Further developing a word mark similarity measurement framework – Part II: Defining an improved similarity score

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Introduction

My initial study on mark similarity measurement¹ focused on formulations for quantifying the objective similarity of pairs of marks, with particular focuses on colour- and word marks. As discussed in previous articles in this series, mark similarity assessment is a key part of the resolution of many intellectual property disputes, and a more objective approach could have a number of advantages, including the potential to provide definitions which could be built into case law, offer greater consistency across dispute decisions, and specify thresholds for IP protection.

However, it is important to reiterate the key point that any objective algorithms of these types should only ever be considered as tools to be used as part of the overall assessment process, which overall includes significant degrees of *subjectivity*. In the first instance, the algorithmic frameworks presented in this series for word marks focus only on visual (spelling) and aural (pronunciation – with a specific basis in American English) similarity, with no account taken of conceptual similarity (i.e. meaning) or the influence of any associated logos, imagery or mark stylisation. Overall, dispute decisions are often reliant on an assessment of the *likelihood of confusion* between the marks in question, which is generally also dependent on a range of other factors, including the distinctiveness, degree of overlap of associated goods and services, strength and degree of renown of the marks, documented evidence of actual confusion, and the degree of attention paid by a typical consumer – many of which may vary between different geographical regions^{2,3}. Some of the factors generally considered for the components which can be measured algorithmically (such as typically putting greater weight on comparisons between elements appearing at the start of the marks in question, and greater emphasis on differences appearing within shorter marks⁴) can, and have, been built into the proposed algorithms wherever possible.

The degree of similarity (of each type) between marks is often specified in dispute cases as 'high', 'medium' or 'low'; with this in mind, it seems reasonable (where constructing any measurement algorithm) to formulate the output as a similarity score (as proposed for colour marks in the previous article⁵ in this series), which aligns broadly with this framework but offers a more quantitative basis for comparison (though keeping in mind that all of the above caveats also still apply!).

Formulation of the similarity score algorithm

The similarity score used for comparison of pairs of word marks (S_{wor}) , in both the previous study and this follow up, reflects both visual (spelling) and aural (pronunciation) similarity (only).

As in the initial version, visual similarity between the marks (i.e. in terms of their spelling) is quantified using two distinct algorithms, each of which reflects different aspects of the similarity. The two algorithms (each of which generates a score which can be expressed as a percentage) are:

¹ https://circleid.com/posts/towards-a-quantitative-approach-for-objectively-measuring-the-similarity-ofmarks

² https://bowmanslaw.com/insights/degrees-of-similarity-put-to-the-test/

³ https://www.taylorwessing.com/en/insights-and-events/insights/2021/03/were-confused-how-the-generalcourt-decides-when-trade-marks-are-confusingly-similar

⁴ https://guidelines.euipo.europa.eu/1803468/1787906/trade-mark-guidelines/3-5-conclusion-on-similarity

⁵ 'Further developing a colour mark similarity measurement framework – Part II: Defining a similarity score'

- The fuzz.ratio metric (F_{lev}), an algorithm implemented in the Python package 'fuzzywuzzy'⁶, based on the concept of Levenshtein distance – a way of quantifying the number of edits required to transform one string into the other – but also taking account of other factors (including the length of the strings).
- The Jaro-Winkler similarity algorithm (and score (sim_i)) (as implemented in the the Python package 'Levenshtein'⁷), which includes an element of consideration of the proximity of the matching / non-matching characters to the *start* of the strings.

In the simplest formulation of the overall algorithm (and as retained here), the score component reflecting overall visual similarity (S_{vis}) is expressed just as the simple mean of the above two scores (as below), although it would be possible to apply different weightings if required.

$$
S_{vis} = (F_{lev} + sim_j) / 2
$$

For *aural* similarity, the proposed calculation framework is based on the creation of a phonetic representation of the marks / strings in question, and then a comparison of these representations (again, using the fuzz.ratio metric).

The initial formulation also made use of two distinct algorithms for generating the phonetic representations, based on the Soundex and NYSIIS (New York State Identification and Intelligence System) encodings. However, both of these have certain shortcomings, not least the poor handling of vowel sounds within the strings, and (in Soundex) the inability to encode any consonants beyond the first four.

In this improved version, therefore, I instead propose the use of the *Phonemizer* algorithm^{8,9} for generating the phonetic versions of the strings, which utilises IPA (International Phonetic Alphabet)¹⁰ encoding, and which was explored in the previous follow-up study¹¹ and appears to perform well (although some data 'cleansing' is required in some cases, to ensure that the algorithm interprets the string as intended). The aural similarity score (S_{our}) can then be calculated simply as the output of the *fuzz.ratio* metric applied to the IPA representations as given by *Phonemizer*, i.e.:

$$
S_{\textit{aur}} = F_{\textit{Pho}}
$$

As in the previous formulation, the overall (word mark) similarity score can then most simply be expressed just as the mean of the two individual components, i.e.:

$$
S_{wor} = (S_{vis} + S_{aur}) / 2
$$

Similarity scores for test-pairs of marks

As an illustration of the performance of this algorithm, I consider a set of approximately 200 pairs of word marks, mostly the subjects of recent trademark disputes (several of which were also considered in previous articles in this series), and with a primary focus on single-word marks (for

⁶ https://pypi.org/project/fuzzywuzzy/

⁷ https://rapidfuzz.github.io/Levenshtein/levenshtein.html#jaro-winkler

⁸ M. Bernard and H. Titeux (2021). 'Phonemizer: Text to Phones Transcription for Multiple Languages in Python', J. Open Source Software, 6(68), p.3958.

⁹ https://pypi.org/project/phonemizer/

¹⁰ https://www.internationalphoneticassociation.org/content/ipa-chart

¹¹ https://circleid.com/posts/further-developing-a-word-mark-similarity-measurement-framework

simplicity). The full set of mark-pairs, and the calculated similarity scores, are presented in Appendix A.

The first point to note is that, generally, little pre-processing of the data is required in order to utilise the algorithm. All marks have been converted to lower-case, though this is generally a matter of choice, just to ensure that upper- and lower-case versions of the same letter are treated identically. The algorithms do also appear to correctly handle accented characters (albeit that the phonetic representations will generally reflect an *English* pronunciation). The only two modifications to the data required in these cases were a rewriting of 'OrangeryOS' as 'orangery-o-s' (to ensure that the pronunciation is rendered as 'oh-es') and (as in a previous study) of 'likeme' to 'like-me'.

Elsewhere (as noted previously), the Phonemizer algorithm renders 'unreadable' strings as individual characters (e.g. 'immun44' as 'immun-four-four', '007' as 'zero-zero-seven', 'ch_t.' as 'see-aitch-tee', and 'mbfw' as 'em-bee-ef-doubleyu'), though these versions have been retained in an unmodified state in the analysis. Some of these representations may not be as originally intended when the marks were conceived, however $-e.g.$ 'genv3rse' is rendered as 'genv-three-rse' (rather than the more likely 'genverse'), and 'm4tter' as 'em-four-tter' (rather than 'matter').

Overall, however, the algorithm does seem to provide a (subjectively) reasonable ranking of the mark-pairs by similarity. An attractive additional characteristic of this framework is that it is entirely repeatable, and unreliant on the number and types of pairs in the dataset (i.e. a particular word-pair will *always* give the same score), so it is always possible to compare like-with-like. Accordingly, it is instructive to consider some representative examples of word-pairs giving particular (approximate) scores (S_{wor}), to provide a 'reckoner' of what the scores represent, i.e.:

- Approx. 90%:
	- o boss / bossi
	- o billionaire / zillionaire
	- o thermacare / thermocare
	- o prinker / prink
	- o intellicare / intelecare
	- o chooey / chooee
	- o mahendra / mahindra
- Approx. 80%:
	- o zara / zarzar
	- o rabe / rase
	- o retaron / retlron
	- o createme / create.
	- o spa / spato
	- o thermomix / termomatrix
- Approx. 70%:
	- o kelio / kleeo
	- o terry / terrissa
	- o tygrys / tigris
	- o nike / nuke
- Approx. 60%:
	- o nutella / mixitella
	- o airbnb / francebnb
- o gallo / rampingallo
- o iphone / mifon
- o joy / bjoie
- o jd / jdyaoying
- Approx. 50%:
	- o zara / zorazone
	- o quirón / quiromasté
- Approx. 40%:
	- o book / restaubook
	- o h10 / motel 10

An additional attractive aspect of this approach is that it is also possible, if required, to consider the visual and aural similarity components separately. For example, the top pairs of marks by visual similarity score (S_{vis}) (only) are fashiongo / fashionego (96.50%), configon / configo (95.25%) and casoria / castoria (95.04%), and by aural similarity score (S_{our}) (only) are sanytol / sanitol, testex / test-x, hobbit / hobbyt , kramer / cramer, kresco / cresco, and cylance / sylence (all 100%, i.e. deemed phonetically identical).

Discussion

Overall, (and again as noted previously) it would not be reasonable to expect any significant correlation between the similarity scores and the findings reached in the associated disputes, because of the significant additional (and subjective) points considered in the analysis, as discussed in the introduction to this article. For example, in the Initio / Vinicio case, the marks were found to have 'below average' visual similarity (despite the quantitative objective visual similarity score of 80.96%), with consideration having been given in the case to the differing impact of the various elements and the overall impression of the respective marks, which feature significant differences in visual presentation¹².

Nevertheless, the similarity score does offer a useful tool to consider the 'pure' visual and aural similarity (only) of the word marks, as part of an overall analysis (for example, in dispute cases), in a framework which is repeatable and qualitative, providing the potential for a consistent approach to assessment of these characteristics. It also aligns with the familiar terminological descriptions of 'degrees' of similarity, whilst offering a more granular and continuous scale.

The algorithm does also offer additional possible use-cases, such as (for example) the ability to postprocess the outputs from trademark watching services, so as to better sort the results by relevance (in cases where the sorting algorithm offered by the service performs less satisfactorily), and thereby aid in the review process.

It is also worth noting that there is also scope for possible future enhancements to the algorithms (some of which have been discussed previously), including (for example) assessments of the distinctiveness of the various elements or sub-elements (subsequences or substrings) of the marks, re-weighting the contribution of any trailing 's', and so on. Distinctiveness and analysis of the 'types' of elements present in the marks may, in particular, be key to making a more meaningful overall assessment of similarity and, ultimately, likelihood of confusion. Relevant examples for consideration in the dataset include Cylance / Sylence (both 'clearly' allusions to the same common

¹² Stobbs CaseFest #16, London, 02-Oct-2024

word ('silence')), Doctolib / Avocatlib (where the first portion of each mark makes reference to a profession), BMW / BMV (where the only difference is manifested as a pair of 'similar' letters), Immun44 / Immuno-19 (both featuring a similar root and, unusually, followed specifically by a number), iPhone / Mifon (with the similarity between 'I' and 'me' being of potential relevance), and Align / Clickalign (relevant because of the range of additional names cited by the latter party, suggesting the key point is the question of the distinctiveness of the term 'align' for the relevant goods and services).

Appendix A: Pairs of marks and their visual, aural and overall similarity scores

