Ananda Jacobs
ISE 599 Music Cognition
Paper review
February 19, 2004
Pitch Spelling Algorithms by David Meredith

This paper provides a very clear, well explained and justified set of methods to pitch spelling. In a logical comparison and contrast format, Meredith tests three different pitch spelling algorithms. First, however, the author gives an introduction in which he cites the current problems with MIDI-to-notation transcription--that it is unreliable and crude--as well as the problem with audio transcription systems, which he says produce only MIDI-like output, not score formatted notes. Given the reliability of pitch-naming by trained musicians in common practice classical music, there should be a way to use a computer program to extract this information from either audio or MIDI format, and produce a score similar to what a human would produce.

Meredith used the 48 preludes and fugues of the first book of Bach's Well-Tempered Clavier. This seems to be a fairly common practice in the study of music perception. I agree with the justification that it lends itself to pitch relation tonal analysis and is useful in that it provides works in all major and minor keys.

The first algorithm under comparison is Longuet-Higgins's. This algorithm computes a "sharpness" value for each note that is input. From there, intervals are defined as two pitches in relation to each other, and come out either "diatonic," "chromatic," or "diabolic." The method tries to minimize chromatic degrees between each note and the tonic.

The second algorithm is by Cambouropoulos and uses a method of penalties to determine pitch spelling. The algorithm processes overlapping "windows" of music, which it uses to compute all possible spellings of the contained pitches. A given interval is penalized if it occurs less frequently in the major or minor scales. Thus, it chooses the least penalized option.

The third algorithm, Temperley's, uses a set of three "preference rules" to determine the best pitch spelling. The rules should prefer to label notes so that they are close on the circle of fifths; diatonic over chromatic semitones; and what he calls "good harmonic progression," which means that it could be checked accurately by his harmonic analysis program.

Meredith rates the above algorithms by percentage correct spellings. Temperley's had the fewest errors, Cambouropoulos's had the most.

The author presents a new algorithm that works in two parts. First, it computes pitch letter name based on context. (This part of the explanation was not especially clear as to where to initially choose the specified variable F.) Second, it goes back and corrects itself on neighbor/passing tones.

This is good, considering it only uses the onset time and MIDI number, and not duration of the note like some other algorithms. (For instance, Chew's Spiral Array uses duration). Meredith makes an excellent point in his conclusion, that, while his algorithm was able to outperform the others, they should all be run on different styles of music, as one may be more suited than others depending on type.