

## MED-TRACK

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### Abstract

The healthcare industry is increasingly leveraging technology to improve patient outcomes and enhance the management of medical routines. This project proposes a comprehensive system designed to assist patients in managing their medication schedules effectively. The Prescription Reader, Reminder, and Nearest Medical Shop Locator with Caretaker Reminder is a multifaceted application that integrates Optical Character Recognition (OCR) technology to scan and digitize handwritten or printed medical prescriptions. Once the prescription is digitized, the system automatically schedules reminders for patients to take their medications based on the prescribed dosage and timing. Additionally, it sends alerts to a designated caretaker to ensure oversight and compliance with the regimen. The system also incorporates a Nearest Medical Shop Locator feature, leveraging GPS technology to guide users to the closest pharmacies in their vicinity, enhancing convenience in obtaining medications. This holistic approach aims to support patients, particularly the elderly and those with chronic illnesses, in adhering to their treatment plans, while also offering peace of mind to caretakers. The platform is designed to be user-friendly, accessible, and adaptable to different medical needs, providing an essential tool for modern healthcare management.

by individuals, particularly the elderly and patients with chronic conditions. The increasing complexity of healthcare demands a solution that not only simplifies medication management but also provides timely support to both patients and their caretakers. The Prescription Reader, Reminder, and Nearest Medical Shop Locator with Caretaker Reminder is an innovative mobile application designed to address these challenges by offering an integrated, user-friendly solution. By utilizing Optical Character Recognition (OCR) technology, the app reads and digitizes handwritten or printed prescriptions, making it easier for users to manage their medication schedules. The app automatically sets up reminders based on the prescription, ensuring that patients take their medication on time. For additional support, the app includes a caretaker reminder feature, which alerts a designated caregiver if the patient misses a dose, enabling proactive oversight of the patient's health. Additionally, the app provides a Nearest Medical Shop Locator, utilizing GPS technology to assist users in finding the closest pharmacy for refilling prescriptions or purchasing medicines. This holistic solution aims to enhance medication adherence, reduce the risk of errors, and provide peace of mind for both patients and their caregivers. With its focus on accessibility and convenience, this app is poised to become an essential tool for anyone managing long-term or complex medication regimens.

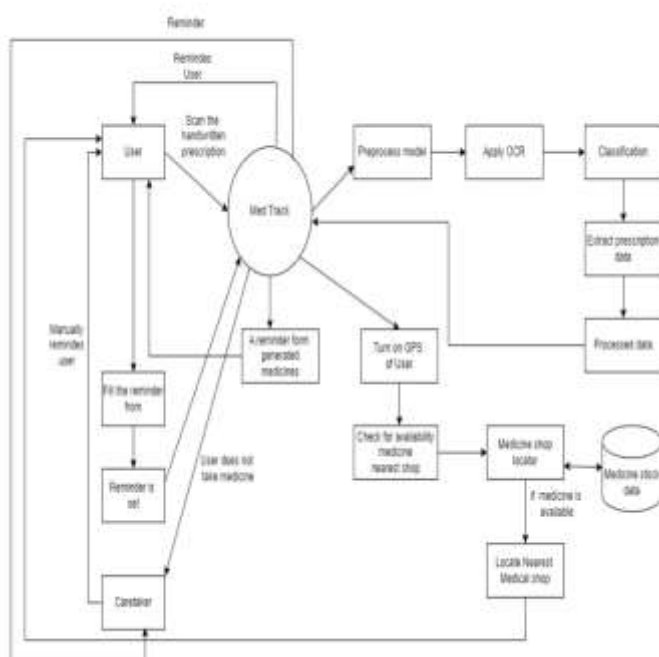
### Key Words:

Prescription Reader, Dosage Reminder, Nearest Medical Shop Locator, Caretaker.

## 1.INTRODUCTION

In today's fast-paced world, managing healthcare routines, especially those involving multiple medications, can be overwhelming for patients and their caregivers. Missed doses, misread prescriptions, and difficulty in finding nearby pharmacies are common challenges faced

## 2. METHODOLOGY



### Prescription

The user scans a handwritten prescription into the app. The system preprocesses the image and applies Optical Character Recognition (OCR) to extract the relevant text. Following this, the system classifies and extracts the necessary data to obtain structured prescription information that can be used for further processing.

### Medicine

Med Track uses the processed prescription data to automatically generate a reminder form for the user's medicines. The system sends timely reminders to the user for taking the prescribed medication. If the user fails to take the medicine as scheduled, the system immediately notifies the caretaker. The caretaker can then manually remind the user or intervene when necessary. Additionally, both the caretaker and the user have the option to manually fill out the reminder form if they prefer not to rely solely on automatic reminders. Once the form is completed, the reminder is officially set in the system.

### Medicine Availability and Location:

The system can activate the user's GPS to determine their current location. It then checks the availability of medicines in nearby medical shops. By using updated medicine stock data and a shop locator module, the

system efficiently finds and suggests the nearest pharmacy that has the required medicine available for purchase.

### Caretaker

Caretakers are promptly notified if the user misses any loses of medication. They are empowered to set, adjust, or manually manage the medication reminders as needed. The caretaker plays a vital backup role in ensuring that medication adherence is maintained, particularly in situations where the user may struggle to manage their own medication schedule independently.

### Role:

## 3. ALGORITHMS USED

### Optical Character Recognition

#### 1. Preprocessing

This step prepares the image for better accuracy:

- **Grayscale conversion:** Turn the color image into grayscale.  
Formula for a pixel (R, G, B):  
$$\text{Gray} = 0.299R + 0.587G + 0.114B$$
- **Thresholding (Binarization):** Convert grayscale image into black and white (binary) image.  
Example (Otsu's method):

$$\text{Threshold } t = \arg \max_t \{\sigma_b^2(t)\}$$

where  $\sigma_b^2(t)$  is the **between-class variance**.

- **Noise Removal:** Apply filters (e.g., Gaussian Blur) to remove noise.
- **Skew Correction:** If text is tilted, find angle  $\theta$  using **Hough Transform** and rotate back.
- **Segmentation:** Break the image into lines  $\rightarrow$  words  $\rightarrow$  individual characters.
- **Feature Extraction:** Extract important features like:
  - Pixel values
  - Edges (using Sobel operator)
  - Histograms of pixel distributions

#### 2. Segmentation and Feature Extraction

After cleaning:

- **Segmentation:** Break the image into lines  $\rightarrow$  words  $\rightarrow$  individual characters.
- **Feature Extraction:** Extract important features like:
  - Pixel values
  - Edges (using Sobel operator)
  - Histograms of pixel distributions

### 3. Character Recognition (Main OCR Core)

There are two main approaches:

#### a) Template Matching (Basic)

Compare input characters with known templates:

- **Cross-correlation formula:**

$$R = \sum_{i,j} (I(i,j) \times T(i,j))$$

where:

- $I(i,j)$  = pixel intensity of input image
- $T(i,j)$  = pixel intensity of template

#### b) Machine Learning-based Recognition (Modern)

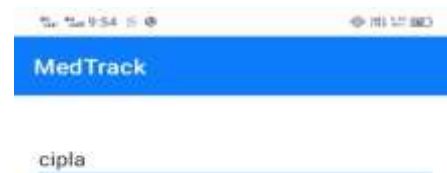
Use models like:

- **Support Vector Machines (SVM)**
- **Convolutional Neural Networks (CNNs)**
- **Recurrent Neural Networks (RNNs)** for sequential characters.

For **CNNs**, the feature extraction and classification are automatic:

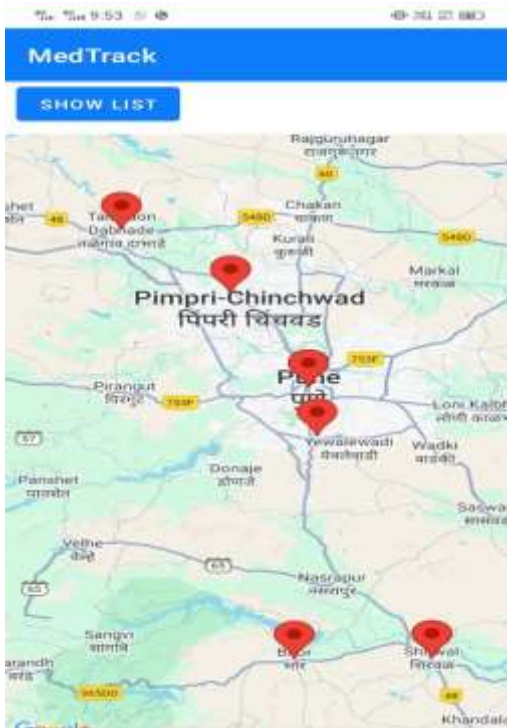
- Convolutions slide a filter  $f$  over the image  $x$ :

$$(x * f)(i,j) = \sum_m \sum_n x(m,n) \cdot f(i-m,j-n)$$



## 4. RESULTS





## 5. DISCUSSIONS

| Aspect                    | Existing System                                                          | Proposed Med Track System                                                 |
|---------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Prescription Storage      | Paper prescriptions, easily lost or damaged.                             | Digital prescriptions stored securely in the app.                         |
| Medicine Reminders        | Manual reminders (notes, alarms) needed for medications.                 | Automatic reminders in the app for timely medicine intake.                |
| Finding Nearby Pharmacies | Requires manual searching, inconvenient and time-consuming.              | Uses Google Maps to quickly locate nearby pharmacies.                     |
| Data Storage and Access   | Medical information stored separately, difficult to access in one place. | All medical data (prescriptions, reminders) stored together in one app.   |
| Patient-Caretaker Support | Limited sharing of information and reminders with caretakers.            | Enables easy sharing of health information and reminders with caretakers. |

## 6. USEFULNESS

The Med Track system offers significant benefits in improving healthcare management, particularly for individuals who rely on multiple medications. It automates the traditionally manual and error-prone process of reading handwritten prescriptions through OCR, reducing the chances of misinterpretation. The automated reminder system ensures users adhere to their medication schedules, which is critical for treatment effectiveness and patient recovery. In cases where users miss doses, caretaker notifications provide an additional

safeguard, allowing timely human intervention and enhancing patient compliance.

Moreover, the integration of GPS-based medicine availability checking helps users quickly find nearby pharmacies that stock their required medications, saving time and avoiding missed treatments due to medicine unavailability. By combining automation, intelligent monitoring, and caretaker support, Med Track greatly improves medication adherence, enhances user convenience, and reduces the risks associated with missed or incorrect medication intake, ultimately promoting better health outcomes.

## 7. CONCLUSION

The Med Track system provides an efficient, intelligent solution for prescription management and medication adherence. By leveraging technologies such as OCR for automatic text extraction, machine learning for classification and information extraction, and GPS-based location services, the system ensures users receive timely reminders for their medicines and can easily locate nearby pharmacies. The integration of a caretaker role adds an important layer of reliability, allowing for manual intervention if the user misses a dose. Overall, Med Track enhances patient safety, promotes consistent medication intake, and offers a smart, user-friendly platform for managing health needs through automation and intelligent assistance.

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