

Viewing Closest Relatives in the My Relatives View of FamilySearch Family Tree

Ben Baker
bakerb@familysearch.org
FamilySearch

Joel Thornton
thorntonjn@familysearch.org
FamilySearch

ABSTRACT

FamilySearch Family Tree currently has several views that support showing persons and their relatives in a variety of ways. Fairly recently, indicator icons in the descendency view and a forthcoming landscape pedigree view make it easier for patrons to know which tasks should be done on their relatives and to view persons beyond direct ancestors. However, a major limitation of the current views of Family Tree is that they require browsing to the proper location to view certain people and any indicators to assist users in knowing what to do. A more effective method is to provide a mechanism for users to more easily see their portion of the Family Tree and provide a systematic order in which to perform work on their own relatives.

For example, it is relatively easy now with the descendency view to view all of the grandchildren of a single particular direct ancestor. However, there is no view that will show all of the grandchildren (or even children) of all of a user's 2nd great grandparents. Many users, particularly those with well-developed trees, when logging into the system first ask themselves "What am I supposed to do?" Currently the best answer is to browse around the various views looking for indications of work to do and to do it. There is no systematic way of working through your relatives to ensure work is completed such as attaching sources, adding missing persons, fixing data problems, completing LDS temple work and so forth.

Previous work over the past couple of years to develop the *Weighted Relationship Distance (WRD)* metric supports ordering relatives of a user by closeness. This metric enables a new view in Family Tree called the My Relatives view where a list of the relatives of a user can be listed, sorted by closeness to the user.

This data is obtained by augmenting the current Scope of Interest with weighted relationship distance data to provide a sorted list by closeness of all relatives currently in a patron's Scope of Interest. Shorter lists of the top few persons matching a particular characteristic may also be useful in other places such as the logged in home page.

1. INTRODUCTION

1.1 Previous Work

In previous work by the primary author, a *Weighted Relationship Distance (WRD)* metric was introduced as a unified method to compute relationship distance for related persons connected through direct, collateral and spousal lines based on closeness of relation. [1]

This metric is defined as a function of four distances (g , c , m , and p) from a base person in a connected family tree graph, each with an associated weighting factor (α , β , γ and δ).

These distances and weighting factors are defined as follows:

- g – Generational or “vertical” distance
Number of generations from base person
- c – Collateral or “horizontal” distance
Minimum generations to a closest common ancestor
- m – Marriage distance
Number of marriages between base person
- p – Positive sign changes for generational distance
Number of sign changes from negative to positive for g

α , β , γ , δ – Weighting factors to control growth rates

Feedback from others using the metric led to the addition of the p parameter and δ weighting factor from the originally published metric. This covers the scenario when the parents of a relative with a -1 generational distance should not be closer to the user than the previous person. An example would be the parents of the son-in-law of the base person.

These distance and weighting factors are applied in Equation (1) below to compute the weighted relationship distance between two persons.

$$WRD(g, c, m, p) = \alpha(|g| + 1)e^{\beta c}e^{\gamma m}e^{\delta p} \quad (1)$$

1.2 Other Approaches

At the 2014 Family History Technology Workshop, the primary author pursued an Apache Cassandra based prototype implementation of FamilySearch Family Tree data in order to more quickly traverse relationship graphs in order to return hundreds of closest relatives. [2]

A research project is also being done at FamilySearch to use a WebGraph database implementation to very quickly retrieve relationship paths between persons. [3] Preliminary integration of the new relationship viewer described in section 2.5 of this paper with this implementation has been done to demonstrate this work.

Both of these approaches hold promise to provide a scalable and performant solution to return a sorted list of closest relatives. However, instead of waiting for these solutions to mature sufficiently for production use, the authors chose to augment the

existing Scope of Interest service to provide value to users of FamilySearch Family Tree now.

The Find-a-Record Research Assistant also uses a similar mechanism as the My Relatives view described in this paper to show various research opportunities for relatives in a sorted order. [4] It uses the fs-traversal library to employ a modified WRD metric to perform this sorting. [5] This product helps users to work on their relatives in a systematic way according to closeness, but doesn't list hundreds of the closest relatives in a single view.

Other products such as the Puzzilla descendant viewer work similarly to the descendency view in FamilySearch Family Tree. [6] They can help users with well-developed trees find work to do, but it requires users to browse to certain locations to find this work and also doesn't show relatives across multiple lines.

1.3 Scope of Interest

FamilySearch has been using a service to maintain some of the closest relatives to the logged in user for some time. The output of this service is called the Scope of Interest (SOI).

Currently the Scope of Interest is defined as all of the direct relatives of the user four generations above the user (i.e. 2nd Great Grandparents), all of the spouses and children of these direct ancestors and the spouses of the children of these direct ancestors. For users with well-developed trees, this typically contains several hundred relatives.

The Scope of Interest is currently used to display relationship path graphs for persons in the Memories and LDS Temple Opportunities sections on familysearch.org. FamilySearch Family Tree also recently added the ability to view relationship path graphs to persons within the Scope of Interest.

Even though the Scope of Interest has been a part of FamilySearch products for some time, there is no way for users to view all of the

persons in their Scope of Interest. The My Relatives view described in this paper fulfills this purpose and also adds a great deal more functionality when viewing persons within the Scope of Interest.

1.4 Existing Relationship Viewer

A relationship viewer has already been developed at FamilySearch to show how two persons are related. This viewer has been in place for some time in the Memories and LDS Temple Opportunities areas. This viewer utilizes the Scope of Interest to show relationships of the user to persons in the tree.

The relationship viewer used in the Memories and LDS Temple Opportunities sections of familysearch.org has several deficiencies including:

- It only supports the default Scope of Interest
- It cannot display additional more distant relations
- It doesn't display person ids nor links to view persons along the relationship path
- It uses fixed size and position for graph elements

2. PROTOTYPE SYSTEM

Unlike relationship calculators that simply show the relationship between persons, the My Relatives view shows all of the closest relatives for a user. Relatives are sorted by closeness to the user using the WRD metric, enabling users to work with their closest relatives in meaningful ways.

The My Relatives view also doesn't require browsing around a pedigree or descendant view to find relatives. It also provides grouping similar relatives together, descriptions to aid the user in understanding where the relative fits into their family and a relationship viewer to view the entire relationship path to a person.

NAME	CLOSENESS	RELATIONSHIP	INDICATORS	WATCHES
Fred William Peacocke 1909-1988 · KJWQ-B53	● ● ● ○ ○	Uncle Husband of Aunt Iris Annette Thornton (KWZS-GCJ) Brother-in-law of Father Theodore Neil Thornton (KWHH-G2B) Son-in-law of Grandfather Thomas Jasper Thornton (KWZM-595)		☆ Watch
John Merlin Curl 1917-1982 · L7NN-NWM	● ● ● ○ ○	Uncle Husband of Aunt Sunbeam Thornton (LV94-GH5) Brother-in-law of Father Theodore Neil Thornton (KWHH-G2B) Son-in-law of Grandfather Thomas Jasper Thornton (KWZM-595)		☆ Watch
Frank Richard Heaton 1923-1990 · KWZ9-4GZ	● ● ● ○ ○	Uncle Husband of Aunt Sunbeam Thornton (LV94-GH5) Brother-in-law of Father Theodore Neil Thornton (KWHH-G2B) Son-in-law of Grandfather Thomas Jasper Thornton (KWZM-595)		☆ Watch
Lyle Mower Deceased · LV92-BN2	● ● ● ○ ○	Uncle Husband of Aunt Sunbeam Thornton (LV94-GH5) Brother-in-law of Father Theodore Neil Thornton (KWHH-G2B) Son-in-law of Grandfather Thomas Jasper Thornton (KWZM-595)		☆ Watch
Zoe Ann Smith 1930-1995 · KW89-JFM	● ● ● ○ ○	Aunt Wife of Uncle Fred Warren Thornton (KW89-JFS) Sister-in-law of Father Theodore Neil Thornton (KWHH-G2B) Daughter-in-law of Grandfather Thomas Jasper Thornton (KWZM-595)		☆ Watch
Phyllis Deon McCafferty 1920-2002 · KWCK-1ZW	● ● ● ○ ○	Aunt Wife of Uncle Robert Edgar Nelson (KWCK-1Z7) Sister-in-law of UNKNOWN (slotid=3) Daughter-in-law of Grandfather Edgar Lyman Nelson (KWCX-995)		☆ Watch
Dorothy Virginia Tresenriter 1915 Deceased · L4TM-BN6	● ● ● ○ ○	Aunt Wife of Uncle Burton Jasper Thornton (KWJX-KX2) Sister-in-law of Father Theodore Neil Thornton (KWHH-G2B)		☆ Watch

Figure 1 - The My Relatives View

2.1 Augmenting the Scope of Interest

The scope service does not return enough information to support full-featured sorting of relatives by closeness desired for the My Relatives view. For direct relatives, the slotId field corresponds to the Ahnentafel or Kekulé number for that person. Relatives on collateral lines and through marriages use the slotId, anchorPersonId and relationshipToAnchor fields to indicate relation to the user.

Below is sample JSON returned from the scope service. Persons returned from the scope service are currently not sorted in any manner.

```
{
  "persons": [
    {
      "id": "KWCN-4QX",
      "name": "Mahonri Moriancumer Tolman",
      "lifespan": "1889-1931",
      "slotInfo": {
        "slotId": -1,
        "anchorPersonId": "KWCZ-QGV",
        "relationshipToAnchor": -1
      }
    },
    ...
  ],
  "lastAccessedTime": 1423277332001,
  "createdTime": 1423275473671
}
```

Each person returned from the scope service is augmented with an anchorPersonSlotId field, weightedRelationshipDistance object and description object as shown in the following example:

```
{
  "persons": [
    {
      id: "KWCN-4QX"
      name: "Mahonri Moriancumer Tolman"
      lifespan: "1889-1931"
      gender: "MALE"
      slotInfo: {
        slotId: -1
        anchorPersonId: "KWCZ-QGV"
        anchorPersonSlotId: 26
        relationshipToAnchor: -1
      }
      weightedRelationshipDistance: {
        generationDistance: 3
        collateralDistance: 1
        marriageDistance: 0
        weightedRelationshipDistance: 10.87312731383618
        starRanking: 7
        simpleRelationshipDistance: 4
      }
    }
  ]
}
```

```
description: {
  relativeDescription: "2nd Great Uncle | Son of 2nd
    Great Grandfather Jaren Tolman (KWCZ-QGV) |
    Brother of Great Grandmother Hattie Naomi
    Tolman (KWCF-RKK)"
  alternateDescriptions: [
    "Son of 2nd Great Grandfather Jaren Tolman (KWCZ-
    QGV)"
    "Brother of Great Grandmother Hattie Naomi Tolman
    (KWCF-RKK)"
  ]
}
...
],
"lastAccessedTime": 1423277332001,
"createdTime": 1423275473671
}
```

The weightedRelationshipDistance object contains information about how close the person is related to the base person. The starRanking simplifies weighted relationship distance values to a scale of 0-10 where 10 is a very close relation and 0 a distant relation. Simple relationship distance is the sum of the absolute value of the three distances (generation, collateral and marriage) and the weightedRelationshipDistance is the value computed according to Equation (1).

The relative description is a natural text description of how the person is related to the base person. These descriptions can relatively easily be determined from the gender, distances and relatives of the person. The authors expect these descriptions to be used throughout familysearch.org in the future to help users better understand their relation to persons in the tree.

2.2 Sorting the Modified Scope of Interest

The modified Scope of Interest is then sorted by descending WRD values first. This results in all relatives of the same relation being placed together with the closest relatives first.

Even though the persons shown on the My Relatives view have been sorted by decreasing WRD values, many persons share the same distance to the logged in user. To increase the utility and ease of understanding of the view, persons with the same WRD value also have a sort order.

For direct ancestors, the slot id is used to sort them by Ahnentafel or Kekulé number. Collateral relatives are sorted by anchor person slot id which results in families being grouped together. Children within the same family are sorted by lifespan so they appear in birth order assuming births have been recorded.

The resulting sorted list enhances a user's ability to focus on relatives in a systematic way according to a priority order. It also helps add context to the tabular format of the My Relatives view to aid users in understanding how each of the persons is related to

them and others in their tree. More sophisticated views showing family groupings may also be implemented in the future.

2.3 Relative Descriptions

Another aspect of relationship calculations which the authors believe could be improved is the descriptions of the relationship. Most people understand terms for direct line relatives such as grandfather and 3rd great grandmother. As relationships get more distant, however, few users without genealogical training readily understand terms such as 2nd great uncle or 2nd cousin 1 time removed.

In the prototype My Relatives view, the authors chose to display multiple relationship descriptions to aid users with context of how each person is related to them. The authors believe more study could be done on this topic to determine which strings are most beneficial to users and how best to present them. A prevailing thought at the moment is that defining the relationship in terms of the closest direct ancestor to the user may be the best description.

For example, a great uncle by marriage can be described in additional ways such as:

- Husband to your great aunt
- Brother-in-law of your grandfather
- Son-in-law of your great grandfather

2.4 Currently Implemented Features

The currently implemented features of the My Relatives view include:

- Basic information for each person – name, lifespan and person id
- Each person’s name is a link that brings up a person card, supporting viewing that person as the base person in a tree view or their person details page
- Star ranking of how closely each person is related to the logged in user
- Descriptions of how the current user is related to the person
- The relationship descriptions are links that bring up a new dialog showing the relationship path from the user
- LDS temple icons indicating when LDS temple ordinances have not yet been completed on behalf of this person. This facilitates LDS temple work for closest relatives first and sharing more distantly related people with others.
- Record hint indicator icons identifying when pending record hints have not yet been attached as sources to each relative
- Watch indicators showing which persons are being watched and allowing the user to watch/unwatch their closest relatives
- A filter text box, support filtering on any text on the screen similar to watch list and reservation list

2.5 New Relationship Viewer

In order to overcome the deficiencies of the existing relationship viewer, a new relationship viewer has also been implemented. This viewer is already in production user to view relationship to

persons within the Scope of Interest and has been used to demonstrate the capabilities of the WebGraph database prototype of Family Tree data. [3]

The key features of this new relationship viewer are:

- It can handle any combination and number of parents, children and spouses
- It supports zooming and dragging of the relationship path
- It uses SVG images for icons and text, allowing crisp presentation at all zoom levels
- It shows person IDs and provides direct links to all persons in the relationship path

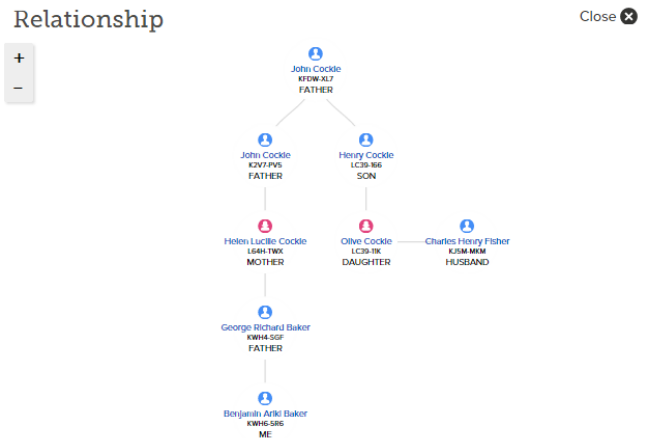


Figure 2 - New Relationship Viewer Example

3. CONCLUSION AND FUTURE WORK

The prototype My Relatives view described in this paper begins to demonstrate capabilities that enable new and powerful ways of interacting with the closest relatives of a user within FamilySearch Family Tree. This work has shown a straightforward method to view the closest relatives of a person all at once in a table. Indicators to highlight areas the user can perform work make it a view with much more utility and relevance than traditional views that require browsing to find work to do. Relative descriptions provide additional context for how the user is related to each person.

Additional features have already been planned to add to this view in the future. A composition showing what these features may look like is show in Figure 3. These ideas include the following:

- Add research suggestion and data problem indicator icons
- Support sorting by the columns in the view and secondary sorting with two columns in tandem
- Control display of relatives down to a particular distance so fewer persons are loaded on the first page of relatives
- Highlight new data problem when more than one biological parent occupies the same slot (i.e. two mothers)

- Point out missing end of line direct ancestors and provide a link to help search for records
- Gamify by "unlocking" larger scope when indicator icons are cleaned off (or meet some threshold of cleanliness) to motivate people to clean up data to grow their My Relatives list
- Support other methods for increasing and retaining a larger Scope of Interest
- Modify the Scope of Interest to return more closely related persons before more distantly related relatives through marriages
- Localization of natural text relative descriptions
- Display thumbnail photos of persons if they are available
- Color code relatives in the list according to direct ancestors, blood relatives and relatives through marriage
- Use a drop down from the Find tab similar to the history list to allow searching within My Relatives
- Add a radio button to toggle view of direct ancestors only, all blood relatives and all my relatives
- Provide a way to only view ancestors, descendants and path to me for any given person in the list
- Pointing out relatives who have been identified as prominent or have participated in significant events
- Add "Help" checkboxes to find top 5 people who need LDS temple ordinances, have pending record hints, have research suggestions, etc.
- Add sorting of persons by closeness and viewing relationships in other views such as memories, watched persons and LDS temple reservation lists

- Promoting e-mail campaigns to point out what others have added to your relatives such as new photos, sources, stories, etc. to draw users back to the site

4. REFERENCES

- [1] Beyond the Relationship Calculator – Using a Weighted Relationship Distance Metric to Prioritize, Categorize and Visualize Relatives. **Ben Baker**. 2013 Family History Technology Workshop. <http://fhtw.byu.edu/static/conf/2013/baker-beyond-fhtw2013.pdf> [Accessed Feb 2015]
- [2] Retrieving a Sorted List of Hundreds of Closest Relatives from FamilySearch Family Tree in Seconds. **Ben Baker**. 2014 Family History Technology Workshop. <http://fhtw.byu.edu/static/conf/2014/baker-retrieving-fhtw2014.pdf> [Accessed Feb 2015]
- [3] WebGraph - An In-Memory Graph Database for Fast Relationship Traversals. **Randall Johnson**. SORT Conference 2014.
- [4] Find-A-Record Research Assistant <https://www.findarecord.com> [Accessed Feb 2015]
- [5] fs-traversal – A JavaScript traversal framework for the FamilySearch Family Tree using the visitor pattern <https://github.com/genealogysystems/fs-traversal> [Accessed Feb 2015]
- [6] Puzzilla Descendant Viewer <https://puzzilla.org> [Accessed Feb 2015]

The screenshot shows the 'My Relatives' section of a family history website. At the top, there are tabs for 'PEOPLE I'M WATCHING' (126), 'CHANGES TO PEOPLE I'M WATCHING', and 'MY RELATIVES' (286). Below the tabs is a filter input field. The main content is a table with columns: NAME, CLOSENESS, RELATIONSHIP, INDICATORS, and WATCHES. The table lists 28 relatives, including Jaren Tolman, Emma Briggs, Edward Priest, Mary Bous, William Willis Young, Missing Ancestor Search Records, Ethel May Baker, Charles Edward Baker, Margaret Frances Baker, Kenneth Lyle Baker, Marie Evelyn Baker, Frank Wayne Baker, Thomas Adam Rentfrow, Jane P. Hughes, Edward Julius Bergen, Lester Cockle, Paul Cockle, Clarence Worden Cockle, Elmer Richmond Cockle, William Earl Cockle, and Sarah Mildred Cockle. Each row shows a closeness score (e.g., 5 dots), a relationship (e.g., 2nd Great Grandfather), and various indicator icons (e.g., missing records, research suggestions). The 'WATCHES' column shows 'Unwatch' or 'Watch' buttons.

NAME	CLOSENESS	RELATIONSHIP	INDICATORS	WATCHES
Jaren Tolman 1853-1912 · KWCZ-QGV	●●●●●	2nd Great Grandfather		★ Unwatch
Emma Briggs 1856-1895 · KWNR-DJQ	●●●●●	2nd Great Grandmother		☆ Watch
Edward Priest 1855-1926 · 2H2Q-G8X	●●●●●	2nd Great Grandfather	📄	★ Unwatch
Mary Bous 1851-1936 · KW8V-W8N	●●●●●	2nd Great Grandmother		★ Unwatch
William Willis Young 1852-1917 · KWNN-63G	●●●●●	2nd Great Grandfather	📄 📄 📄 📄 📄	★ Unwatch
Missing Ancestor Search Records	●●●●●	2nd Great Grandmother	📄	★ Unwatch
Ethel May Baker 1922-1922 · LZRX-T3R	●●●●●	Aunt		★ Unwatch
Charles Edward Baker 1925-1999 · KCCY-FKP	●●●●●	Uncle		★ Unwatch
Margaret Frances Baker 1929-1993 · KH0N-WXG	●●●●●	Aunt	📄	★ Unwatch
Kenneth Lyle Baker 1933-1936 · K895-VWJ	●●●●●	Uncle		★ Unwatch
Marie Evelyn Baker 1935-1980 · KHFG-XG4	●●●●●	Aunt		★ Unwatch
Frank Wayne Baker 1939-2007 · 9KGB-Q3N	●●●●●	Uncle		★ Unwatch
Thomas Adam Rentfrow 1880-1963 · KFN-67L	●●●●●	Husband of Grandmother Helen Lucille Cockle (L64H-TWX)		★ Unwatch
Jane P. Hughes 1865-1954 · LH3Q-5Z3	●●●●●	Wife of Great Grandfather John Cockle (K2V7-PV5)		☆ Watch
Edward Julius Bergen 1860-1937 · KC4Y-TWM	●●●●●	Husband of Great Grandmother Ella Amanda May (KN6B-VNF)		★ Unwatch
Lester Cockle 1882-1887 · MM8G-17W	●●●●●	Great Uncle	📄	★ Unwatch
Paul Cockle 1884-1887 · MM8G-17K	●●●●●	Great Uncle	📄 📄	★ Unwatch
Clarence Worden Cockle 1886-1934 · L72K-QK5	●●●●●	Great Uncle		★ Unwatch
Elmer Richmond Cockle 1888-1958 · K63R-9W1	●●●●●	Great Uncle	📄	★ Unwatch
William Earl Cockle 1890-Deceased · KZ6B-ZCC	●●●●●	Great Uncle		★ Unwatch
Sarah Mildred Cockle 1891-1936 · KH26-VRN	●●●●●	Great Aunt	📄	★ Unwatch

Figure 3 - Composition Showing Future Desired Features