

# Combining multiple pitch tracking algorithms improves estimation accuracy.

## Real-Time Implementation, Comparison, and Combination of Pitch Tracking Algorithms

Janina Reuter<sup>1</sup>, Merikan Koyun<sup>2</sup>, Christoph Daniel Schulze<sup>1</sup>, Reinhard von Hanxleden<sup>1</sup>  
<sup>1</sup>Kiel University, <sup>2</sup>sonoware GmbH

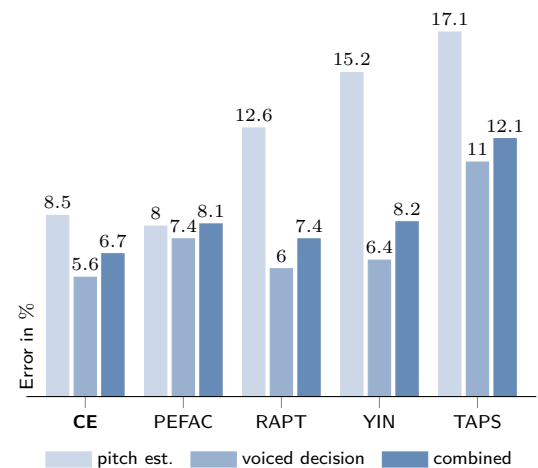
**Previous work.** A variety of pitch tracking algorithms using different methods achieve an error rate of  $\leq 10\%$ .

**The idea.** Construct a simple, yet versatile, combination of insights from existing pitch tracking algorithms to improve error rates further.

**Evaluation** on the pitch tracking database from Graz University of Technology

- pitch estimation (correct if within 5% of reference)
- voiced decision (correct if equal to reference)
- combined: pitch estimation & voiced decision (correct if both are correct)

### Results



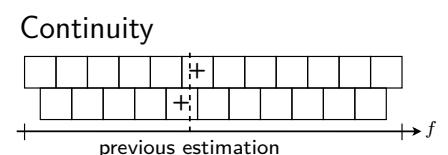
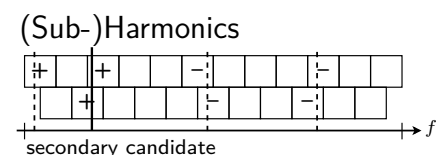
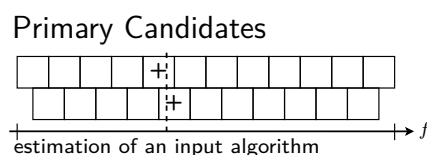
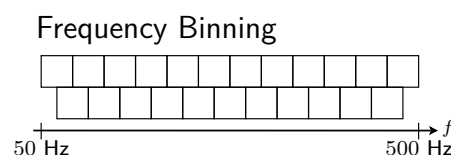
**PEFAC**  
Pitch Estimation Filter with Amplitude Compression

**RAPT**  
Robust Algorithm for Pitch Tracking

**YIN**  
Yin and Yang

**TAPS**  
Temporally Accumulated Peak Spectrum

### Candidates Evaluation (CE)



**Voiced score.** Do algorithms and previous voiced decision exceed threshold?