

# tablatar

## automatic guitar tablature transcription

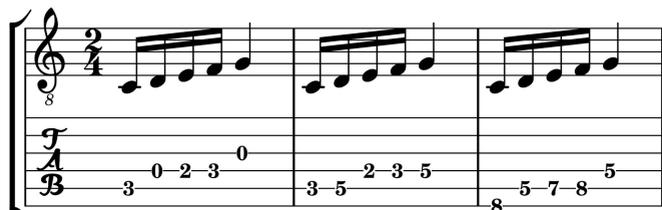
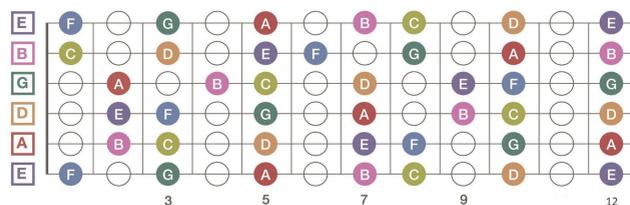
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<https://ke-chan.github.io/tablatar/>

### 1. Background & Motivation

- Guitarists who cannot read sheet music are able to learn music from tablature
- Tablature mimics the guitar's fretboard and denotes which strings and frets to play



### 2. Problems

- Given a monophonic guitar recording, produce an accurate tablature
- The same sets of notes can be played many different ways—generate a tablature with the most “playable” sequence of notes

### 3. Current Methods

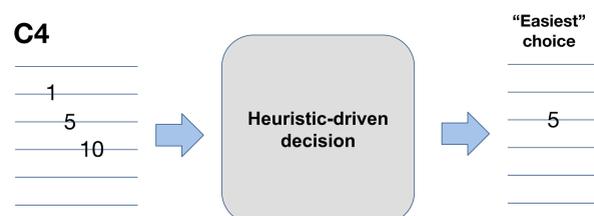
#### Manual transcription

- Time-consuming, with risk of human error
- Requires previous music theory knowledge to create from scratch
- Commercially published or available for free online (e.g. UltimateGuitar<sub>[1]</sub>)

#### Automatic transcription

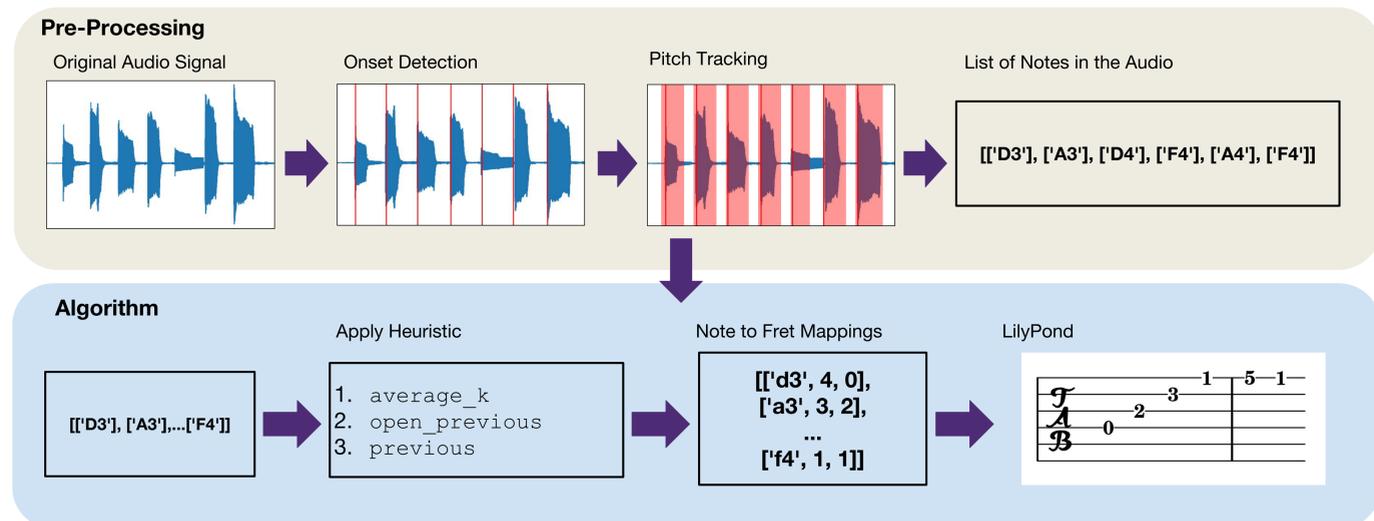
- Websites like Chordify<sub>[2]</sub> allow users to extract the chords of a song, showing users the “backbone” of the song, but not how to play the actual melody

### 4. Approach



We apply one of three heuristics to choose which possible fretting of a note is most playable in the context of the song.

### 5. Methods



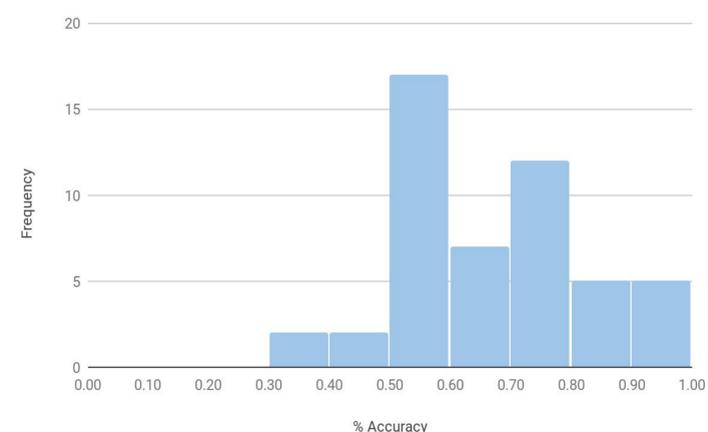
- Chunk notes at 0.5 second difference in onsets to allow players time to move their hand
- Choose fretting of the next note using one of three heuristics:
  - `average_k` = get fretting closest to the average position of the previous `k` frets, while preferring open strings
  - `open_previous` = get fretting closest to previous fret, preferring open strings
  - `previous` = get fretting closest to the previous fret
- Create chunk mappings based on each possible starting position of their first note, and choose the mapping with minimum total distance traveled (excluding open strings)
- Combine mappings from each chunk and generate LilyPond source

### 6. Results & Evaluation

#### Mapping Notes to Frets & “Playability”:

- Tested on a self-recorded dataset of 50 moderate-speed, monophonic melodies performed on a line-in electric guitar
- Measured qualitatively; gave tablature to beginning guitarists
- All results are technically playable, but with varying degrees of difficulty
- Also measured the accuracy of the notes detected from the original recordings

Distribution of % accuracy of mapped notes



### 7. Conclusion, Limitations & Future Work

#### Conclusions

- Our results indicate that onset accuracy is one of the most important factors in generating accurate notes
- There is no good “ground truth” to compare tablature to, as a sequence can be played in multiple ways
  - Subjective measures of evaluation are required
- We found `open_previous` was best on our data set, but `average_k` is preferable for long recordings

#### Limitations

- Accurate onset detection is difficult when relying on pre-existing libraries
- Correctness of result varies with quality and speed of recordings

#### Future Work

- Improve accuracy of onset detection and pitch tracking with machine learning
- Add support for multiphonic and more complex melodies
- Consider the creation of more sophisticated fret-mapping algorithms to model common chord shapes

[1] <https://www.ultimate-guitar.com/>

[2] <https://chordify.net/>