MIDI to Music Sheet using ML

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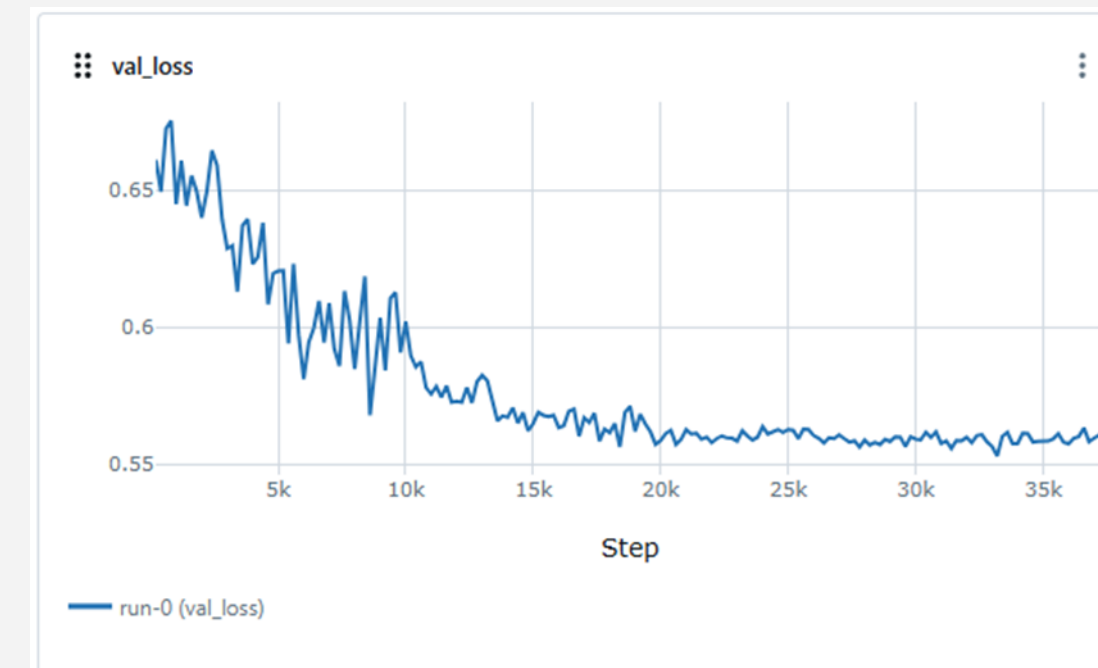
Background

This project is to use Machine Learning to standardize such MIDI files and reduce the influence of musicians' live improvisation, ensuring that the notes land precisely on the beat where they belong. Thus it's easier to convert them into sheet music using notation editors.

The MIDI files recorded in real-time or transcribed by AI from audio files (e.g. recording of a piano performance) are often too "messy" to be directly opened with music notation software like Sibelius and Musescore, because of performers' live improvisation, notes deviate from their original positions in time, causing a "messy" display in the editing software.
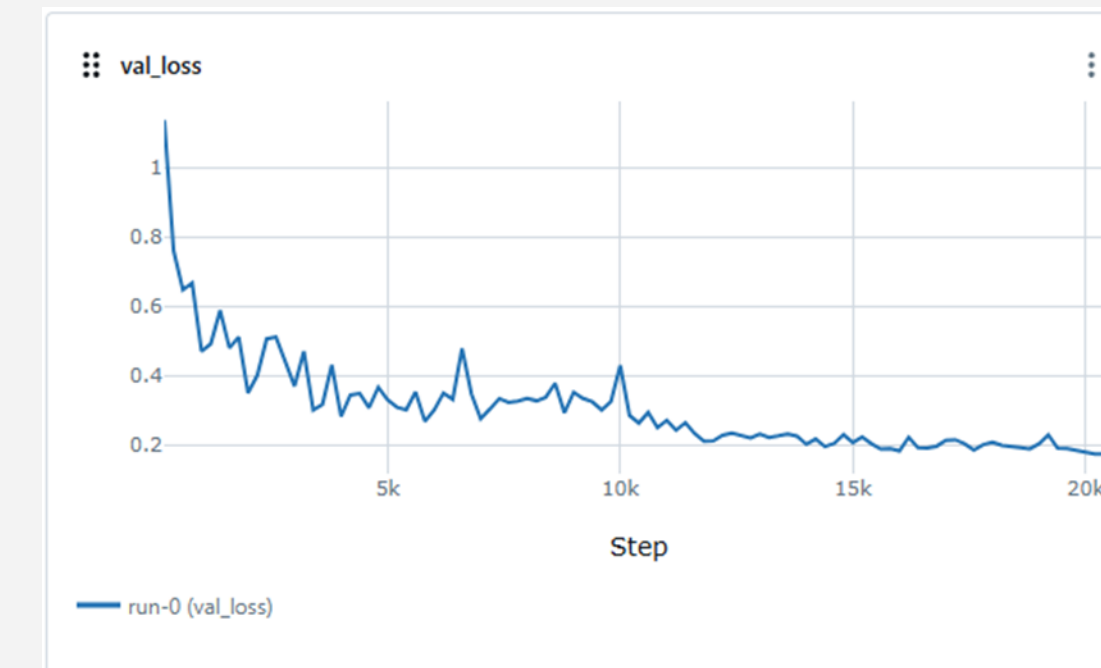
Motivation

The inspiration is from my need for sheet music in my spare time. Sometimes I hear piano arrangements or transcriptions that I like and want to play them on the piano myself, but I'm not professional in music. This is when I need this project.
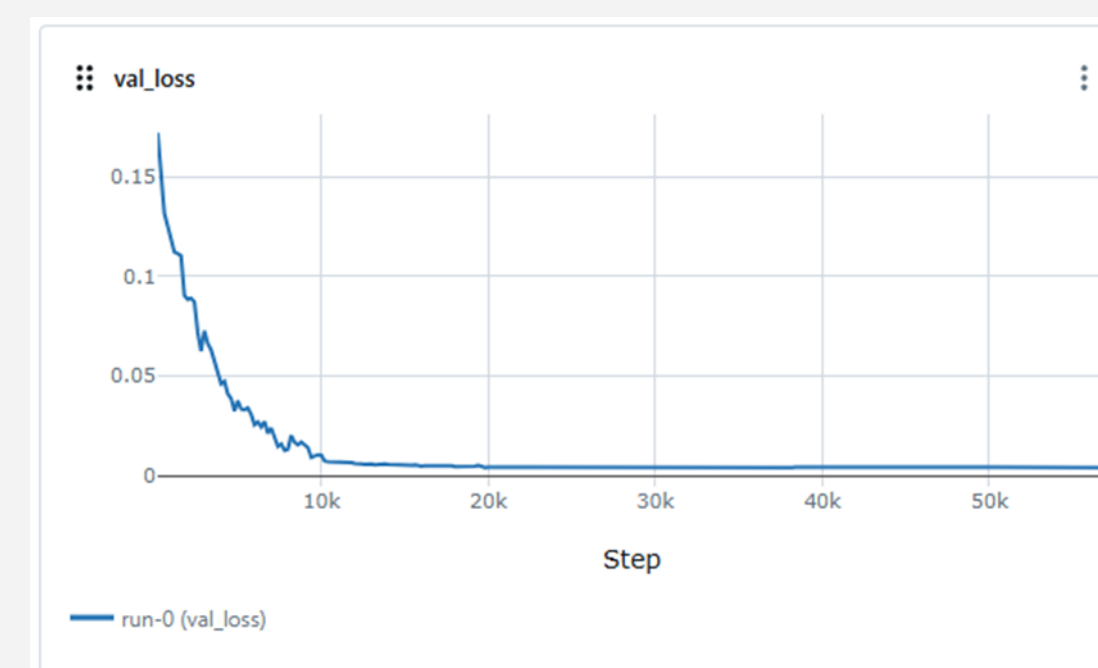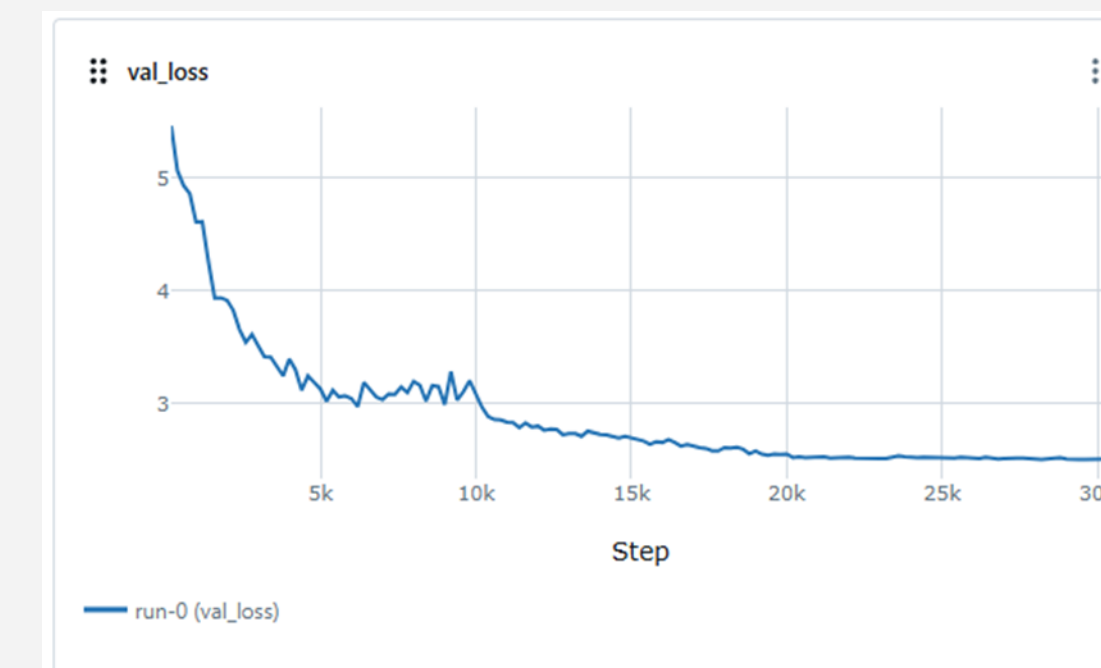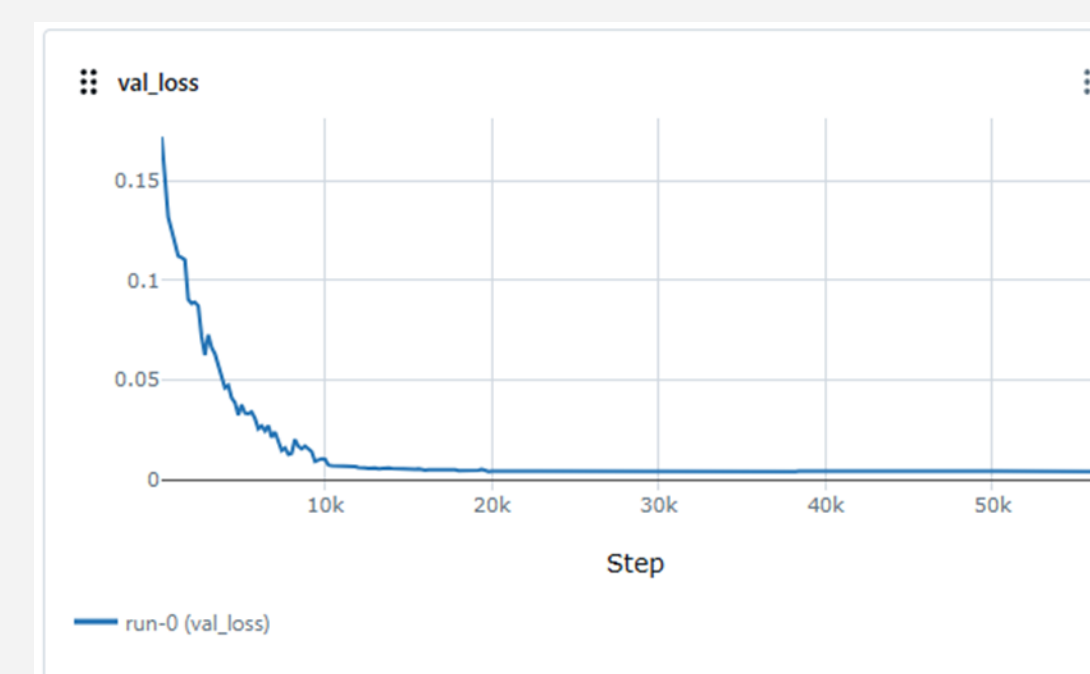
Model Training

Time signature

Key signature

Hand parts

Beat training

Quantisation training

Evaluation Results

	Time sig	Key sig	Hand parts	Beat	Quantisation
Accuracy	0.8966	0.8441	0.9835	0.8977	0.9031
precision	1.0000	0.9019	0.9644	0.8644	0.9500
recall	0.7500	0.9185	0.9631	0.8883	0.9547
F1 score	0.8571	0.8945	0.9638	0.8729	0.9502

Results

Figure 1 Sheet music generated from MIDI that is recorded from live performance

Figure 2 Sheet music after manual adjustment

Figure 3 Predicted Sheet music

References

L. Liu, Q. Kong, V. Morfi, and E. Benetos, "Performance MIDI-to-score conversion by neural beat tracking", in 23rd International Society for Music Information Retrieval Conference (ISMIR), Dec. 2022.