![PeacockData logo]

WHAT IS FUZZY LOGIC?

pdNickname Pro, **pdGender Pro,** and **pdSurname Pro** are fully compatible with fuzzy logic. This technology allows matching name data that has typographical errors or utilizes stylized spelling methods. The following illustrates the fuzzy logic technology. Further information specific for these packages can be found in the product user documentation.

TYPOGRAPHICAL ERRORS

The fuzzy logic technology in the **Pro** editions of this software allows matching data that has typographical errors. If users look at the fuzzy logic records, they are likely to see errors they have repeatedly made or seen. In many cases you will have to look close to see the difference, but they are different.

The following are examples of fuzzy logic based on common typographical errors taken from our **pdNickname Pro** and **pdGender Pro** software:

	Fuzzy name	Real name	Notes
Example 1	ALL	AL	the "L" is repeated
Example 2	ROCO	ROCCO	the second "C" is left out
Example 3	CHRISTOFER	CHRISTOPHER	the "PH" digraph is phonetically transcribed as "F"
Example 4	SOHPIA	SOPHIA	the "PH" digraph is reversed
Example 5	MARGRAET	MARGARET	the second "AR" digraph is reversed

The most likely typographical errors are determined based on the number of letters, the characters involved, where they are located in the name, the language, and other factors. None of the fuzzy spellings formulate a real name already in the database. This sometimes happens when the fuzzy spelling was already a real variation of the same name.

HOW FUZZY LOGIC WORKS

The latest version of our fuzzy logic technology was built for our **pdSurname** product. Any enhancements over earlier technology will be available to all our **Pro** edition name software users (including **pdNickname Pro** and **pdGender Pro**) as free updates.

The biggest enhancement in our technology is in its ability to work with language rules other than English and Spanish. This is important for a last name database which tends to have more ethnic variety than first names and nicknames. The examples below are taken from our **pdSurname Pro** software.

The fuzzy logic algorithms have five layers:

PHONETIC MISSPELLINGS

These algorithms look at digraphs, trigraphs, tetragraphs, pentagraphs, hexagraphs, and even a German heptagraph, "SCHTSCH", used to translate Russian words with the "SHCHA" or "SHCH" (romanticized) sound. These are, respectively, two to seven letter sequences that form one phoneme or distinct sound. Most of letter sequences trigraph and above are Irish who have more language rules than you can shake a stick at.

Many misspellings occur as transcribers enter the sounds they hear. The character sequences and the sounds they produce are different for each language and situation, such as before, after, or between certain vowels and consonants, so our substitutions are language-rule based. Furthermore, our algorithms consider both how a name may sound to someone who speaks English as well as how it may sound to someone who speaks Spanish, which is often different. Take the digraph "SC". Before the vowels "E" or "I" it is most likely to be misspelled by an English speaker as "SHE" or "SHI" while a Spanish speaker may hear "CHE" or "CHI" and sometimes "YE" or "YI". Our library includes over 80,000 language-based letter sequence phonetic rules. Phonetic misspelling examples:

	Fuzzy name	Real name
Example 6	ALLANO	AGLIANO
Example 7	GUALTIEREZ	GUALTIERREZ
Example 8	HEATHFALD	HEATHFIELD
Example 9	OUGHGARD	AAGARD
Example 10	YONGMAN	YOUNGMAN

REVERSED DIGRAPHS

These algorithms look for misspellings due to reversed digraphs (two letter sequences that form one phoneme or distinct sound) which are a common typographical issue, such as "IE" substituted for "EI". The character sequences and the sounds they produce are different for each language and situation, such as before, after, or between certain vowels and consonants, so our substitutions are language-rule based. Reversed digraph examples:

	Fuzzy name	Real name
Example 11	ANLGES	ANGLES
Example 12	DEILEMAN	DIELEMAN
Example 13	OLAERY	OLEARY
Example 14	RODREUGEZ	RODREGUEZ
Example 15	SCHUMAHCER	SCHUMACHER

DOUBLE-LETTER MISSPELLINGS

These algorithms look for misspellings due to double letters typed as single letters and single letters that are doubled. The most common typographical issues occur with the characters, in order of frequency, "SS", "EE", "TT", "FF", "LL", "MM", and "OO". Double-letter misspelling examples:

	Fuzzy name	Real name
Example 16	HUMBEER	HUMBER
Example 17	ZWOLE	ZWOLLE

MISSED LETTERS

These algorithms look for missed keystrokes and provide fuzzy logic matches with missing letters. Unlike the other algorithms, these are not language specific. Keystrokes can be missed in any language. Missed letter examples:

	Fuzzy name	Real name
Example 18	UNTER	HUNTER
Example 19	TAMRON	TAMERON

STRING MANIPULATIONS

Because so many of our algorithms are language-rule bases, additional name string manipulations are provided for the relatively small number of names without language applied. Most of these are similar to the reversed digraph substitutions. String manipulation examples:

	Fuzzy name	**Real name**
Example 20	ELWROTHY	ELWORTHY
Example 21	POEPLE	PEOPLE

STYLIZED SPELLINGS

Some problems with matching names are not related to typographical errors but the stylization of the name with hyphens, apostrophes, spaces, and special characters (ASCII values 128 to 255) such as "Á" (A-acute), "Ö" (O-umlaut), and "Ñ" (N-tilde).

The following are examples of fuzzy logic based on stylized spellings taken from our **pdNickname Pro** and **pdGender Pro** software. Special characters are also handled by both **pdSurname Pro** and **pdSurname Standard**. The technology will be added free to the standard edition of the first name software in the next updates. Examples are as follow:

	Stylized	**Not stylized**	**Notes**
Example 22	BJÖRK	BJORK	spelled with O-regular instead of O-umlaut
Example 23	NICOLÁS	NICOLAS	spelled with A-regular instead of A-acute
Example 24	'ASHTORET	ASHTORET	spelled without an apostrophe prefix
Example 25	ABD-AL-HAMID	ABDALHAMID	spelled without hyphens delimiting the name parts
Example 26	JUAN MARÍA	JUANMARIA	spelled without the space between the two parts and with I-regular instead of I-acute

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