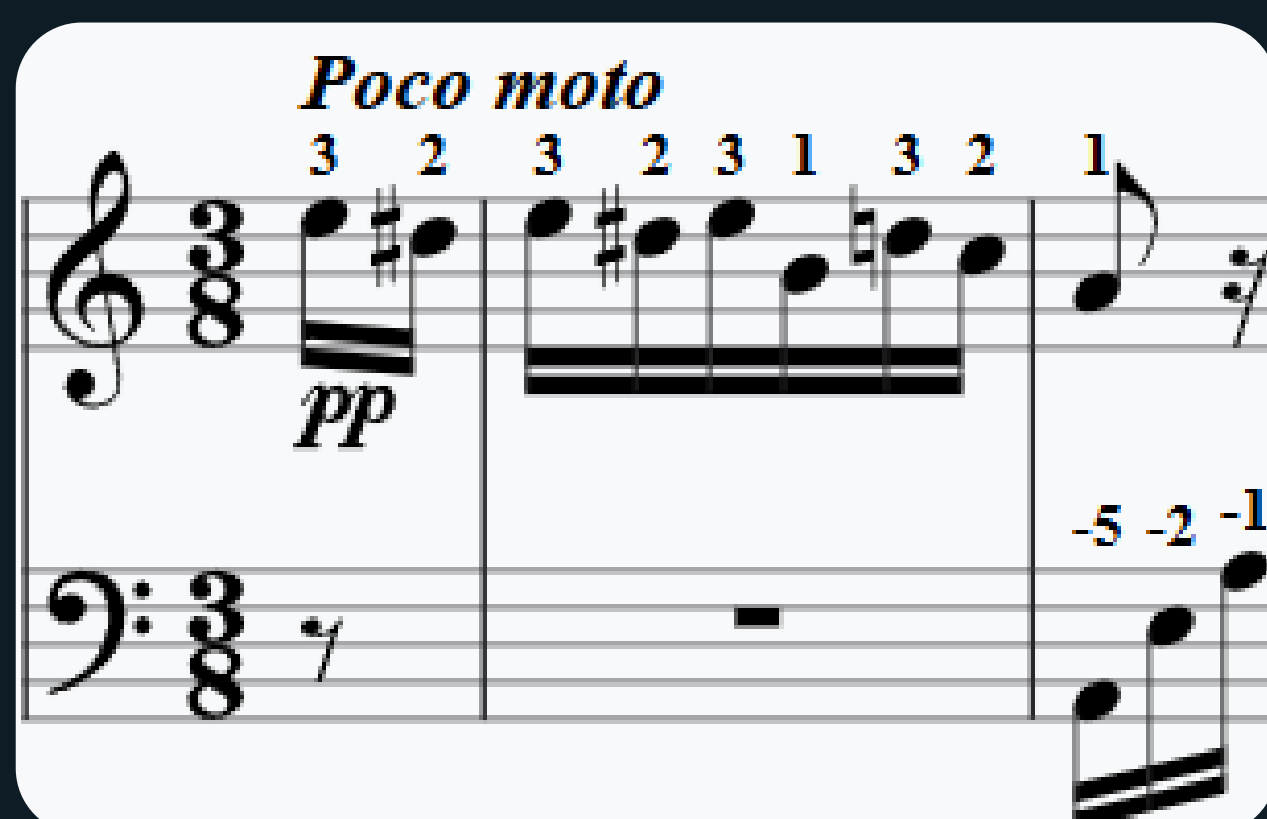


PIANO LEARNING FINGERING SUGGESTION MODEL USING HMM

AUTOMATIC PIANO FINGERINGS

- **Objective:** A data-driven system that suggests physically feasible finger placements for piano learners.
- **Dataset:** Trained on the PIG dataset (150 classical pieces, 309 annotated fingerings).
- **Machine Learning:** Uses first-order HMM to model finger transitions.

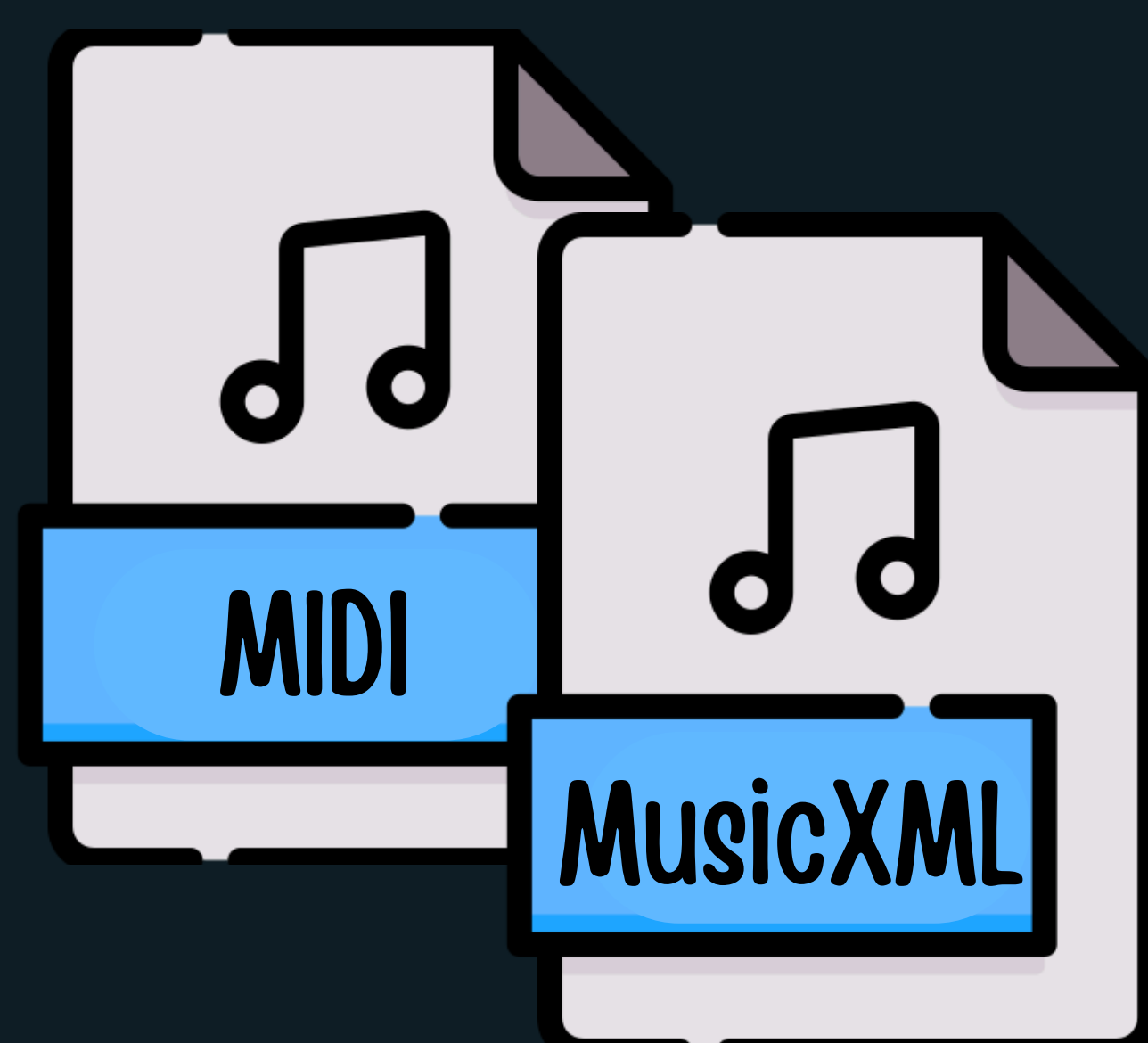
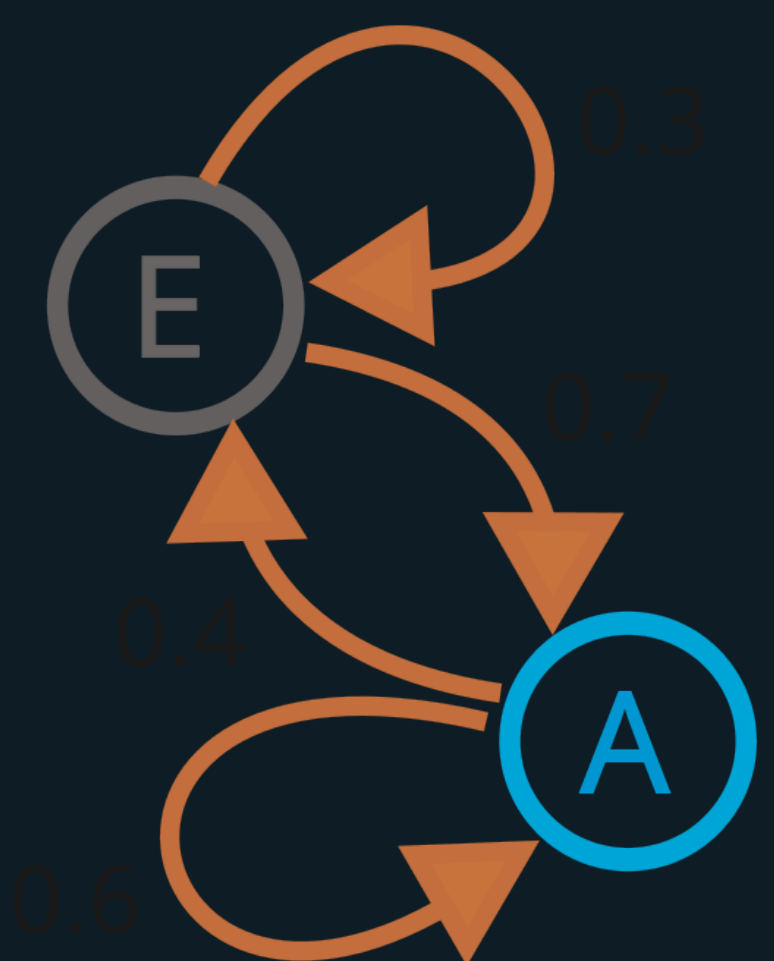


INTUITIVE UI FOR ANNOTATIONS

- **Objective:** Visualized fingering overlays on sheet music.
- **Input:** MIDI (MID) / MusicXML (MXL)
- **Output:** TSV/MXL files with annotated finger numbers.
- **Handling challenges:** Auto-assigns hands via part detection (polyphonic/monophonic).
- **SVG Rendering:** Renders score previews for MusicXML inputs.

HIDDEN MARKOV MODEL

- **States:** 5 fingers per hand (RH: 1 – 5, LH: -1 – -5).
- **Observables:** Pitch differences (white/black key distances).
- **Train:** Transition/emission matrices derived from the PIG dataset.
- **Decode:** Viterbi algorithm to find the best fingering path. Penalty system for chords/intervals/leap to avoid unfeasible fingers.



SUPPORT FINGERINGS ON MIDI/MUSICXML

- **Description:** Seamless integration with industry-standard formats
- **MIDI:** Processes virtual piano performances.
- **MusicXML:** Renders annotated scores for sheet music software (e.g., MuseScore, Finale).
- **Potential applications:** Music education tools, automatic score editors, AI-assisted practice platforms.

