Tactile Language Modelling with Hidden Markov Models

The question I am asking is:
Can we model Braille reading as a sequence-to-sequence task (like ASR/OCR) where noisy tactile signals are mapped to text using perceptual-linguistic reasoning, outperforming character-by-character classification?

What measurable data would the model use?
The model would use raw tactile sensor data gotten from the interaction of a reader's finger with Braille dots. Similar to the PD study, the project would use the data collected without preprocessing, as the raw data would capture the noisy, uncertain nature of touch becoming language

The type of HMM problem this would be:
If I do not know the specific sequence of the hidden states, i.e, the exact Braille characters or words generated given a tactile observation sequence, then I would be dealing with a learning problem

Training Algorithm:

What values are known?

1. The observed tactile sensor data - the collected data, similar to the stabilometric signals collected in the PD study
2. The number of hidden states the model will use to represent different Braille dot configurations
3. The structure of the HMM, for example, left to right if modelling sequential unfolding, like in Braille reading

What values are unknown and must be learned?

1. The initial probability vector
2. The state transition probability matrix - the likelihood of transitioning from one state to another, e.g, the probability of moving from a state representing dot 1 to a state representing dot 2 of a Braille character
3. The emission probabilities - the sensor data being collected is continuous, and so the model will use a Gaussian HMM. That said, the hidden values that will need to be learned are the mean vectors and covariance matrices for the Gaussian probability function

Parameter updates:
To maximize the log-likelihood of observed tactile data, the parameters to be iteratively updated are

1. Initial probability vector
2. State transition probability matrix
3. Mean vectors and covariance matrices