

Liberating Data: How libraries and librarians can help researchers with text and data mining.

 blogs.lse.ac.uk/impactofsocialsciences/2016/07/12/how-libraries-and-librarians-can-help-with-text-and-data-mining/

With advances in computational methods and the proliferation of data sources, text and data mining offers exciting new directions for research. [Neil Stewart](#), [Jane Secker](#), [Chris Morrison](#) and [Laurence Horton](#) look at the role of libraries in providing support to researchers for these projects, particularly to help with rights issues and to digitise material for scholarly re-use. Librarians should be bold about the advice they give to researchers and encourage them to use the new copyright exceptions.



Recent alterations to copyright legislation, and in particular changes in the UK following the [Hargreaves Review of intellectual property law](#), have removed legal barriers for researchers who wish to perform [text and data mining \(TDM\)](#) on the research literature corpus. This change has opened up a previously prohibited form of research, and holds the promise of being able to answer entirely new research questions that were previously not amenable to enquiry; Ross Mounce [wrote about these changes](#) and what these new forms of research might look like on this blog. This post examines the ways in which libraries and librarians can facilitate the work of researchers who might want to apply TDM methods to library resources, be they electronic or hard copy sources. It also advocates for librarians to be bold about the advice they give to researchers to encourage them to use the new copyright exceptions. This may at times mean directly contravening the terms and conditions of a licence with an electronic resource supplier.

What might researchers want to mine?

TDM is generally performed on corpora of text or data in electronic form. For example, a body of chemistry research literature might be mined by running TDM software on it to [discover then create a database of molecular structures](#), a valuable resource for molecular chemists, crystallographers and other scientists. Alternatively, to use an example from the [Digital Humanities](#), a large body of newspapers from the Victorian era can be [mined to extract jokes](#), which can be used to analyse aspects of Victorian culture and social history. It is not just electronic corpora that can be mined, though- and we provide an example of digitisation of hard copy for TDM purposes below.

9539

DEPARTMENT OF COMMERCE - BUREAU OF THE CENSUS
FIFTEENTH CENSUS OF THE UNITED STATES: 1930
POPULATION SCHEDULE

Enumeration District No. 12-2114
Superior's District No. 2

Date Illinois Incorporated place Chicago, Ill. County Cook Ward of city 1 Block No. 27

Township or other division of county Parson's Unincorporated place Place of birth Date of immigration April 7, 1883 Immigrant Denmark

Serial	Sex	Age	Race	Name	Relationship to head of household	Marital status	Date of birth	Place of birth	Parents' place of birth	Language spoken at home	Citizenship	Years in U.S.	Schooling	Occupation and industry	Value of real estate owned	Value of personal property owned	Total value	Mortgage	Net worth	Remarks
1	M	37	Swedish	Stigman, Allen H.	Head	M	1893	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
2	F	35	Swedish	Stigman, Emma	Wife	M	1895	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
3	M	12	Swedish	Stigman, Walter	Son	S	1918	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
4	F	10	Swedish	Stigman, Sylvia	Daughter	S	1920	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
5	M	10	Swedish	Stigman, William	Son	S	1920	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
6	F	8	Swedish	Stigman, Margaret	Daughter	S	1922	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
7	M	7	Swedish	Stigman, Harold	Son	S	1923	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
8	F	5	Swedish	Stigman, Evelyn	Daughter	S	1925	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
9	M	4	Swedish	Stigman, Robert	Son	S	1926	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
10	F	3	Swedish	Stigman, Ruth	Daughter	S	1927	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
11	M	3	Swedish	Stigman, Carl	Son	S	1928	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
12	F	2	Swedish	Stigman, Helen	Daughter	S	1929	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
13	M	2	Swedish	Stigman, Eugene	Son	S	1930	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
14	M	1	Swedish	Stigman, James	Son	S	1931	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
15	F	1	Swedish	Stigman, Mary	Daughter	S	1932	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
16	M	1	Swedish	Stigman, Arthur	Son	S	1933	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
17	F	1	Swedish	Stigman, Elizabeth	Daughter	S	1934	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
18	M	1	Swedish	Stigman, Charles	Son	S	1935	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
19	F	1	Swedish	Stigman, Virginia	Daughter	S	1936	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
20	M	1	Swedish	Stigman, William	Son	S	1937	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
21	F	1	Swedish	Stigman, Margaret	Daughter	S	1938	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
22	M	1	Swedish	Stigman, Robert	Son	S	1939	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
23	F	1	Swedish	Stigman, Ruth	Daughter	S	1940	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
24	M	1	Swedish	Stigman, Carl	Son	S	1941	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
25	F	1	Swedish	Stigman, Helen	Daughter	S	1942	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
26	M	1	Swedish	Stigman, Eugene	Son	S	1943	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
27	F	1	Swedish	Stigman, Mary	Daughter	S	1944	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
28	M	1	Swedish	Stigman, Arthur	Son	S	1945	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
29	F	1	Swedish	Stigman, Elizabeth	Daughter	S	1946	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
30	M	1	Swedish	Stigman, Charles	Son	S	1947	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
31	F	1	Swedish	Stigman, Virginia	Daughter	S	1948	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
32	M	1	Swedish	Stigman, William	Son	S	1949	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
33	F	1	Swedish	Stigman, Margaret	Daughter	S	1950	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
34	M	1	Swedish	Stigman, Robert	Son	S	1951	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
35	F	1	Swedish	Stigman, Ruth	Daughter	S	1952	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
36	M	1	Swedish	Stigman, Carl	Son	S	1953	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
37	F	1	Swedish	Stigman, Helen	Daughter	S	1954	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
38	M	1	Swedish	Stigman, Eugene	Son	S	1955	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
39	F	1	Swedish	Stigman, Mary	Daughter	S	1956	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
40	M	1	Swedish	Stigman, Arthur	Son	S	1957	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
41	F	1	Swedish	Stigman, Elizabeth	Daughter	S	1958	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
42	M	1	Swedish	Stigman, Charles	Son	S	1959	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
43	F	1	Swedish	Stigman, Virginia	Daughter	S	1960	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
44	M	1	Swedish	Stigman, William	Son	S	1961	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
45	F	1	Swedish	Stigman, Margaret	Daughter	S	1962	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
46	M	1	Swedish	Stigman, Robert	Son	S	1963	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
47	F	1	Swedish	Stigman, Ruth	Daughter	S	1964	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
48	M	1	Swedish	Stigman, Carl	Son	S	1965	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
49	F	1	Swedish	Stigman, Helen	Daughter	S	1966	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
50	M	1	Swedish	Stigman, Eugene	Son	S	1967	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
51	F	1	Swedish	Stigman, Mary	Daughter	S	1968	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
52	M	1	Swedish	Stigman, Arthur	Son	S	1969	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
53	F	1	Swedish	Stigman, Elizabeth	Daughter	S	1970	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
54	M	1	Swedish	Stigman, Charles	Son	S	1971	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
55	F	1	Swedish	Stigman, Virginia	Daughter	S	1972	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
56	M	1	Swedish	Stigman, William	Son	S	1973	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
57	F	1	Swedish	Stigman, Margaret	Daughter	S	1974	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
58	M	1	Swedish	Stigman, Robert	Son	S	1975	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
59	F	1	Swedish	Stigman, Ruth	Daughter	S	1976	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
60	M	1	Swedish	Stigman, Carl	Son	S	1977	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
61	F	1	Swedish	Stigman, Helen	Daughter	S	1978	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
62	M	1	Swedish	Stigman, Eugene	Son	S	1979	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
63	F	1	Swedish	Stigman, Mary	Daughter	S	1980	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
64	M	1	Swedish	Stigman, Arthur	Son	S	1981	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
65	F	1	Swedish	Stigman, Elizabeth	Daughter	S	1982	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
66	M	1	Swedish	Stigman, Charles	Son	S	1983	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
67	F	1	Swedish	Stigman, Virginia	Daughter	S	1984	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
68	M	1	Swedish	Stigman, William	Son	S	1985	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
69	F	1	Swedish	Stigman, Margaret	Daughter	S	1986	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None
70	M	1	Swedish	Stigman, Robert	Son	S	1987	Illinois	Denmark	Swedish	Swedish	10	12	None	None	None	None	None	None	None

How can librarians help?

There are a number of things library services and librarians can do to assist with TDM services. These include:

- Advertise TDM support as a service, perhaps by coupling it with the related fields of [Research Data Management](#) or Digital Humanities support services.
- Encourage the development of partnerships with academic colleagues to work on TDM projects.
- Be clear about licensing and terms & conditions under which resources are made available to colleagues at your institution, and get to understand the legal exception that [permits TDM for the purposes of non-commercial research](#) [PDF link] regardless of contractual stipulations.
- Be firm with publishers, data providers and other content suppliers in the case of “unusual behaviour” reports or DRM blocks to protect the legitimate interests of researchers, as defined by law.
- Advise on the next port of call should local support not be enough, up to and including appealing to the [Intellectual Property Office](#) (IPO) if a rights-holder will not remove DRM locks (though to date take up of this has been [very low](#)). Information on making a complaint [can be found on the IPO's website](#).
- Be aware of data protection issues: TDM is not exempted from data protection law, so content identifying a living individual must be processed in compliance with the [Data Protection Act \(1998\)](#).
- Be mindful of clauses in any new licence agreements you are signing for resources that might restrict TDM activities.

Digitisation projects for TDM

An example of a recent TDM project here at LSE is ongoing work to digitise a series of hard copy South African census data volumes. This series reaches back to the mid-19th century and carries on through to 1960. It includes volumes concerning individual provinces before [the unification of South Africa in 1910](#) as well as volumes for the whole country post-1910, and the total run comprises some 25,000 pages across 35 volumes.

[Dr Joachim Wehner](#), a colleague in LSE's [Department of Government](#), was the project's instigator when he identified the series as un-digitised and potentially of great historical importance for the understanding of South Africa. Working in collaboration with [Daniel de Kadt](#), a PhD candidate in political science at MIT, he formulated a research question that he intends to answer by performing TDM on the datasets: what occurred to quality of life indicators as the South African franchise was gradually restricted on the grounds of (needless to say, dubious) racial categories under apartheid, then widened post-apartheid? To answer this question he needed to “unlock” the data in the census volumes by digitising it then running [Optical Character Recognition](#) software over the digitised pages. This has created a set of tables as spreadsheets that are now amenable to further analysis, both by traditional methods and using computational and statistical methodologies.

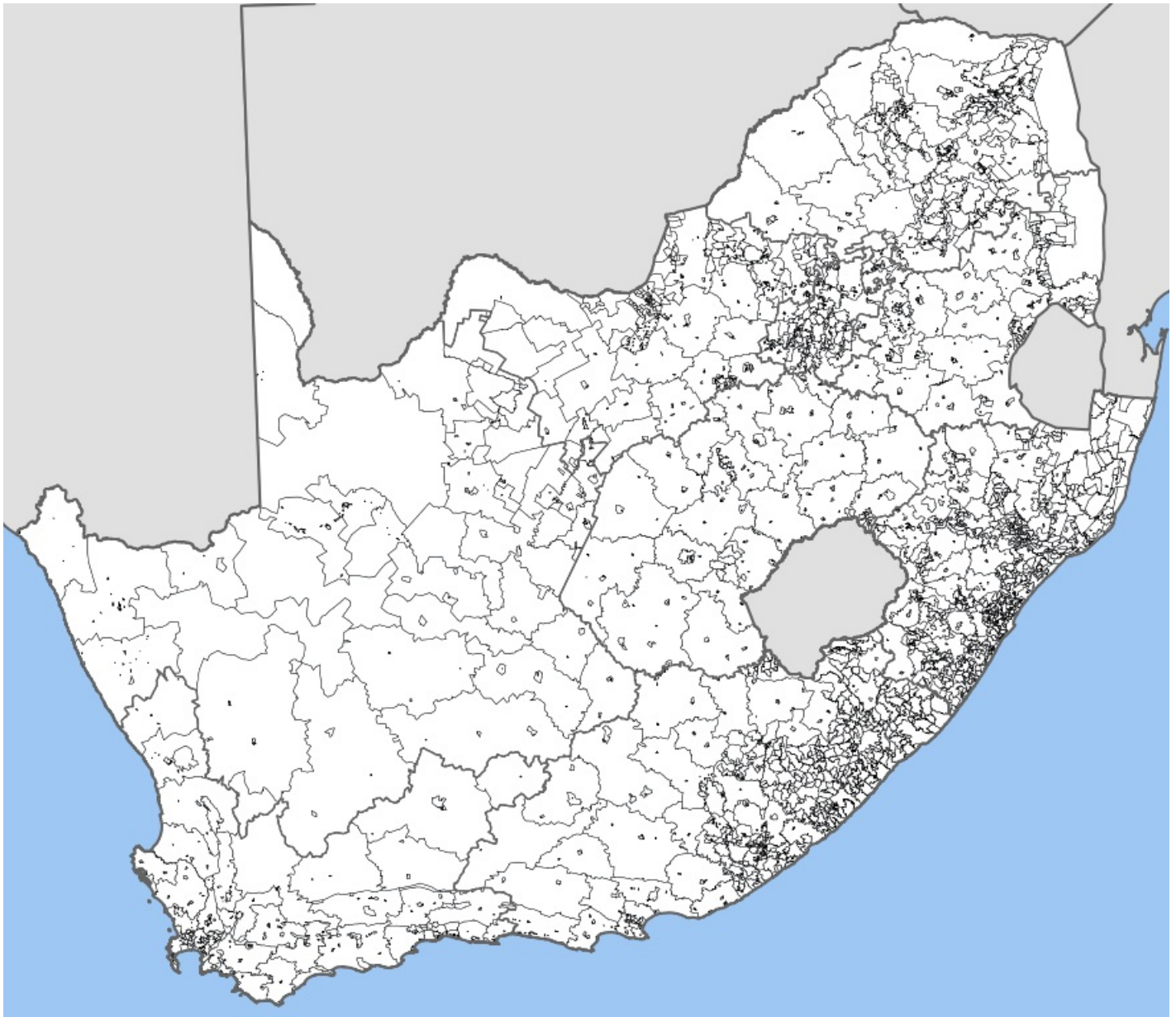


Image credit: Stats SA [Map of South Africa divided into “Main Places” from Census 2001](#).CC BY

The project is ongoing, but the lesson to take away for the purposes of this blogpost is that Dr Wehner’s research question could not have been approached without support from LSE Library. This support comprised arranging and helping manage the digitisation of the volumes and its subsequent OCR-ing, and providing a place for (some or all of) the digitised material and data tables to be made openly available: LSE’s [Digital Library](#). The (ultimately) open availability of the data is perhaps the most exciting thing about the project, given the plethora of possible questions that might be amenable to answer after the previously locked-away data is made available.

Conclusion

Researchers should look to their library services for assistance with TDM, and libraries should be ready and willing to assist with these projects, particularly to help with rights issues and to digitise material for scholarly re-use. In future, [further harmonisation needs to occur across the EU](#) to bring member countries in line with the recent UK legislation, thereby allowing multi-national research partnerships across Europe, something not currently permitted. The [Libraries and Archives Copyright Alliance \(LACA\)](#) and [Universities UK](#) have been keen to collect evidence of

problems researchers run into when trying to use the new copyright exception. In a recent example, LACA advised an academic to appeal to the IPO to have DRM removed from a site he wished to mine. [Content Mine](#) are also doing a lot of work in this area, to press publishers who restrict researcher's ability to mine through technical protection measures, and leading on TDM projects as well, for example a project to [mine the research literature for information about the Zika virus](#). Finally, for librarians who are used to signing licence agreements, they must be mindful of the right to mine, and recognise the important role they can play in liberating data and knowledge to allow new scientific breakthroughs.

Note: This article gives the views of the author, and not the position of the LSE Impact blog, nor of the London School of Economics. Please review our [Comments Policy](#) if you have any concerns on posting a comment below.

About the Authors

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Chris Morrison is the Copyright and Licensing Compliance Officer at the University of Kent, responsible for copyright policy, education and advice, and is also a member of the UUK / Guild HE Copyright Working Group. He was previously Copyright Assurance Manager at the British Library and prior to that worked for copyright collecting society PRS for Music. Chris is the creator of [Copyright the Card Game](#), a game-based approach to understanding copyright.

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