A SYSTEM AND METHOD FOR RECOGNITION OF HANDWRITTEN TELUGU CHARACTERS

IITM Technology Available for Licensing

PROBLEM STATEMENT

- Generally, Handwritten character recognition can be performed either online or offline.
- Based on prior arts survey, a **Hidden Markov Model based system** is used for online character recognition in Telugu & report a top-l accuracy of 91.6%, but said system operates at symbol level, **not at character level**.
- Further there are **other issues** including **accuracy** to identify **characters** both in online and offline mode.
- Hence, there is a need to mitigate above challenges, and present invention provides the solution in efficient manner.

INTELLECTUAL PROPERTY

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TECHNOLOGY CATEGORY/ MARKET

Technology: Method for recognition of handwritten Telegu Character;
Industry: Banking Sector, Security;
Applications: Banking Sector & others;
Market: The global **optical character recognition** market is projected to grow at a **CAGR of 14.8%** during **2023-2027.**

TRL (TECHNOLOGY READINESS LEVEL)

TRL-3/4, Proof of Concept ready, tested in lab

TECHNOLOGY

- The present invention describes a **method & system for recognition of handwritten characters** based on **Convolutional Neural Networks (CNN).**
- Each network comprises **a first, second, third, & a fourth hidden layers** of neurons connected to each other.
- The **method** of recognizing handwritten characters is depicted in the smart chart and figures.
- The handwritten characters are scanned into an input image & processed by Convolutional neural networks.
- **Principal component analysis** (PCA) system is to identify the output class to which the characters belong.
- The **support vector mechanism** (SVM) is configured to determine support vectors & identify the output class based on the determined support vectors, & also to train weight stage from the last hidden layer of the CNN to the output layer.
- The entire hierarchy of CNN layers from the input to the last hidden layer may then be considered as a kernel layer of the SVM.

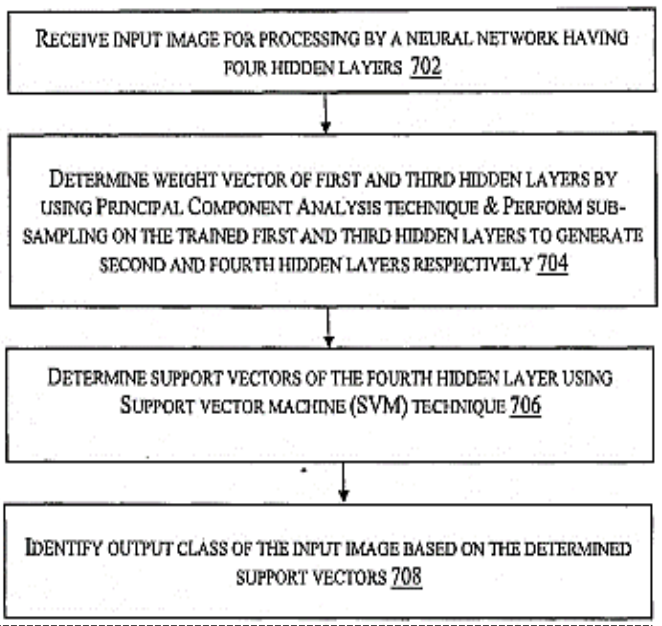

Fig.1: Illustrates the claimed method for recognition of handwritten characters

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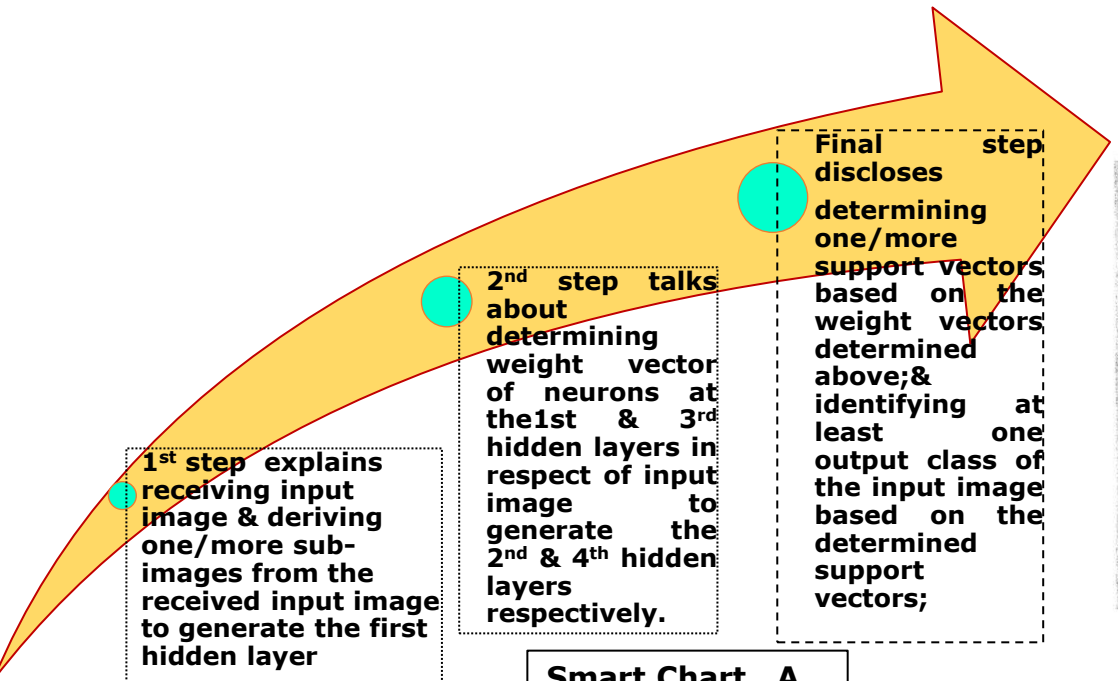
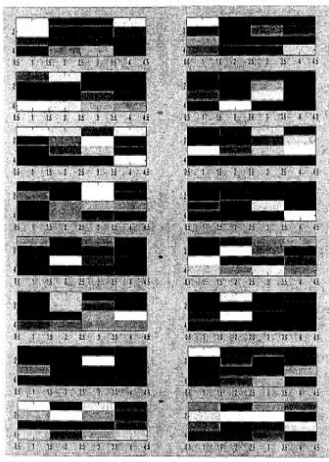
Image





Smart Chart . A

KEY FEATURES / VALUE PROPOSITION

❖ *Technical Perspective:*

- Data collected splits into training & testing data wherein **90% data** used for **training** & remaining for **testing**.
- **Training data** divides into two sets & used to **train nine different networks**.
- A classifier is created by combining the networks with **least correlation performance** on the test dataset. Further, a **new classifier** pair **yielded higher accuracy** than individual classifiers.
- Facilitates the feature of supporting **the recognition of handwritten** not only **Telegu character** but also support other **Indian regional language** like **Tamil, Kannada & Malayalam.**

❖ *Industrial Perspective:*

- **User friendly with high accuracy & cost-effective** system & method.
- **Very fast process & consumes less time** for recognition of Indian Language character (Telegu).

Flowchart

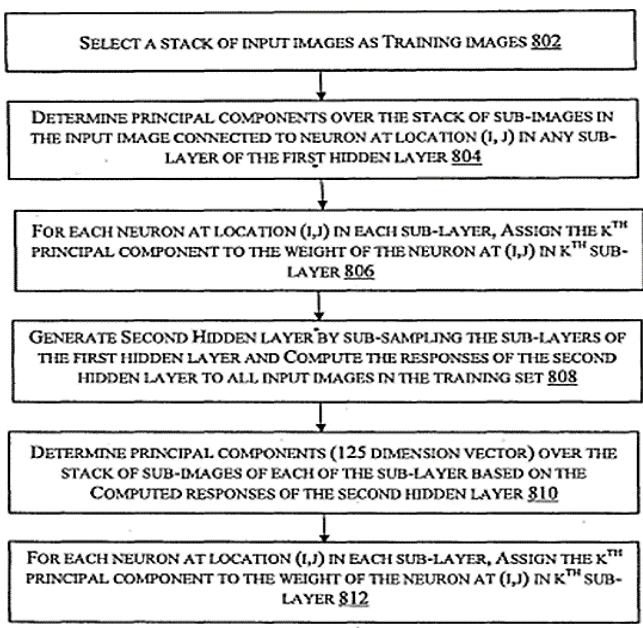


Fig. 2: Illustrates a flowchart of a method of obtaining weights for neurons at the fIrst and third hidden layers using Principal Component Analysis technique

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