HTR and the crowd

A hybrid approach to transcribing civil records from Curaçao





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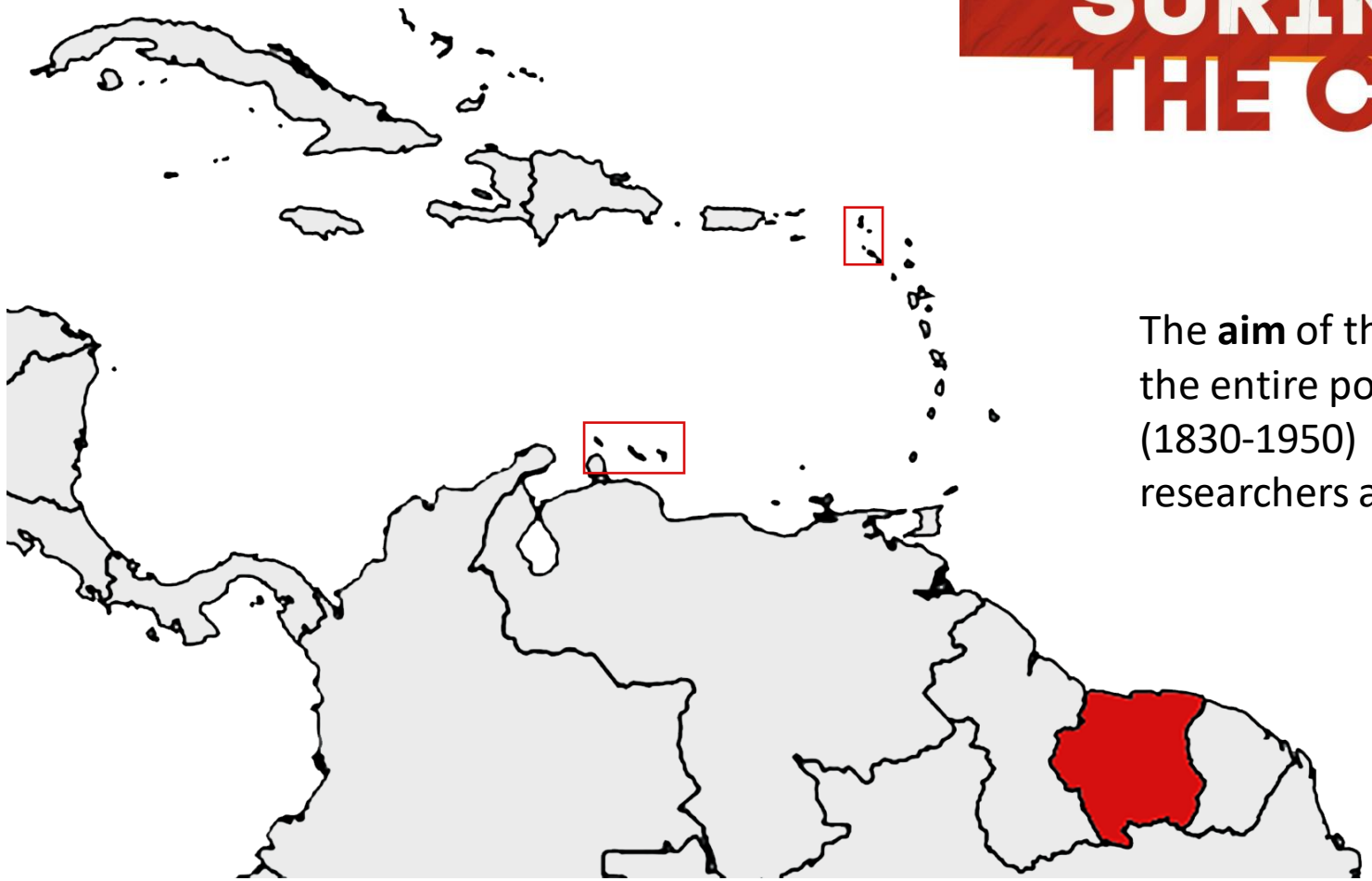
DH Benelux 7 June 2024

Radboud University

RADBOUD GROUP FOR HISTORICAL DEMOGRAPHY AND FAMILY HISTORY

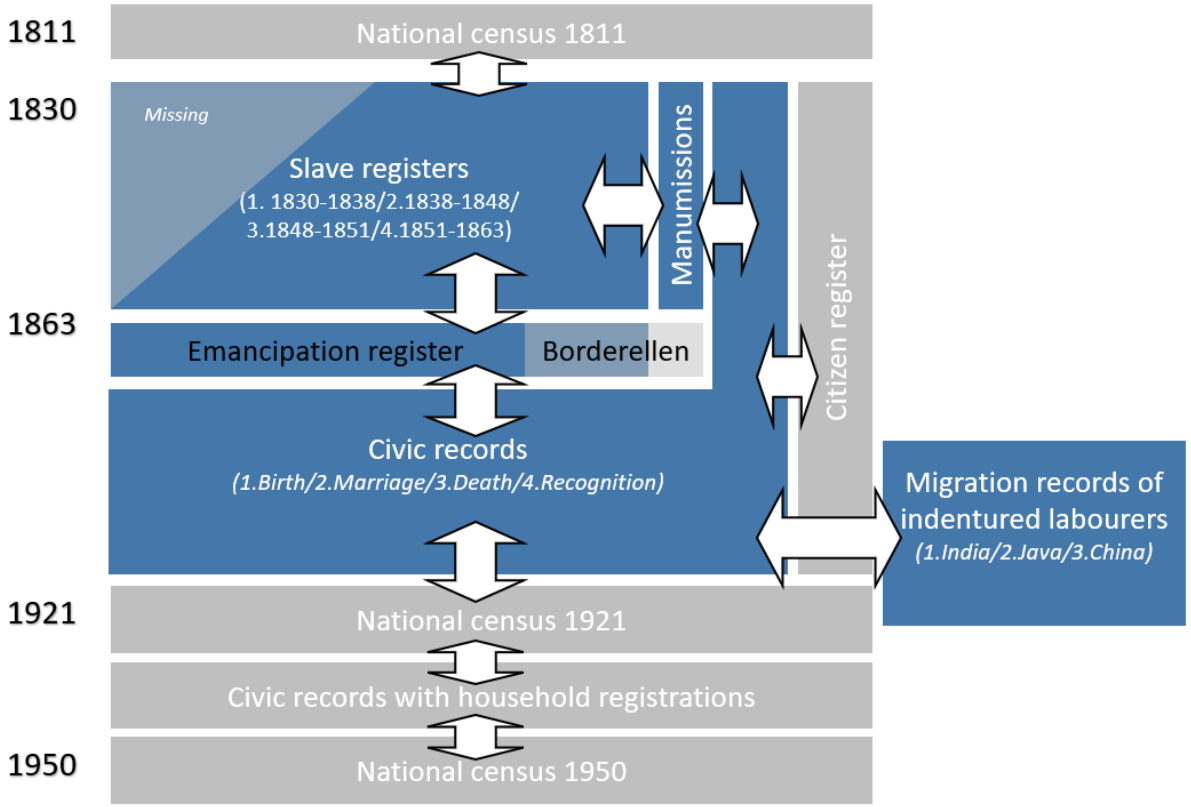
HISTORICAL DATABASE OF SURINAME & THE CARIBBEAN



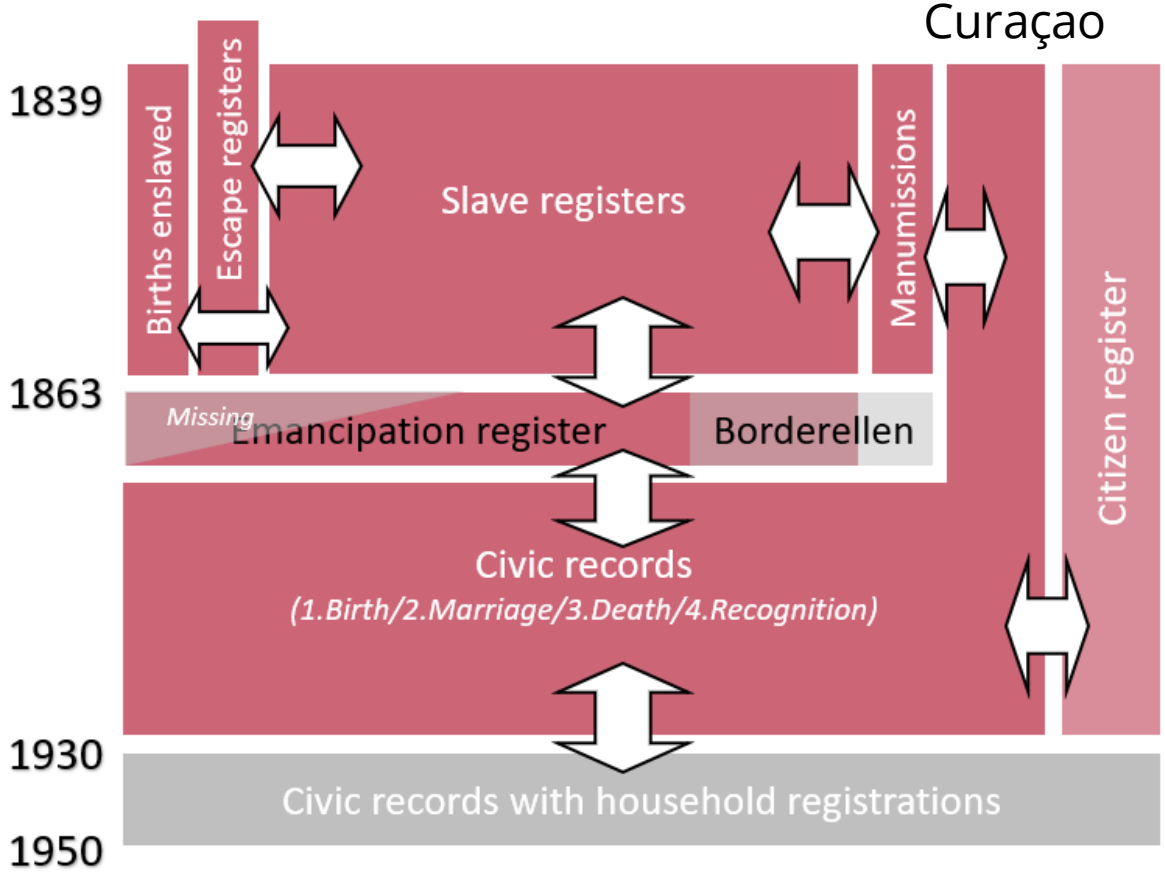
The **aim** of the HDSC is to build a historical database of the entire population of Suriname and former Dutch Antilles (1830-1950) and to make these databases freely available to researchers and the public.

HDSC Project

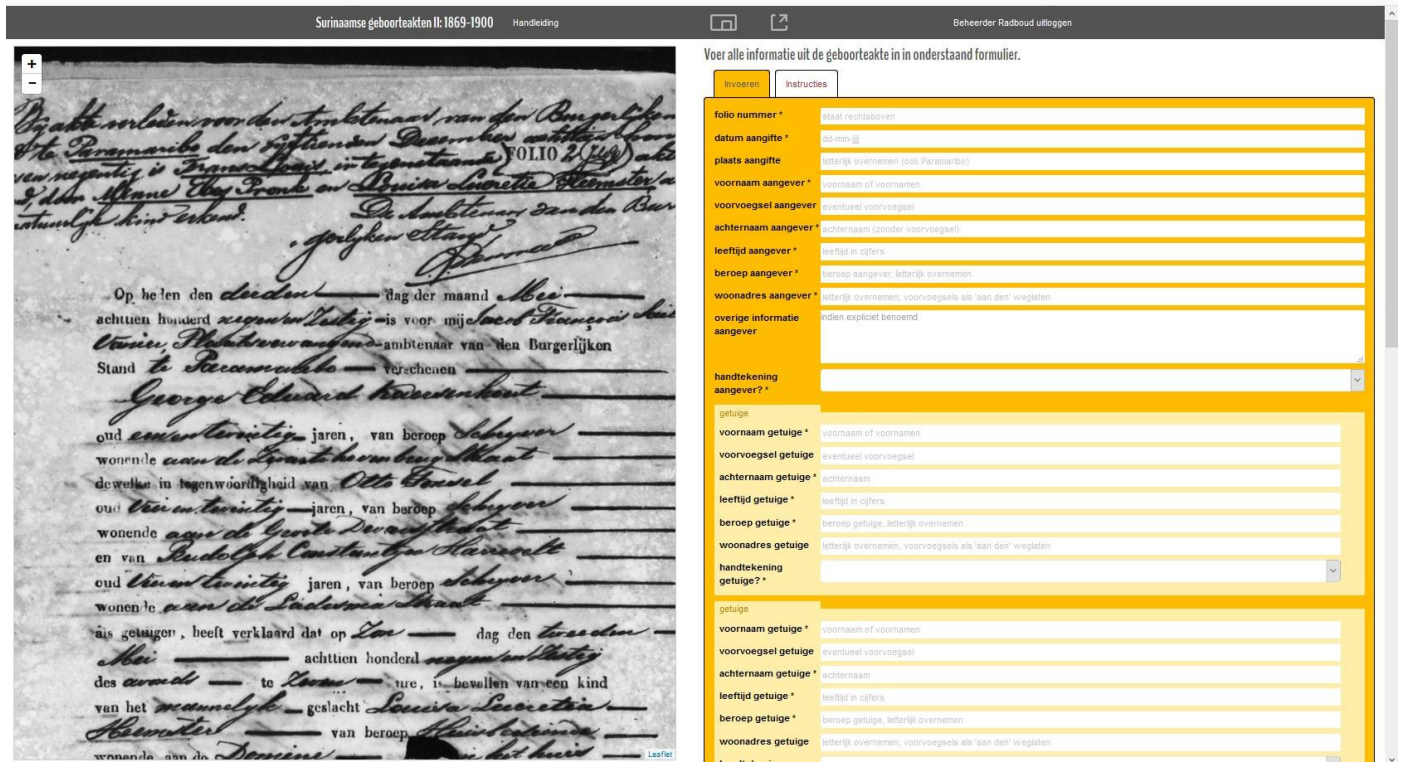
Suriname



Curaçao



Citizen science: data entry civil records

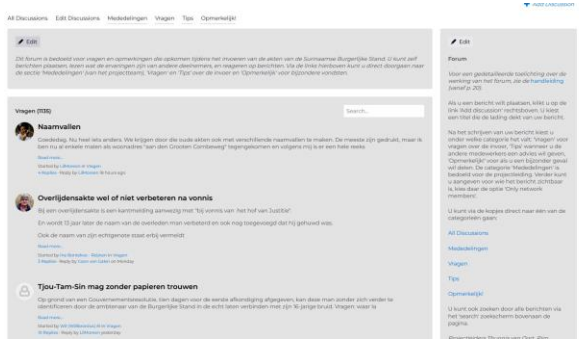


- Platform: **hetvolk.org**
- Forum **hdsc.ning.com**

- Each certificate entered 2x + 1x checked (controllers)

- ~300k certificates… (x 3 tasks)

- Since Sept. 2021: ~540k tasks completed



SLAVERY REGISTERS & MORE
Historical database Suriname Curaçao

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Citizen Science vs. (Hybrid) HTR

CITIZEN SCIENCE

PROS

- High quality results
- Citizen involvement
- Direct contact with user group

CONS

- Recruitment & coordination takes time & effort (= €)
- Time-intensive
- Production decrease over time

(HYBRID) HTR / ENTITY EXTRACTION

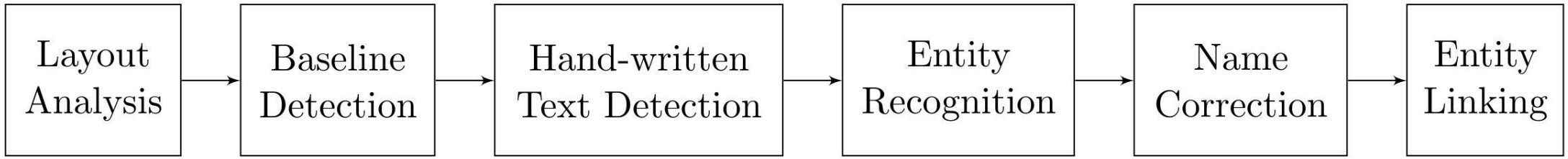
PROS

- Can handle large volumes in brief timespan
- Improvement over time through increased training material
- Transferable to other projects?

CONS

- Lower quality results
- Lack of training data
- Risk of citizen scientists losing motivation
- Costs for processing each document
- During pilot: still time-intensive
- Requires technical expertise

Proposed automated pipeline



1. Layout analysis: determine page layout: how many text columns?
2. Baseline detection: find the lines of text
3. Hand-written Text Detection: get the text of the document
4. Entity Recognition: find the names and dates in the text
5. Name correction: integrate name corrections mentioned in text
6. Entity Linking: link names of identical persons

For step 1-3 we use the program https://readcoop.eu/transkribus

N° 1.

Verbeteringen.

Heden den Negen en twintigsten January des Jaars Een duizend acht honderd Een en Dertig

Compareerden voor mij Ambtenaar van den Burgerlijken stand op dit eiland.

De personen van Isaac Johannes Rammelman Elsevier junior en Pieter Pletsz

van competenten ouderdom en alhier woonachtig.

Dewelke aangifte hebben gedaan dat op dit eiland op den tweeden January des Jaars Een duizend acht honderd een en dertig te half vijf ure des morgens overleden is: Jacob Bonaventura Rammelman Elsevier

Oud Zes maanden en twee dagen

Geboren te Curaçao

op den dertigsten Juny des Jaars Een duizend acht honderd en dertig

zijnde Blank

laatstelijk gewoond te Curaçao

Ongehuwd

En is deze behoorlijk geteekend na voorlezing

op Curaçao dato utsupra.

J.J. Rammelman Elsevier Jr.

In stede van den Ambtenaar voornoemd

P. Pletsz

Hn Pletsz

Kn P ieng

F° 1

Eerste blad

Mh. de Kanter.

Aanteekeningen.

Deze inschrijving is geschied ingevolge Publicatie van Directeur adm en Raden dd 5–13 January 1831.

Using Transkribus

Transkribus provides two foundation models for recognizing hand-written historical Dutch: IJsberg and The Dutchess

Both models perform well on the HTR task but less well on layout detection: they fail to identify text column boundaries

We fine-tuned The Dutchess with 278 death certificates from Curaçao to improve both layout detection and HTR

Evaluation of pipeline

Our HTR model (available as Transkribus model 42578) reports a character error rate (CER) of 3.7% (96.3% correct), which sounds good

However, when we checked different parts of the texts, the performance was mixed: 90% correct for dates but only 33% for names

The character error rate is always lower than the word error rate and this is again lower than the error rate for names

Name accuracy results of HTR model retraining

	1830-1839	1840-1849	1920-1929
Fine-tuning with 5,712 names	68%	69%	41%
Replacing unknown names	68%	66%	43%
Removing unknown names	93% (65%)	88% (67%)	73% (44%)

Postprocessing (replacing unknown words with known words) did not always increase performance for the best retraining configuration

High performances can be obtained for part of the data

Integration of crowd sourcing and automatic methods

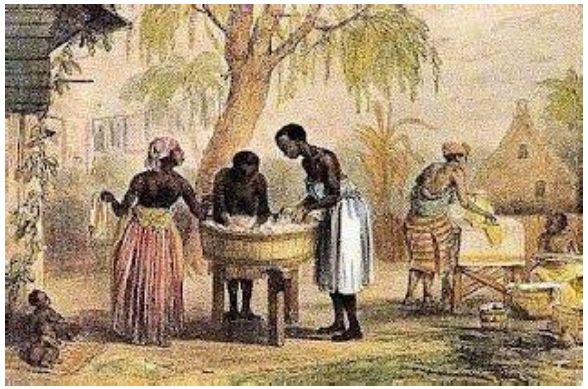
We are currently testing the first combination of crowd sourcing in combination with automatic methods:

- Processing 24,000 death certificates of Curaçao with Transkribus
- Comparing regexes with ChatGPT4 for entity recognition

- Transkribing person names and professions by citizen scientists (sample)
- Integrating machine output in crowd-sourcing pipeline (sample)

We are interested in the time investment of the latest step

Concluding remarks



- Automatic hand-written recognition is a promising method for historical text digitization
- Results are not perfect and require additional manual checks, especially for names
- Effects of using automatic methods on motivation citizen scientists are not yet clear
- Several challenges of the automatic methods remain to be conquered
- Pipeline applicable for other HTR projects? We value input/suggestions for collaboration

Data Publications

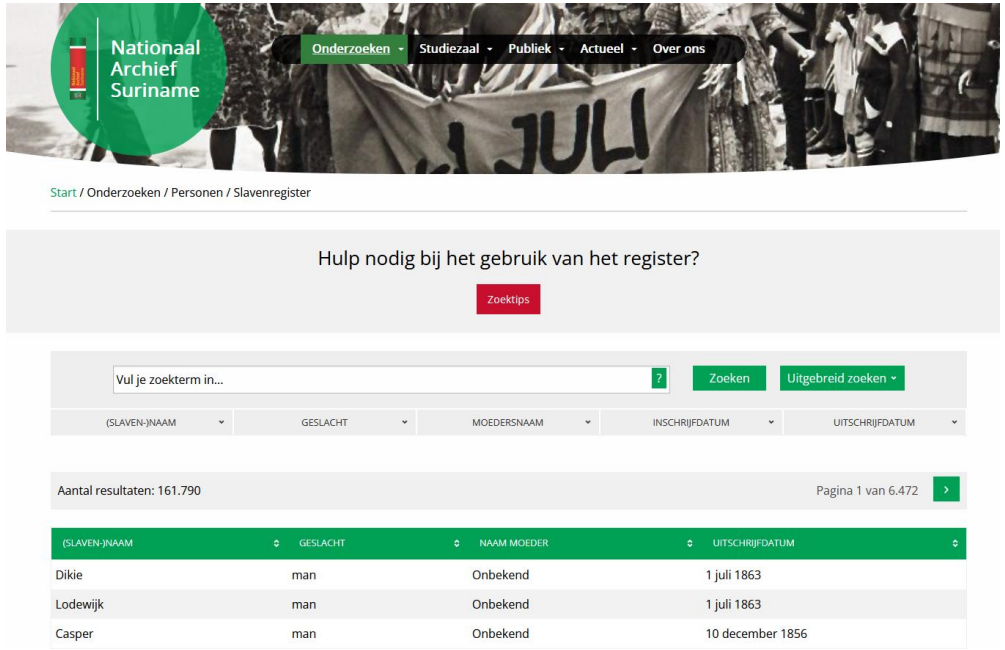
- The data are accessible via search interfaces on the national archive websites of Suriname, Curaçao, Aruba and The Netherlands

- The data are published on IISH Dataverse: **datasets.iisg.amsterdam/dataverse/HDSC**

- See our website: **ru.nl/hdsc**

- Documentation is available in data papers

  e.g. Slavery in Suriname. A Reconstruction of Life Courses, 1830–1863. (2023). Historical Life Course Studies, 13, 191-211. https://doi.org/10.51964/hlcs15619



The Historical Database of Suriname and Curacao was made possible thanks to the support of our more than 1,000 volunteers and the following partners:

For more information on the Historical Database of Suriname and Curacao, see:

ru.nl/hdsc