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# Handy

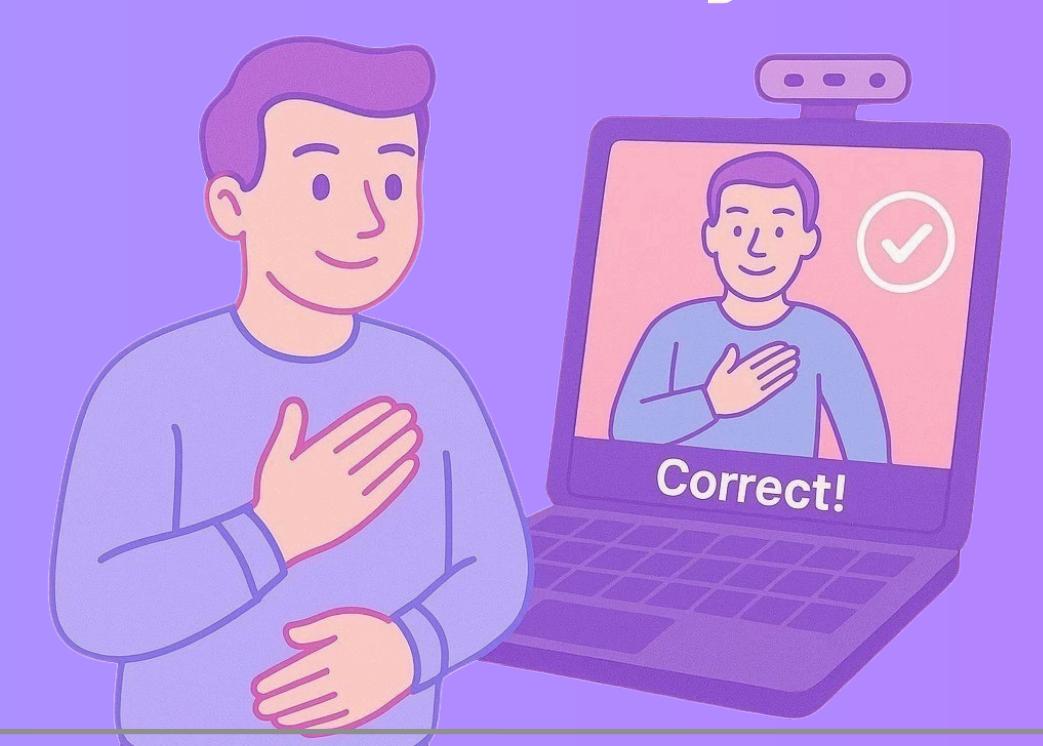
## A Friendly Hand to Help You Understand!

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Handly



## Motivation

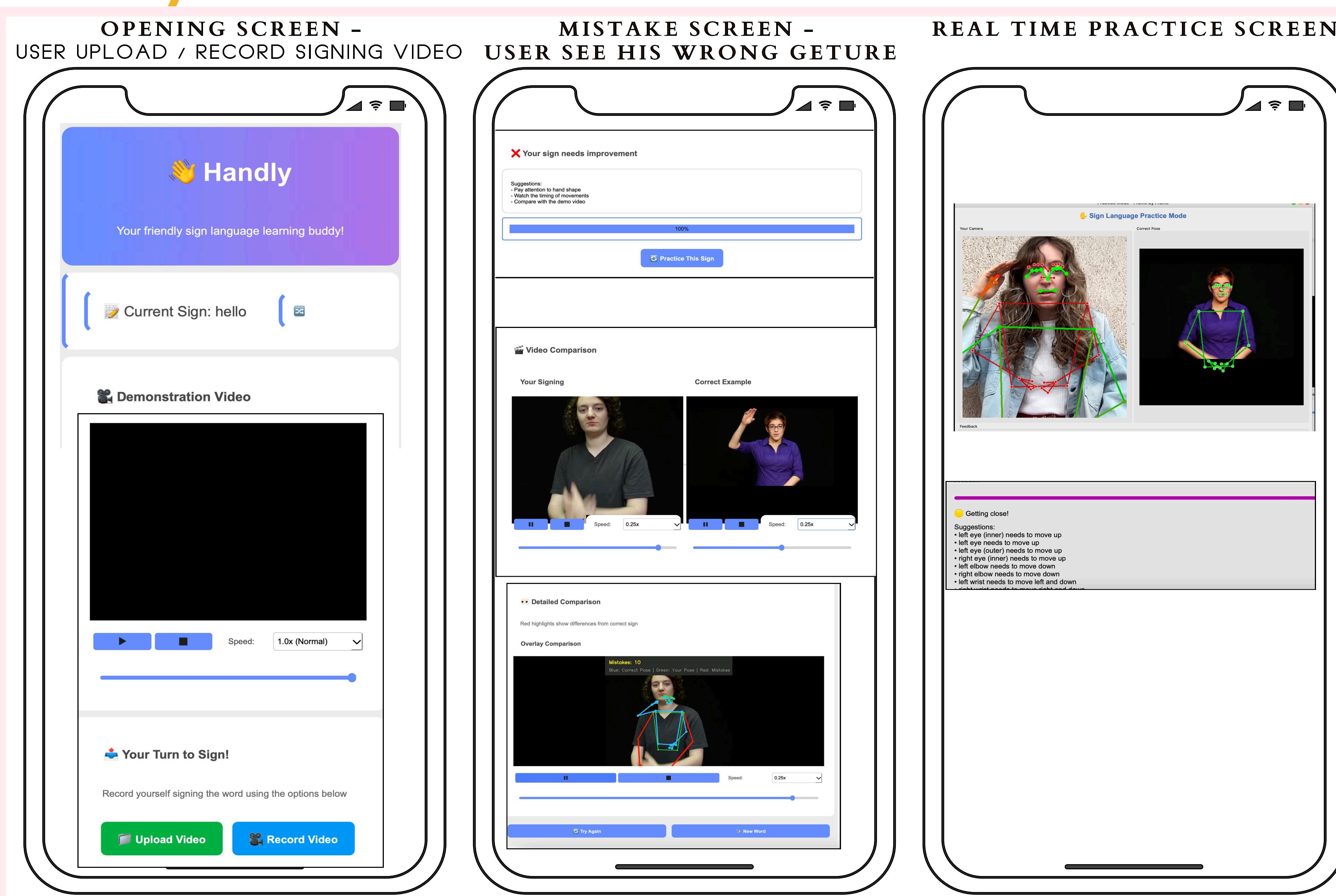
**Background** – Sign language is a vital tool for the deaf and hard-of-hearing community, but many existing learning platforms lack interactivity and real-time feedback, making it difficult for learners to track progress and stay motivated.

**The gap** – Most sign language learning tools use static videos and lack real-time feedback, making it hard for learners to track and improve their performance.

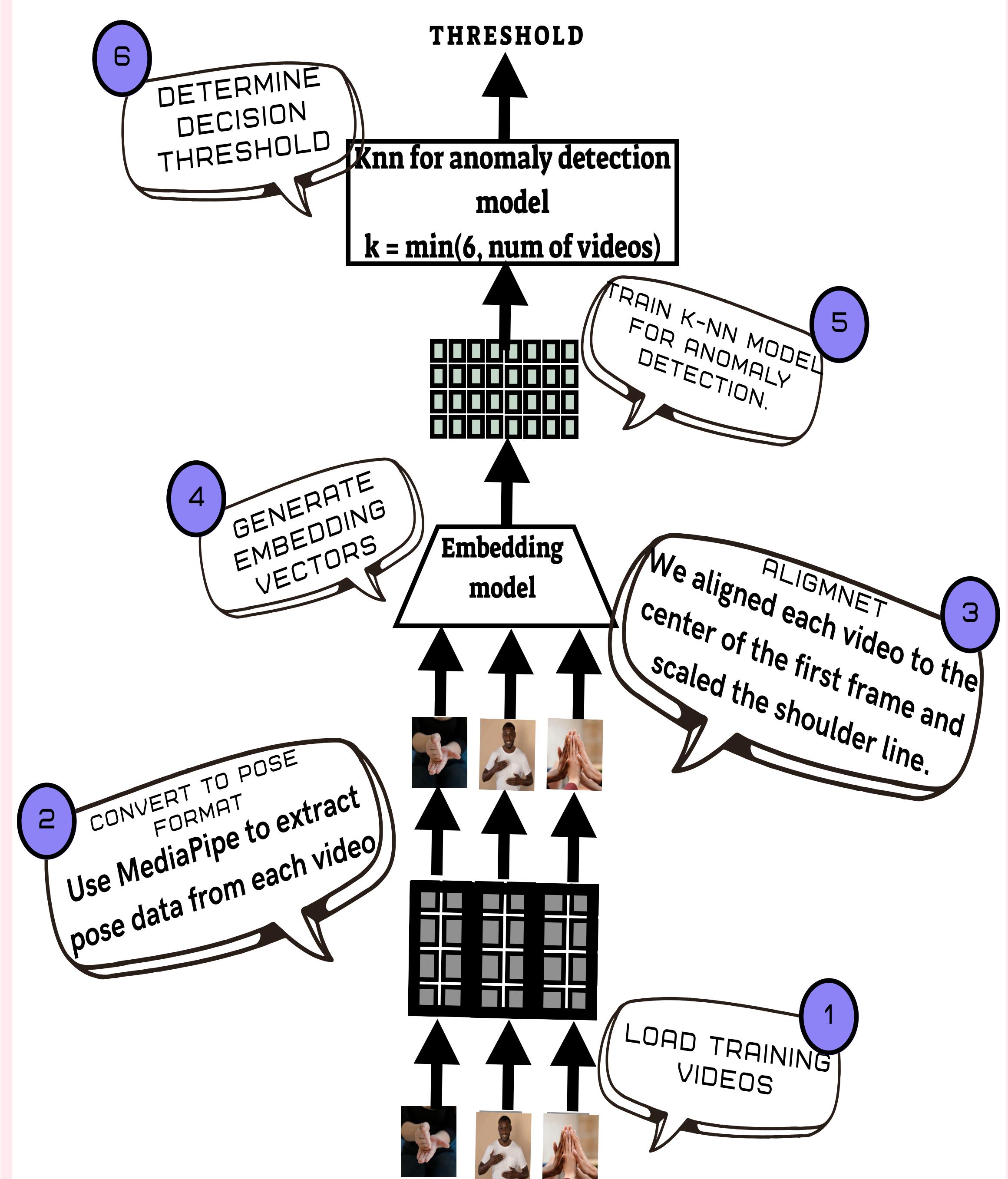
**The goal** – Create an interactive system that provides real-time, personalized feedback, guiding users through correct sign production.

**Solution (Our approach)** – Handy is a desktop app that uses MediaPipe and KNN-based anomaly detection to compare user gestures with reference signs, offering step-by-step visual and voice feedback. It supports over 1,500 signs for personalized learning.

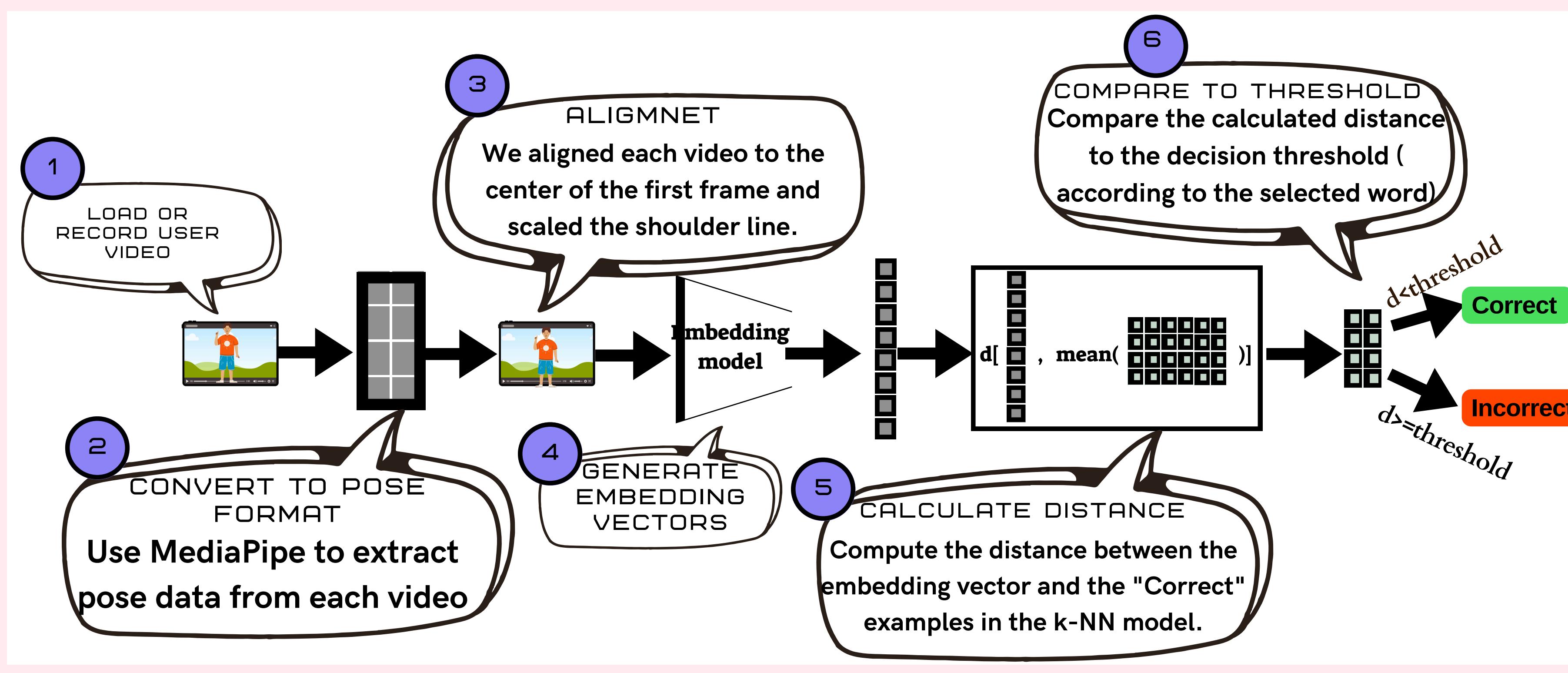
## The System



## The Preprocessing Phase



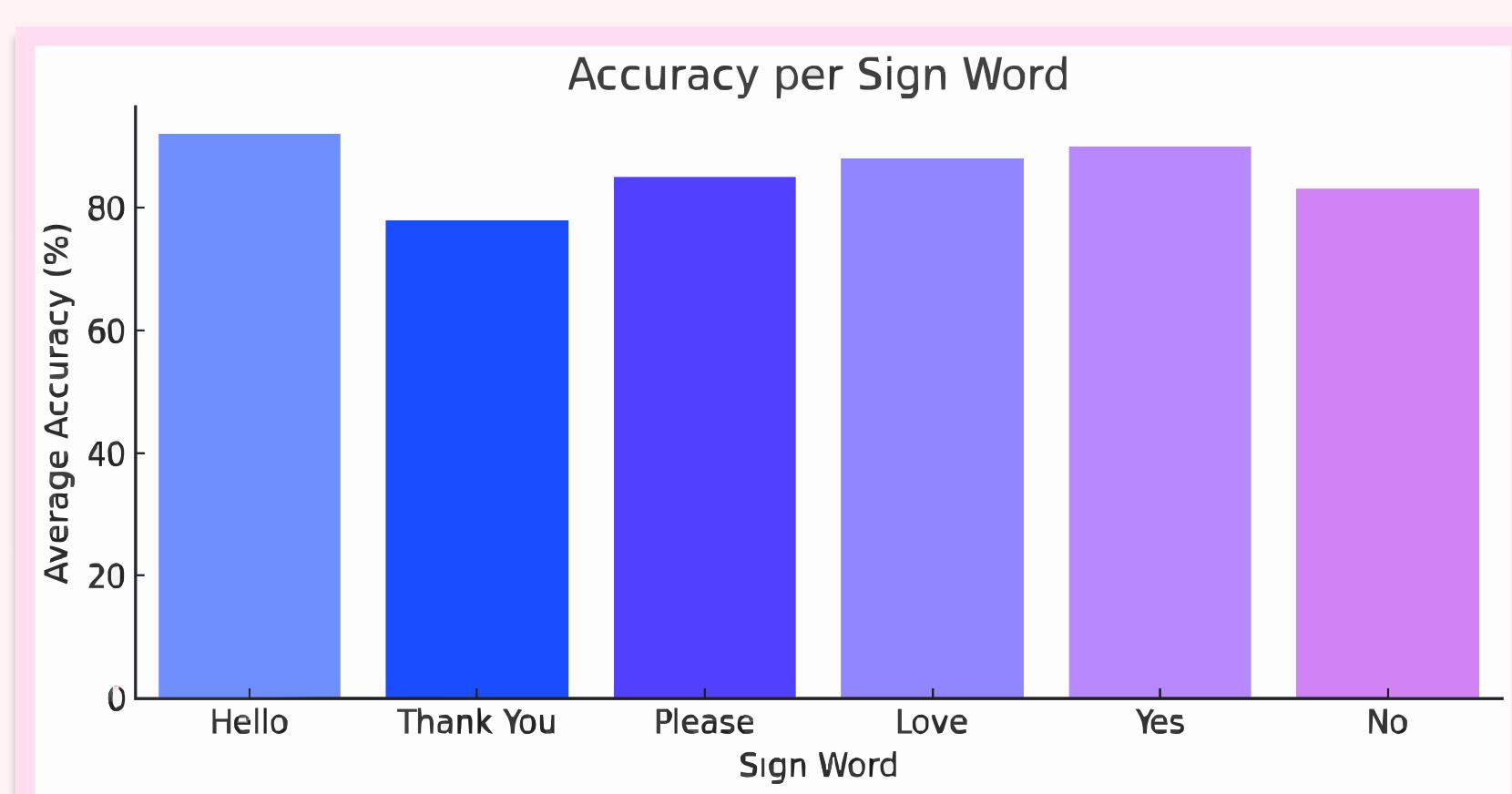
## The Prediction Phase



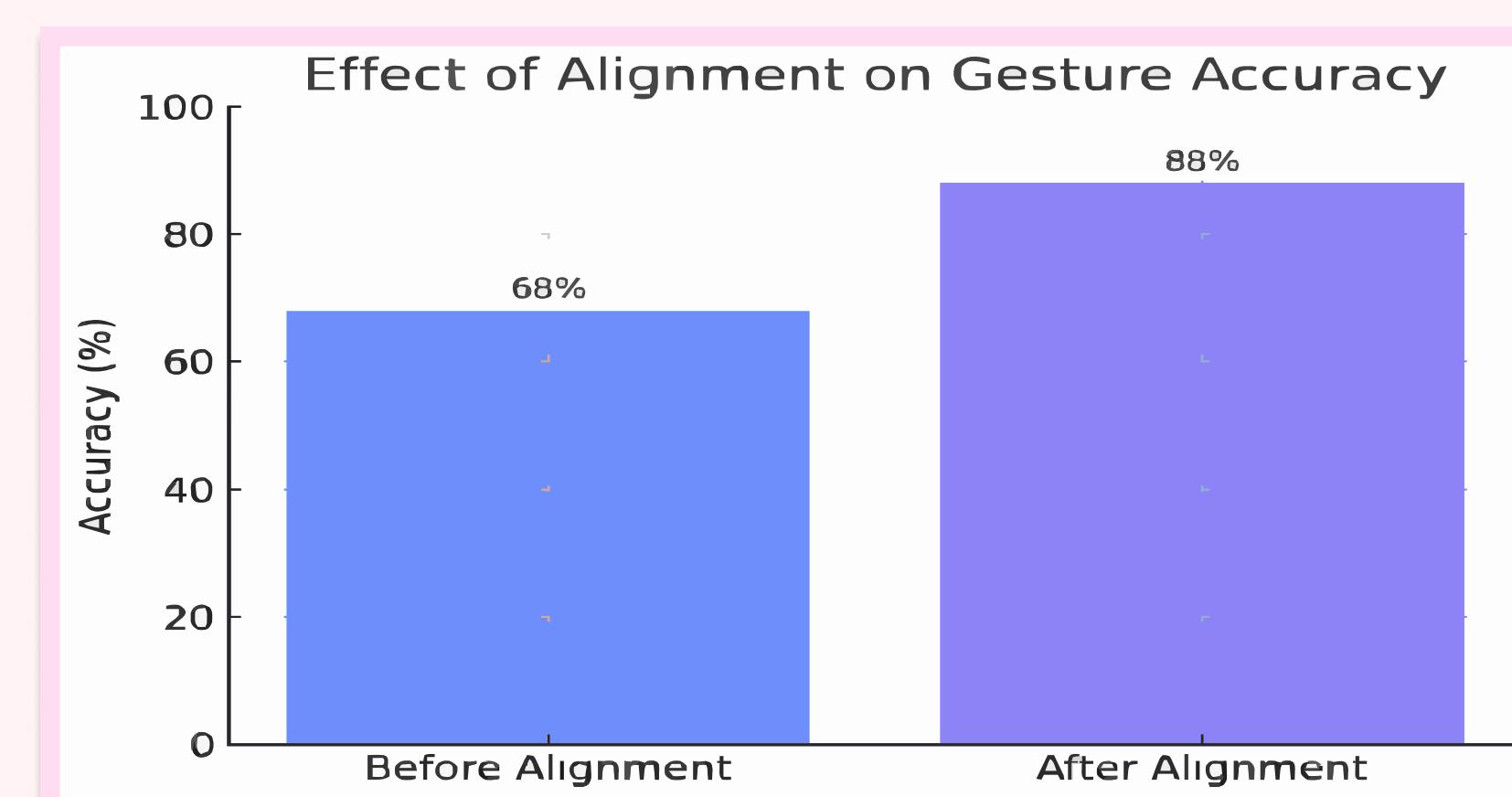
## References

- [1] Hand Talk Translator: [handtalk.me](http://handtalk.me)
- [2] ASL Sign Language Recognition with Deep Learning: [arxiv.org/abs/2001.09907](https://arxiv.org/abs/2001.09907)
- [3] SignAll: [signall.us](http://signall.us)
- [4] Effortless Real-Time Sign Language Translation – <https://github.com/sign/translate>
- [5] Sign Translator – <https://sign.mt>

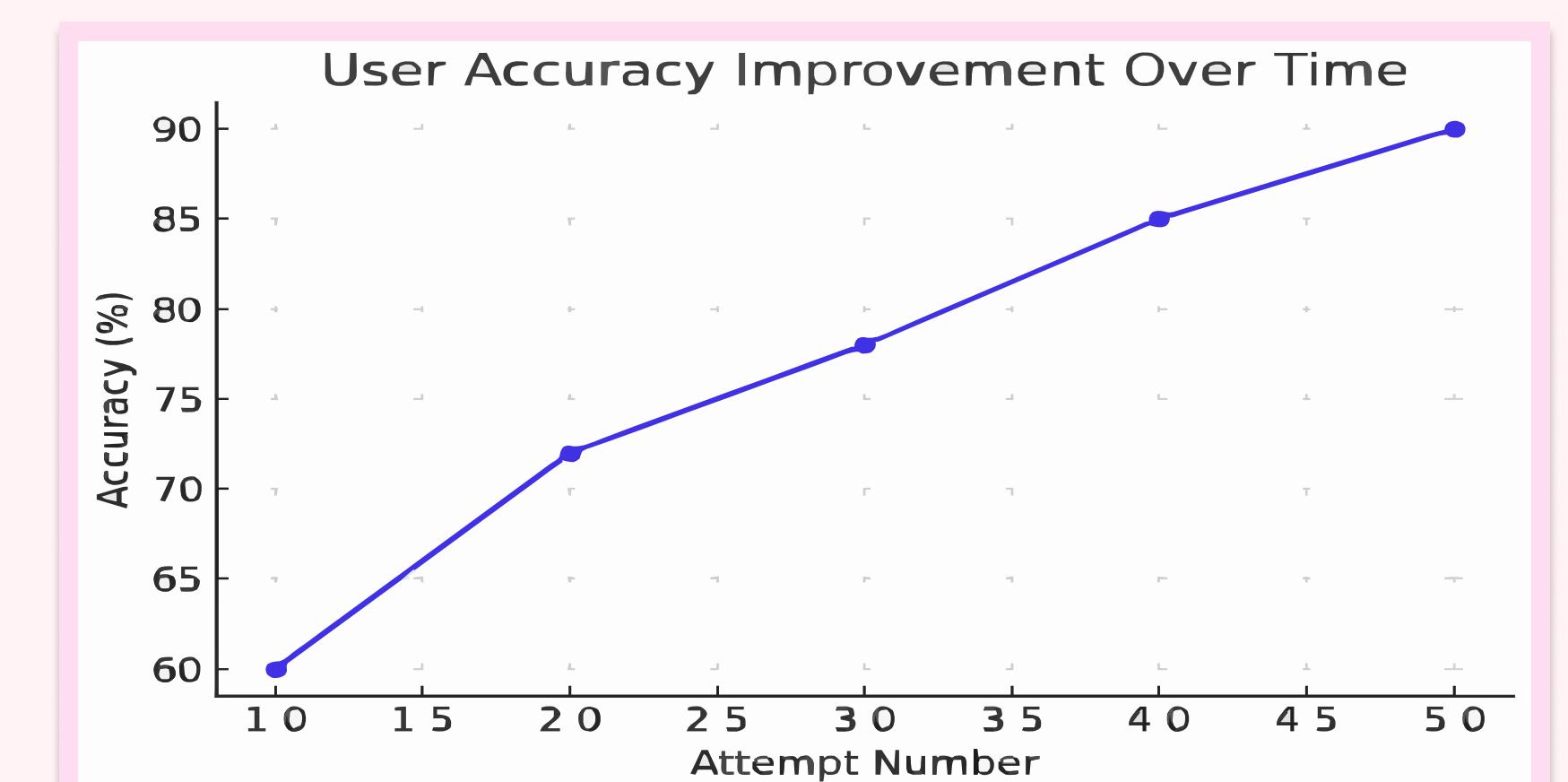
## Results



**1. Sign Recognition Accuracy** – We tested 6 selected words. The system achieved high accuracy on all the words.



**2. Pose Alignment Improves Accuracy** – Using shoulder-based alignment and first-frame normalization improved average accuracy.



**3. User Learning Over Time** – We tracked a user signing “Hello” and saw steady improvement, showing our feedback supported learning.