



Analyzing Pro Bono Legal Conversations for Better Service

DataFest 2023 Challenge

Team UTSCA

Introduction

- Our goal, through data analysis, is to identify key recommendations to help the ABA better allocate resources and for attorneys prepare better for their conversations.
- This includes where to allocate more attorneys, what law areas require recruiting or training more attorneys, and a machine learning model that takes in client information and predicts the most likely topic that the client will want to talk to the attorney about.

Number of Total Attorneys

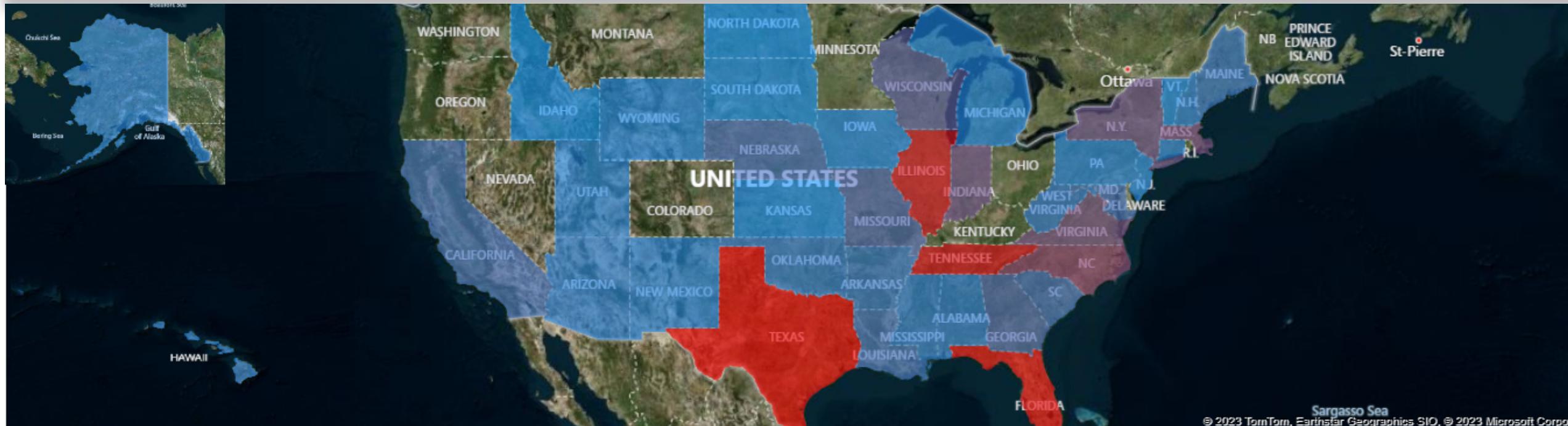
11,544

Average Attorneys Per State

275

Attorneys

Heat Map of Attorney's Locations



County's with the most Attorneys

| County | Number of Attorneys |
|---------------------------------|---------------------|
| Cook | 651 |
| Davidson | 414 |
| All Natural Disaster Assistance | 320 |
| Suffolk | 290 |
| Harris | 245 |
| Other | 243 |
| Wake | 235 |
| New York | 224 |

Cities with the most Attorneys

| City | Number of Attorneys |
|-----------|---------------------|
| Chicago | 554 |
| Nashville | 390 |
| boston | 255 |
| Houston | 250 |
| Atlanta | 232 |
| RALEIGH | 211 |
| New York | 195 |
| Memphis | 172 |

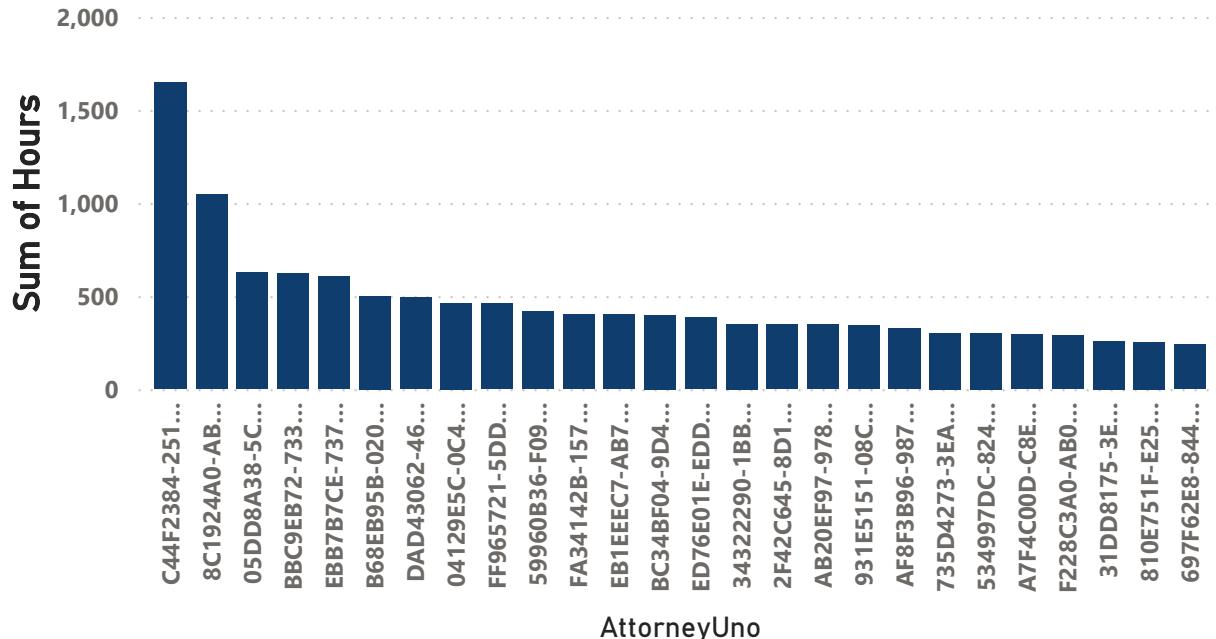
States with the most Attorneys

| StateName | Number of Attorneys |
|----------------|---------------------|
| Texas | 1140 |
| Florida | 1103 |
| Tennessee | 1036 |
| Illinois | 997 |
| North Carolina | 629 |
| Massachusetts | 533 |
| Virginia | 517 |
| Indiana | 494 |

Average Time (hours) Attorneys Spent Responding

0.39

Attorneys ranked from Most Hours Worked to Least



Attorneys

State in most need of help

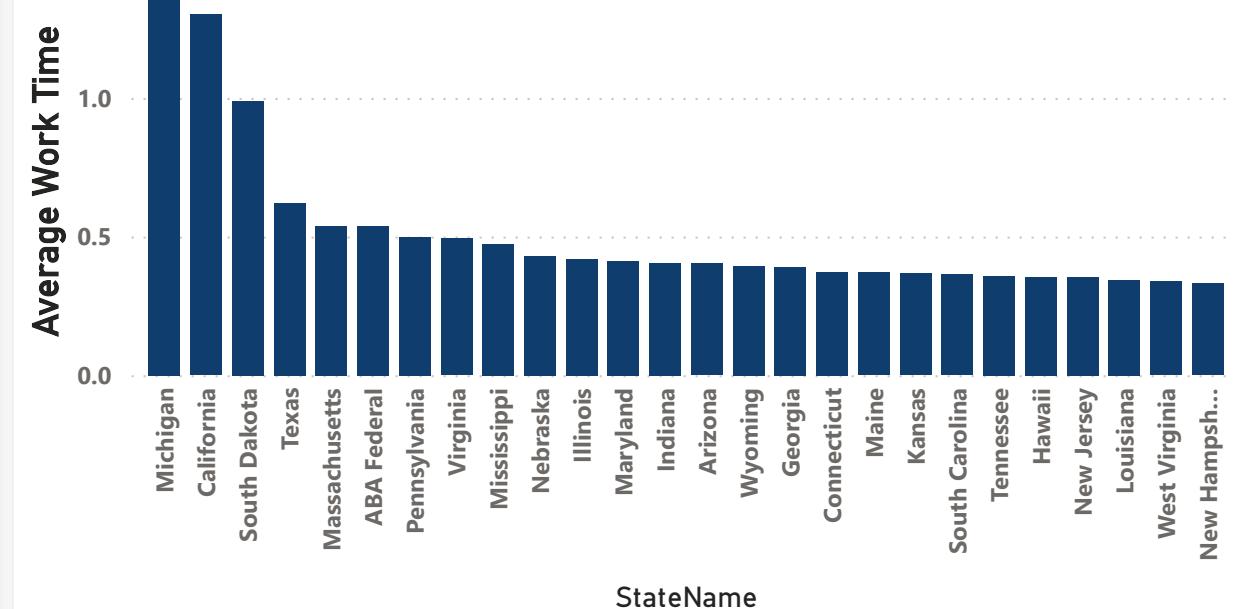
StateName

Average of Hours

Michigan

1.36

States ranked from Most Hours Being Assisted to Least



County's with the most Hours

| County | Average of Hours |
|-------------|------------------|
| Navajo | 4.00 |
| Watauga | 4.00 |
| Bastrop | 3.70 |
| Ingham | 2.53 |
| Charlotte | 2.50 |
| Tennessee | 2.36 |
| Santa Clara | 2.19 |
| Talbot | 2.10 |

Cities with the most Hours

| City | Average of Hours |
|---------------|------------------|
| Washington DC | 11.17 |
| Costa Mesa | 6.20 |
| Glenville | 5.53 |
| White Plains | 5.26 |
| na | 5.00 |
| Piney Flats | 4.40 |
| Hoboken | 4.01 |
| Romeo | 4.00 |

Postal Codes with the most Hours

| PostalCode | Average of Hours |
|------------|------------------|
| 77009 | 14.50 |
| 28277 | 10.67 |
| 33143 | 9.50 |
| 20007 | 8.43 |
| 60565 | 7.00 |
| 92626 | 6.20 |
| 33183 | 5.85 |
| 12225 | 5.52 |

Number of Total Clients

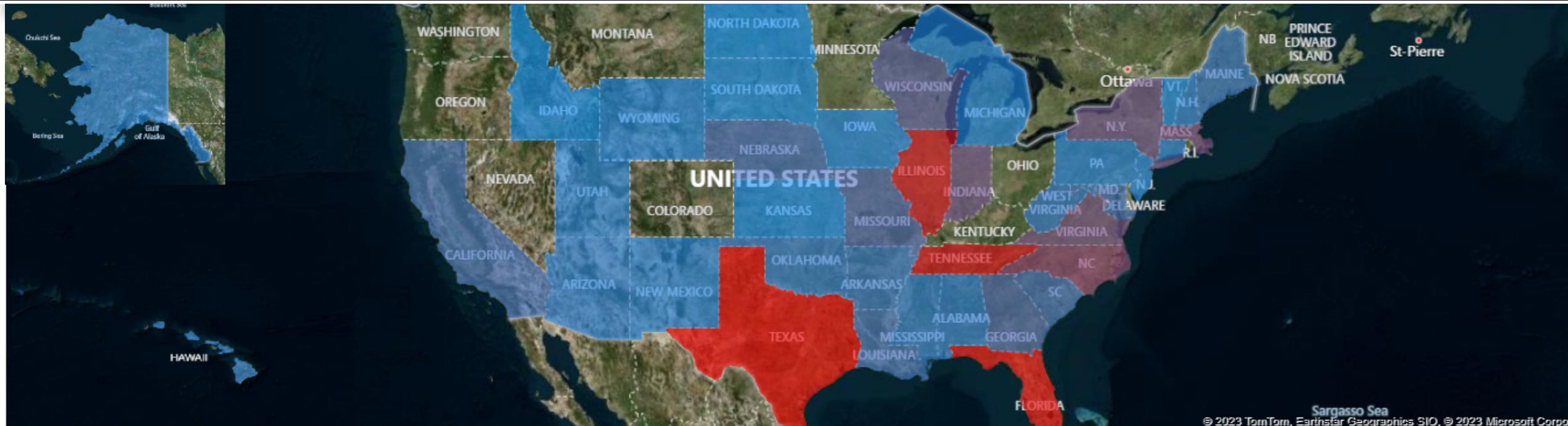
331,426

Clients

Average Clients Per State

8,286

Heat Map of Clients' Locations



County's with the most Clients

| County | Number of Clients |
|--------------|-------------------|
| Marion | 7454 |
| Cook | 7410 |
| Maricopa | 6349 |
| Harris | 5549 |
| Lake | 3841 |
| Hillsborough | 3363 |
| Dallas | 3273 |
| Middlesex | 2254 |

States with the most Clients

| StateName | Number of Clients |
|----------------|-------------------|
| Texas | 36050 |
| Indiana | 31450 |
| Florida | 30520 |
| Illinois | 23030 |
| South Carolina | 18990 |
| Tennessee | 18330 |
| Massachusetts | 15900 |
| Missouri | 14410 |

Gender of Clients



● Female ● Male ● I'd rather not answer ● Other

Average Client Age

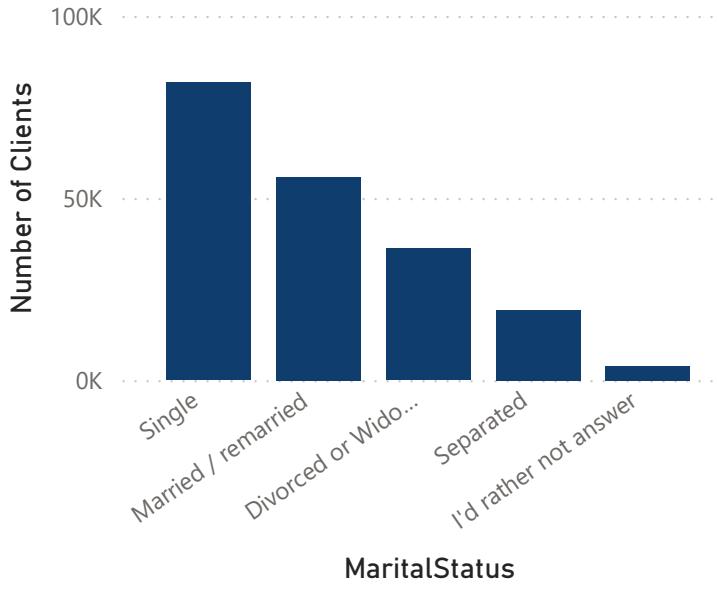
40.34

Clients

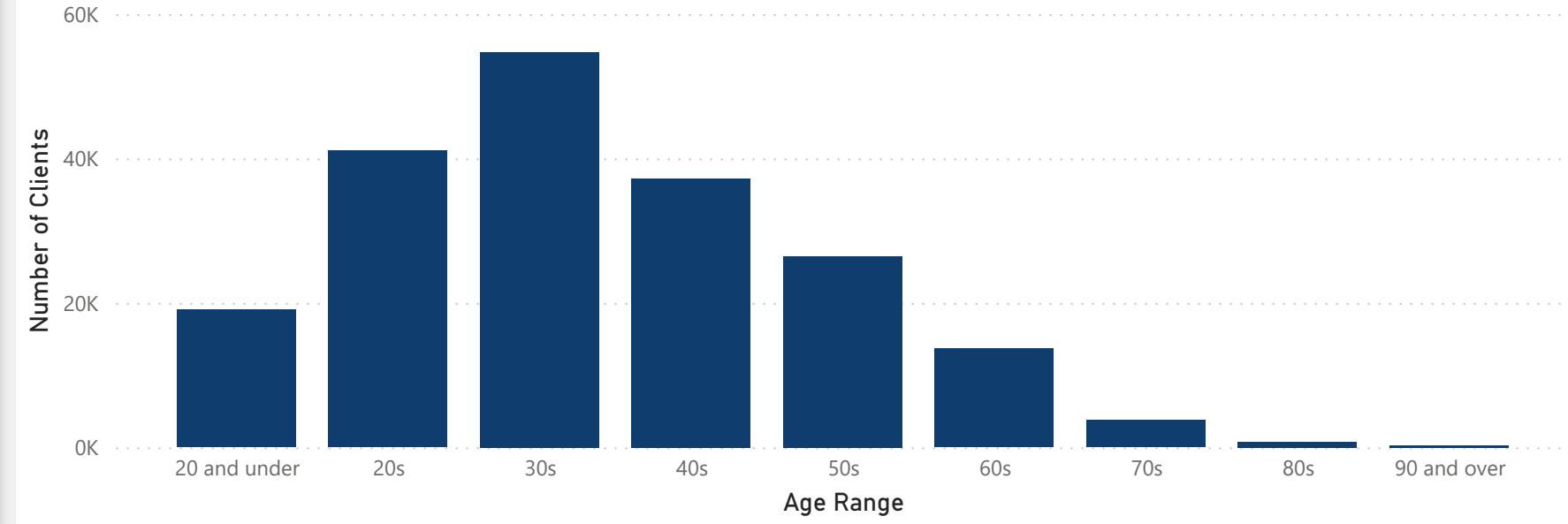
Median Client Annual Income

21000

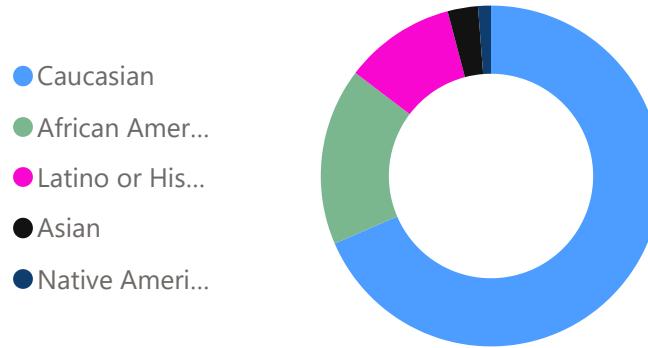
Marital Status of Clients



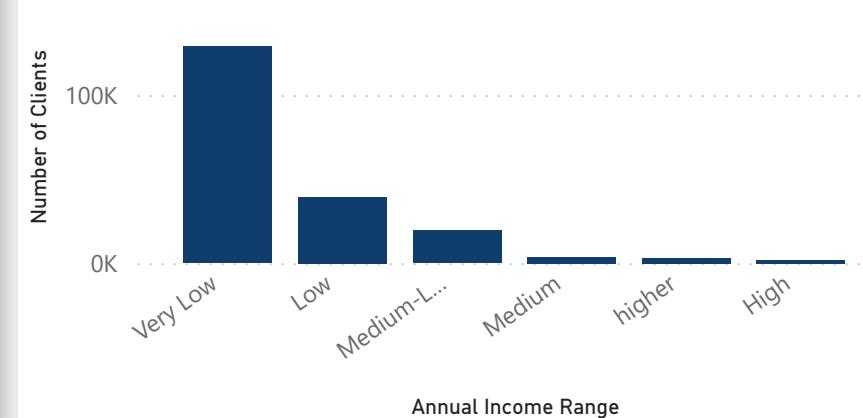
Clients Age Range



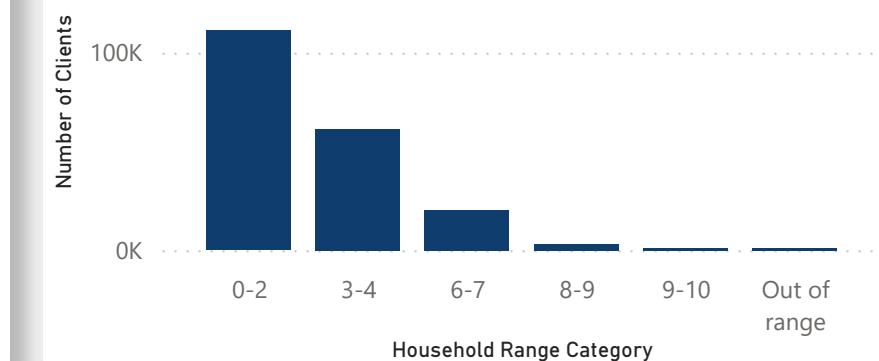
Ethnicity of Clients



Clients Annual Income Range



Number of People Living with Client



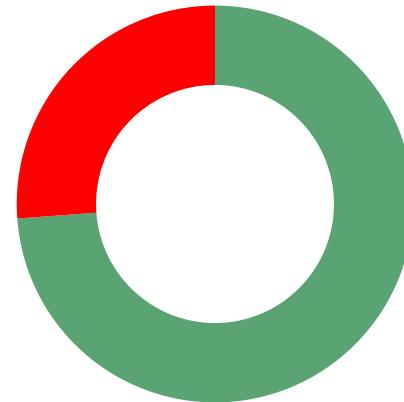
Conversations Between Attorneys and Clients

| Question Id | Text Id | PostText |
|-------------|---------|--|
| 1 | 215865 | I called the clerks office, they keep saying do my own research on how to file an ex parte hearing for my daughter because they don't have the necessary paperwork, how will i write this out on a sheet of paper with my evidence to try and get emergency custody for my daughter, is there anything else i need to have with this sheet of paper to go and file at the courthouse, the clerks here in Cumberland County is giving me a hard time and its already stressful because i need to see a judge and i just dont have the money for a attorney at the moment., |
| 2 | 215866 | I rent a LIHTC apt. with lease rule; Section ###: Children under the age of ###. I received a lease violation that my ### old son was outside unsupervised and therefore have violated the lease. Initially, they tried to say he was also involved with other kids lighting fire crackers which he was not so manager agreed to drop that as he was an ### for a minute or so on his way home coming onto the property. Everything I've read says this is a violation of his civil rights regardless of what the lease says. The lease rule is illegal under Fair Housing Act as rule violates the law, is discrimination, 1st & ### ##, unreasonable, interferes with their rights with association and due process rights related their freedom of ###. Property mgmt. and owners say they had lawyers look their leases over and there is nothing illegal about it (### vs ### kinda)My Question: Is my lease curfew requiring children under the age of ###?, |
| 3 | 215867 | My apt. leases states no trash or trash can is allowed in front of tenant's apartment else a lease violation. Property mgr. has tenant friends she knows and trusts to be her eyes and ears to monitor and report to her and take photos when possible of other tenants, especially the children seen unsupervised (a tenant took a picture of my son on the property when he was unsupervised because they took his picture and then several more pictures to prove there were no adults around anywhere) and committing acts of vandalism. I know it's ok to take photo's in public areas as long as no invasion of privacy and not spying. My mgr. picks and chooses who to serve with lease violations so when one of her tenant friends that takes pictures for her gets a picture of her trash can on her porch, then that person that reports her friend's violation to her gets told not to take pictures of people's apartments!. So, it's ok for some tenants to but not everyone... I'm thinking it's fine to take pictures of any tenant's apartment ### ## area as that is not a private area where one could be caught with a trash can or a bag of trash and someone snaps a cell phone pic and gives it to the manager. I would think that's legal but not sure what is illegal.QUESTION: IS taking photos of tenants apartment fronts (the visible part of the apartment front that anyone standing outside can see from the sidewalk or road) considered public areas or considered legal to do so?What would be illegal to take a picture of or to take a picture of a person?, |
| 3 | 215868 | Mr. ###:Thank you for your question; you are not alone in asking lawyers about exactly where the parameters of this privacy issue lay, and on the whole, I think you got it just right. Yes, people can take photos of persons, conduct or things that are readily in plain view, so like you said, the apartment fronts are fair game in terms of ### taking photos. (I am not saying that this is not highly ### ## it is legal based on this description.)It is when a person ###, ### or causes items to be ### into private spaces that civil and/or criminal liability can arise. The civil claim is called intrusion upon |

Number of Conversations

202,879

Proportion of Questions Answered

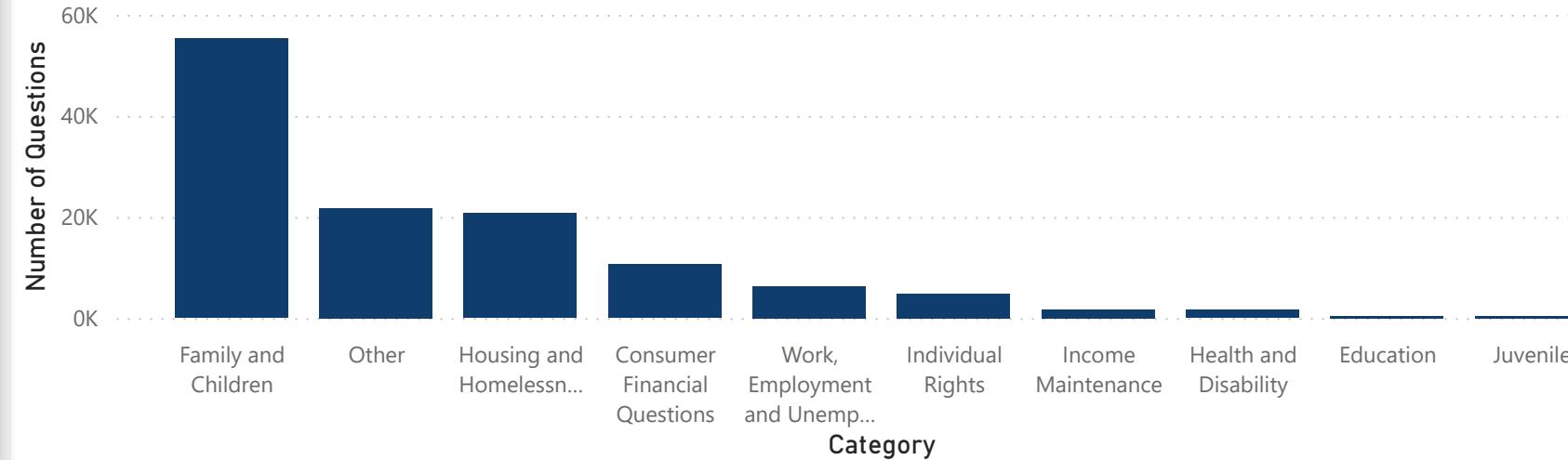


Number of Total Messages

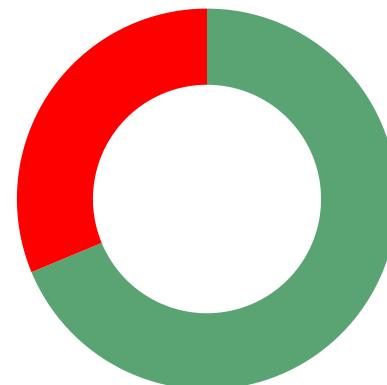
356,959

Conversations

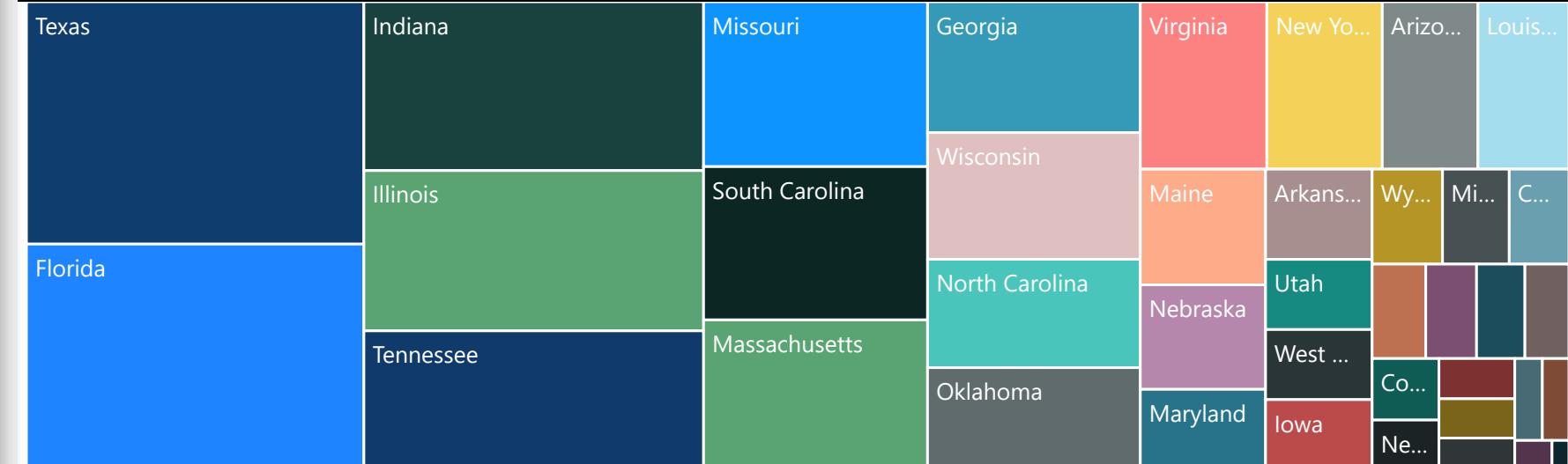
Category of Questions



Proportion of Questions Closed by Attorney



Questions asked per State



Number of Total Clients**331,426**

Ratio of Attorneys to Clients

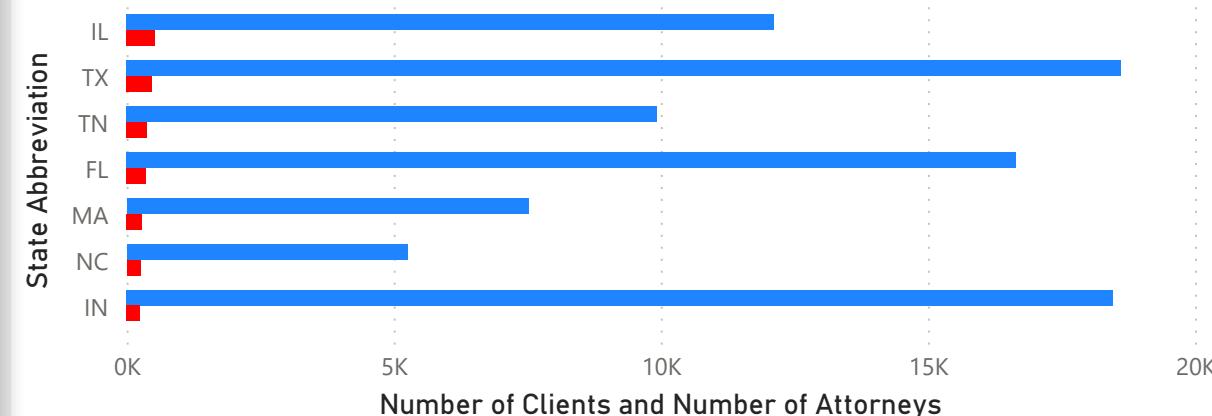
Number of Total Attorneys**11,544**

Number of Questions by Category/State

| Category | StateName | Number of Questions |
|------------------------------|----------------|---------------------|
| Family and Children | Indiana | 11449 |
| Family and Children | Texas | 9647 |
| Family and Children | Florida | 8214 |
| Family and Children | Illinois | 7269 |
| Family and Children | South Carolina | 6366 |
| Family and Children | Tennessee | 4948 |
| Family and Children | Missouri | 3741 |
| Housing and Homelessness | Florida | 3660 |
| Housing and Homelessness | Massachusetts | 3163 |
| Family and Children | Georgia | 2956 |
| Family and Children | Wisconsin | 2925 |
| Housing and Homelessness | Indiana | 2648 |
| Family and Children | Massachusetts | 2601 |
| Housing and Homelessness | South Carolina | 2504 |
| Family and Children | Oklahoma | 2431 |
| Housing and Homelessness | Texas | 2429 |
| Family and Children | North Carolina | 2368 |
| Housing and Homelessness | Tennessee | 2354 |
| Housing and Homelessness | Illinois | 2272 |
| Family and Children | Arizona | 2162 |
| Family and Children | Virginia | 2013 |
| Family and Children | Louisiana | 1923 |
| Family and Children | Maine | 1868 |
| Housing and Homelessness | Missouri | 1813 |
| Consumer Financial Questions | Indiana | 1779 |
| Family and Children | West Virginia | 1758 |

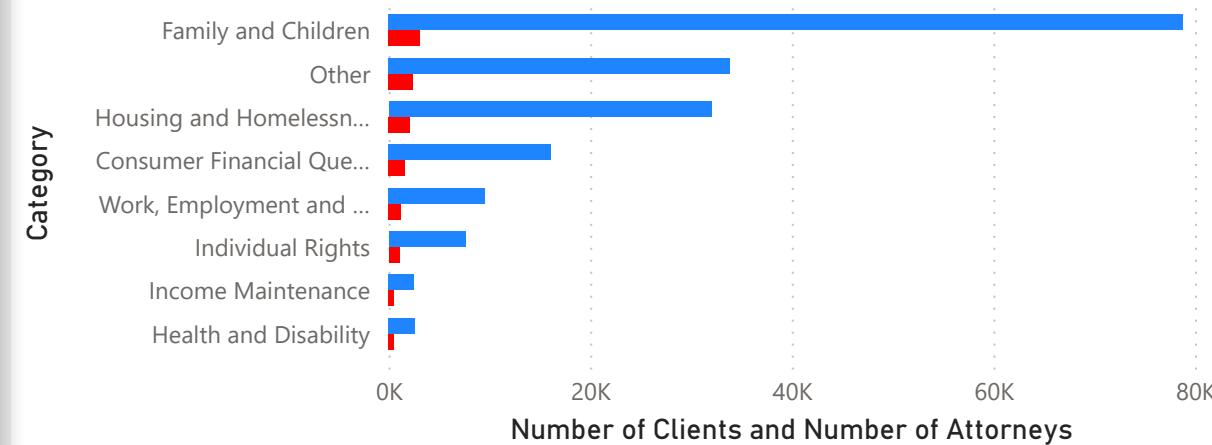
Ratio of Attorneys vs. Clients by State

● Number of Clients ● Number of Attorneys



Ratio of Attorneys vs. Clients by Category

● Number of Clients ● Number of Attorneys



Advice for the attorneys

- After analyzing the data, we realize that Indiana and North Carolina have the least client attorney ratio, while on the other hand, Texas and Florida have the most attorneys.
- Michigan and California are being assisted the most. Our clients are generally low-income, female, middle-aged, Caucasian and living by themselves. Hence we could have a better portrait of our clients.

| ClientInfo | StateName | County | PostalCode | EthnicIdentity | Age | Gender | MaritalStatus | Veteran | Imprisoned |
|--|---------------|------------------------|------------|--|------|--------|-----------------------|---------|------------|
| 12AF0355-444A-495D-9937-E2E09D01A098 | Wyoming | Laramie | 82007 | Latino or Hispanic | NULL | Male | Married / remarried | NULL | NULL |
| 24B65F12-B8AA-4807-BB6E-0510BD722C5 | Nebraska | Lancaster | 68010 | Caucasian | 56 | Female | Divorced or Widowed | NULL | NULL |
| 37F56412-DCAA-450B-AB8D-0B0170D9F0423 | Connecticut | Hartford | 06108 | African American | 30 | Female | Single | NULL | No |
| B59ABF8E-CDD2-402B-BE0D-403CB4D7073 | Georgia | Bibb | 30152 | Caucasian,Native American or Alaska Native | 33 | Female | Divorced or Widowed | NULL | No |
| 0C8133E8-BDCC-4632-A10C-85478085638 | Georgia | Clayton | 30296 | African American | 42 | Female | Single | No | No |
| AF4A975D-17FA-4077-8958-2544AC28D0A | Alaska | Anchorage Municipality | 99507 | Caucasian,Native American or Alaska Native | 37 | Female | Single | No | No |
| C7209690-7E5F-458A-9124-205B4095AD7 | Iowa | Polk | 50249 | Caucasian | NULL | Female | Divorced or Widowed | No | NULL |
| C12FFB2-FABA-4C72-BB0D-00A1C9381A | Georgia | Tift | 31194 | Caucasian | 23 | Female | Divorced or Widowed | No | NULL |
| F16515A8-F726-4C8C-BB0A-881B350E08A8 | Pennsylvania | Bucks | 19601 | Latino or Hispanic | NULL | Female | Single | No | NULL |
| 43257A8F-F726-4CA7-95A2-AE07-C72C82D7C88 | Maryland | Washington | 21210 | Caucasian | 38 | Male | Married / remarried | NULL | No |
| AF4A975D-17FA-4077-8958-2544AC28D0A | Texas | Harris | 77008 | Caucasian | 66 | Female | Divorced or Widowed | No | No |
| 00414641-0778-4067-A004-294651202D | Alabama | Madison | 35105 | Caucasian | 51 | Male | Single | No | No |
| 63B8FED0-5623-47C1-88F2-8553E42D991C | ABA Federal | Florida | 32162 | Caucasian | 54 | Male | Divorced or Widowed | Yes | No |
| D8D6E996-3401-4605-A0B5-781B054905A8 | Louisiana | Caddo Parish | 71118 | Caucasian | NULL | Female | Married / remarried | NULL | No |
| DD782AC8-7D17-4E0E-9188-7099E35D0818 | Maryland | Anne Arundel | 21061 | African American | 18 | Female | Single | NULL | No |
| FFBA0AF2-099E-44F7-AF4F-4EFD67E56F8 | Pennsylvania | Somerset | 15541 | Caucasian | 48 | Female | Married / remarried | No | No |
| E41F5F8C-9FD5-4D18-A719-285237351633 | Louisiana | Tangipahoa Parish | 78665 | NULL | NULL | NULL | NULL | NULL | NULL |
| 08708705-0200-48BC-A596-08CD5739AC95 | New Hampshire | Hillsborough | 03104 | African American | 39 | Female | Single | No | No |
| 9E336747-8877-466B-8067-4D58840A15C | ABA Federal | Washington | 98002 | I'd rather not answer | NULL | Male | Single | No | NULL |
| 9108870-5808-47A4-A907-C181934C8 | Louisiana | Bossier Parish | 71112 | NULL | NULL | NULL | NULL | NULL | NULL |
| 9698551C-8237-4EA8-9533-936617A9914 | Wyoming | Natrona | 82601 | Caucasian,Other | NULL | Female | Divorced or Widowed | NULL | NULL |
| 3D1C69FD-0245-47C1-939F-ACB9000B5C3F | Maryland | Baltimore | 21214 | African American | 54 | Male | Married / remarried | No | No |
| B5178607-3F53-44D0-A0E0-490786C4A00 | Alaska | Anchorage Municipality | 99504 | Native Hawaiian / Pacific Islander | 37 | Female | Married / remarried | No | No |
| CFC00C42-846C-A454-A00E-A0277C6350A | Connecticut | New Haven | 06492 | Caucasian | NULL | Male | Married / remarried | NULL | NULL |
| 61560961-7C84-5451-8560-0388297844A | Connecticut | New Haven | 06460 | NULL | NULL | NULL | NULL | NULL | NULL |
| 8BAD48AF-DE12-4935-B27D-035FCA24D1 | Iowa | Iowa | 50702 | Caucasian | 30 | Female | Single | No | No |
| E17D0996-8859-49CA-AD77-1A74200704AC | Pennsylvania | Cumberland | 17013 | Caucasian,Other | 49 | Female | Single | No | No |
| C2070474-C478-4B2E-9A72-72715D18574F | Missouri | Jackson | 64112 | Caucasian | 31 | Male | Single | No | No |
| A2504C3-2F22-4A57-BD9C-556785E4F48A | Georgia | Newton | 30954 | I'd rather not answer | 48 | Male | Married / remarried | NULL | No |
| 063FC13D-F3B5-4838-9F8C-8773886C91C3 | Mississippi | Prentiss | 38828 | Caucasian | NULL | Female | Divorced or Widowed | NULL | NULL |
| 65KA2C2F-C609-497B-B950-011705D91623 | Alabama | St. Clair | 35131 | Caucasian | 32 | Male | I'd rather not answer | No | No |
| 73734ACD-9827-42B0-B020-DA59AC0455A5 | Louisiana | Lafayette Parish | 70129 | Caucasian | NULL | Female | Separated | NULL | No |
| 774AD7C7-C446-4C40-9501-CC156662D0A2 | Illinois | LaSalle | 61179 | Caucasian | 25 | Female | Married / remarried | NULL | No |
| F2619990-83F9-4C0F-83C4-D44953A7E70D | Alabama | Etowah | 35957 | African American | 25 | Male | Married / remarried | No | No |

| t_1 | t_2 | t_3 | t_4 | t_5 | t_6 | t_7 | t_8 | t_9 | t_10 | t_11 | predicted |
|--------------|-----------------|--------------|-------------|---------------|-------------|------------------|------------|----------------|--------------|--------------|-----------|
| bank | landlord | jurisdiction | claim | court | la | email | trust | attorney | custody | order | |
| money | rent | state | employer | file | â | michigan | dad | lawyer | daughter | motion | |
| account | move | colorado | employment | paperwork | youâ | contact | understand | case | court | hearing | |
| bankruptcy | court | worker | treated | information | thatâ | telephone | make | court | case | judge | |
| check | tenant | health | time | filed | donâ | documents | wife | legal | live | custody | |
| pay | eviction | sons | lost | case | itâ | parent | give | work | mother | filed | |
| rent | lease | due | retirement | order | doesnâ | custodial_parent | property | represent | father | request | |
| filings | notice | work | issue | time | case | custodial | estate | situation | children | file | |
| usa | place | medicaid | harm | lot | canâ | wrote | brother | provide | back | protective | |
| bank_account | trailer | doctor | employee | form | situation | appeal | passed | things | full | file_motion | |
| social | letter | situation | ptsd | copy | didnâ | free | wanted | file | lives | protective_c | |
| sue | water | home | damages | website | living | told | assets | attorneys | work | return | |
| order | belongings | reply | back | agreement | good | monday | marriage | fees | school | modification | |
| payment | stated | texas | reputation | give | hope | important | made | information | custody_case | made | |
| asked | owner | back | breach | pr | things | www | deceased | lawyers | pick | granted | |
| loan | called | matter | contract | fill | helpful | agree | dementia | response | week | state | |
| wait | agreement | legal | limitations | court_order | wisconsin | information | direction | hire | dad | modify | |
| benefits | home | oklahoma | brought | situation | immediately | adobe | prior | representation | full_custody | record | |
| owe | landlord_tenant | manager | claims | judge | good_luck | hills | fact | good | visit | question | |
| change | rental | department | related | court_website | issue | hills_michigan | married | appointed | change | back | |

Advice for the attorneys

- For this task we wanted to analyze what a client would be likely to talk about, given the client's info.
- To do this, we extracted keywords from conversations between clients and attorneys, then organized the keywords into topics.
- Then we mapped each conversation to its client, and each conversation to a topic (through the keywords). Now we have a mapping between clients, and topics.
- Now we feed it into a RandomForest model. From this we can predict the topic that an arbitrary client will talk about, given the client's info. (such as demographics, location, etc...) Now before an attorney even talks to a client, they can prepare for what the client will likely talk about, which would be of great use to attorneys.

Conclusion

- Recommendation 1:

Allocate more attorneys to Indiana, North Carolina, Massachusetts, Florida and Tennessee. That is because they have the least client attorney ratio among all states.

- Recommendation 2:

Recruit or train attorneys in the topics of “Family and Children” and “Housing and Homeless”. That is because these are the two most frequently asked questions among all.

- Recommendation 3:

We have trained a model to predict the topic an arbitrary client will talk about, purely based on the client’s info. So before an attorney even interacts with a client, they can now have context about what the client is likely to talk about.