Brief Write-up – Braille Auto-Correct System

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🔍 Overview

This project implements a Python-based **Braille Auto-Correct and Suggestion System**. It helps users typing Braille via a QWERTY keyboard by detecting and correcting errors in input, such as mistyped, missing, or extra keys.

The system works by:

- Converting QWERTY key combinations to Braille dot binary patterns.
- Representing entire Braille words as sequences of binary patterns.
- Comparing user input with a dictionary of known Braille words.
- Suggesting the closest valid word using the **Levenshtein distance** algorithm.

→ Braille Input Format

Braille characters are typed using the keys:

- **D, W, Q, K, O, P** corresponding to Braille dots **1 to 6**

Example:
`"DK"` = D (dot 1) + K (dot 4) → Braille letter C (in binary: `100100`)

→⚙ How It Works

1. Each Braille character (key combo) is converted into a **6-bit binary string**.
2. A full word is represented as a **sequence of binary patterns** (one per letter).
3. Input sequence is compared to known words using **Levenshtein Distance**.
4. The word with the **lowest distance** (i.e., closest match) is returned as a suggestion.

→Test Case Example

Input:
`["DOP", "D", "DK", "DKO", "DOP"]`

Expected Output:
`hello` (with distance: 0)

→📈 Performance

- The algorithm runs efficiently for small to medium dictionaries.
- Uses a custom Levenshtein implementation (no external libraries), making it portable and lightweight.
- Easily extendable to real-time input or larger wordlists using Trie structures.

→🛠 Future Enhancements (Optional Bonus Ideas)

- Add real-time correction via a CLI or web interface (Flask).
- Include Braille contractions and multiple language support.
- Build a learning model that improves suggestions based on user history.

→✅ Files Included

- `braille_autocorrect.py` – Python code
- `Braille_Test_Cases.txt` – Sample input/output cases
- `README.md` – GitHub version (if hosted)
- `Brief_Writeup_Anusha.txt/.pdf` – This document