target text. It demonstrated  robustness even under low data volume, reaching an average  precision of 96.50% in the competition datasets, which is  equivalent to an average of 3.74 percentage points in improvement to the current state-of-the-art. |
| 4. | Handwritten Digit Recognition Using CNN | Mayank Jain ,  Gagandeep Kaur ,  Harshit Gupta | 2023 | **Methodology-**  A. Pre-Processing  1. Convolutional Layer  2. Relu Layer  3. Pooling Layer  4. Fully connected Layer  B.Prediction  1.From Test Dataset  2.Images from User’s side  **Conclusion-**  In this work, with the point of improving the exhibition of  transcribed digit acknowledgment, they assessed variations of a convolutional neural organization to keep away from complex pre-preparing, exorbitant component extraction and  a perplexing troupe (classifier blend) approach of a  conventional acknowledgment framework. Through broad  assessment utilizing a MNIST dataset. |
| 5. | Mobile Client- Server Approach for Handwriting  Digit Recognition | Hasbi Ash Shiddieqy,  Trio Adiono,  Infall Syafalni | 2019 | **A. Client-server system**  -The **advantage** of a client-server-based system is proven,  highly scalable, easy to integrate, low cost. Example of  client-server system-based services is AI Services (AWS),  Cloud AI (Google Cloud), AI Platform (Microsoft Azure),  AICS (IBM).  **B. Pattern Recognition of handwritten digits**  -**LeNet5** is one of the basic and significant CNN architecture  **C. Implementation State of the Art**  -Implementation recognition module can be applied in software CPU, GPU,  or fully customized hardware FPGA  **D. Mobile Application**  A. Training handwritten digit recognition  -MNIST dataset  Conclusion  The system operates and capable to classify handwritten  digits with an accuracy of 99% in the test data MNIST and  56% in real user data from android. |