Housing Unit Inventory

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Project Overview: Summary of Project Details

Project Title: Detailed Household and Housing Unit Characteristics: Data and Replication Code Version 3

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Required Citations:
Rosenheim, Nathanael, Roberto Guidotti, Paolo Gardoni & Walter Gillis Peacock. (2021). Integration of detailed household and housing unit characteristic data with critical infrastructure for post-hazard resilience modeling. *Sustainable and Resilient Infrastructure*. https://doi.org/10.1080/23789689.2019.1681821

Rosenheim, Nathanael. (2022). "Detailed Household and Housing Unit Characteristics: Data and Replication Code." [Version 2] *DesignSafe-CI*. https://doi.org/10.17603/ds2-jwf6-s535

Project Description : People are the most important part of community resilience planning. However, models for community resilience planning tend to focus on buildings and infrastructure. This project provides a solution that connects people to buildings for community resilience models. The housing unit inventory method transforms aggregated population data into disaggregated housing unit data that includes occupied and vacant housing unit characteristics. Detailed household characteristics include size, race, ethnicity, income, group quarters type, vacancy type and census block. Applications use the housing unit allocation method to assign the housing unit inventory to structures within each census block through a reproducible and randomized process. The benefits of the housing unit inventory include community resilience statistics that intersect detailed population characteristics with hazard impacts on infrastructure; uncertainty propagation; and a means to identify gaps in infrastructure data such as limited building data. This project archives example data and python code files. Python is an open source programming language and the code files provide future users with the tools to generate a 2010 and 2020 housing unit inventory for any county in the United States. This project's method is reproducible, generalizable, and that the characteristics included provide a valid representation of the social and economic characteristics of a community's population in 2010 and 2020.

Funding Source: Award name and number:

Center for Risk-Based Community Resilience Planning : NIST-70NANB20H008, NIST-70NANB15H044 (http://resilience.colostate.edu/)

Southeast Texas Urban Integrated Field Lab: DE-SC0023216 (https://setx-uifl.org/)

Related Works:

Interdependent Networked Community Resilience Modeling Environment (IN-CORE) : https://incore.ncsa.illinois.edu/

Hazard Reduction and Recovery Center (HRRC): https://www.arch.tamu.edu/impact/centers-institutes-outreach/hazard-reduction-recovery-center/

Keywords: Social and Economic Population Data, Housing Unit, US Census, Synthetic Population

License: Open Data Commons Attribution License (https://opendatacommons.org/licenses/by/summary/)

DesignSafe-CI project identification number: Project-2961 - Available at: https://www.designsafe-ci.org/data/browser/public/designsafe.storage.published/PRJ-2961

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Data Dictionary: Summary of Variables

Variable Name	Data Type	Length	Categorical	Variable Label
huid	String			Housing Unit ID
blockid	String	15		Block ID
numprec	Int			Number of Person Records
ownershp	Int		True	Tenure Status

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Variable Details and Notes

The following pages provide details on each variable. Where applicable, notes provide links to verify data. Categorical variables include details on category codes.

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huid: Housing Unit ID

Variable characteristic	Variable details
variable type	string
total cases	49
valid cases	49
missing cases	0
unit of measure	Housing units
unit of analysis	Housing unit
unique values	49
minimum length	20
maximum length	20
example 1	B371559601011027H001
example 2	B371559601011013H001
example 3	B371559601011031H005
example 4	B371559601011031H051

Variable Notes: huid

1. Primary Key for sample data.

Housing Unit Inventory

blockid: Block ID

Variable characteristic	Variable details
variable type	string
total cases	49
valid cases	49
missing cases	0
unit of measure	Housing unit in census block
unit of analysis	Geographic unit
unique values	1
minimum length	17
maximum length	17
example 1	371560000000000.0
example 2	371560000000000.0
example 3	371560000000000.0
example 4	371560000000000.0

Variable Notes: blockid

1. 2010 Census Block ID

Housing Unit Inventory

numprec: Number of Person Records

Variable characteristic	Variable details
variable type	numeric (Int)
total cases	49
valid cases	49
missing cases	0
unit of measure	Persons
unit of analysis	Housing unit
range	minimum value: 1.00 to maximum value: 1.00
mean	1.00
median	1.00
standard deviation	0.00
10th percentile	1.00
25th percentile	1.00
50th percentile	1.00
75th percentile	1.00
90th percentile	1.00

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ownershp: Tenure Status

Variable characteristic	Variable details
variable type	categorical (Int)
total cases	49
valid cases	49.0
missing cases	0
unit of measure	Housing unit
unit of analysis	Household
range	minimum value: 1 to maximum value: 2

ownershp: Tenure Status - Categorical codes, labels and frequencies

Code	Label	Count of Housing units	Percent Housing units	Sum of Persons	Percent Persons
1	1. Owned or being bought (loan)	33	67.35%	33	67.35%
2	2. Rented	16	32.65%	16	32.65%

Variable Notes: ownershp

1. Based on 2010 Census SF1 Table H16.

2. Tenure status is not applicable for vacant not occupied housing units.

3. Tenure status is not applicable for group quarters.

4. To verify results compare table to:

https://data.census.gov/cedsci/table?g=0500000US{state_county}&tid=DECENNIALSF12010.H16.

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Key Terms and Definitions

American Community Survey (ACS): "The American Community Survey (ACS) is a nationwide survey designed to provide communities a fresh look at how they are changing. The ACS replaced the decennial census long form in 2010 and thereafter by collecting long form type information throughout the decade rather than only once every 10 years." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_AmericanCommunitySurveyACS).

Census block: "A statistical area bounded by visible features, such as streets, roads, streams, and railroad tracks, and by nonvisible boundaries, such as selected property lines and city, township, school districts, and county boundaries. A block is the smallest geographic unit for which the Census Bureau tabulates decennial census data... Over 11 million blocks were identified for the 2010 Census." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_Censusblock).

Decennial census: "The census of population and housing, taken by the Census Bureau in years ending in 0 (zero)." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_Decennialcensus).

Household: "A household includes all the people who occupy a housing unit (such as a house or apartment) as their usual place of residence. A household includes the related family members and all the unrelated people, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated people sharing a housing unit such as partners or roomers, is also counted as a household. The count of households excludes group quarters." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_Household).

Housing Unit: "A house, an apartment, a mobile home or trailer, a group of rooms, or a single room occupied as separate living quarters, or if vacant, intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have direct access from outside the building or through a common hall." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_Housingunit).

Group Quarters: "The Census Bureau classifies all people not living in housing units as living in group quarters. A group quarters is a place where people live or stay, in a group living arrangement, that is owned or managed by an entity or organization providing housing and/or services for the residents... Group quarters include such places as college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, and workers' dormitories." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_GroupQuartersGQ).

Tenure: "Refers to the distinction between owner-occupied and renter-occupied housing units." (U.S. Census Bureau Glossary: https://www.census.gov/glossary/#term_Tenure).

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