

Informe

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Importación de librerías

```
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.0 --
## v ggplot2 3.3.2      v purrr 0.3.4
## v tibble 3.0.4       v dplyr 1.0.4
## v tidyr 1.1.2        v stringr 1.4.0
## v readr 1.4.0        v forcats 0.5.0

## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()

#library(kableExtra)
library(pander) #Para mostrar los vectores más estéticamente

## Warning: package 'pander' was built under R version 4.0.5

library(DT)
library(readr)
library(missForest)

## Warning: package 'missForest' was built under R version 4.0.5
## Loading required package: randomForest
## Warning: package 'randomForest' was built under R version 4.0.5
## randomForest 4.6-14
## Type rfNews() to see new features/changes/bug fixes.
##
## Attaching package: 'randomForest'
## The following object is masked from 'package:dplyr':
##
##      combine
## The following object is masked from 'package:ggplot2':
##
##      margin
## Loading required package: foreach
## Warning: package 'foreach' was built under R version 4.0.4
```

```
##
## Attaching package: 'foreach'
## The following objects are masked from 'package:purrr':
##
##   accumulate, when
## Loading required package: iterators
## Warning: package 'iterators' was built under R version 4.0.4
## Loading required package: iterators
## Warning: package 'iterators' was built under R version 4.0.4
```

Importación del dataset

```
raw_data <- read_csv("Data/Raw/uncleaned_data.csv")

##
## -- Column specification -----
## cols(
##   index = col_double(),
##   `Job Title` = col_character(),
##   `Salary Estimate` = col_character(),
##   `Job Description` = col_character(),
##   Rating = col_double(),
##   `Company Name` = col_character(),
##   Location = col_character(),
##   Headquarters = col_character(),
##   Size = col_character(),
##   Founded = col_double(),
##   `Type of ownership` = col_character(),
##   Industry = col_character(),
##   Sector = col_character(),
##   Revenue = col_character(),
##   Competitors = col_character()
## )

# raw_data %>% DT::datatable(
#   extensions = 'FixedColumns',
#   options = list(
#     dom = 't',
#     scrollX = TRUE,
#     scrollCollapse = TRUE)
# )
```

Exploración del dominio de las variables

Nombre de todas las variables

```
cols_raw_data <- names(raw_data)
cols_raw_data

## [1] "index"          "Job Title"      "Salary Estimate"
```

```
## [4] "Job Description" "Rating" "Company Name"
## [7] "Location" "Headquarters" "Size"
## [10] "Founded" "Type of ownership" "Industry"
## [13] "Sector" "Revenue" "Competitors"
```

Selección de las variables de interés para el estudio del dominio

```
cols_no_interest <- c("index","Job Description") #Eliminamos Job Description de momento por tener demas
cols_raw_data_filtered <- cols_raw_data[-which(cols_raw_data %in% cols_no_interest)]
```

Visualización en forma de lista del dominio de cada variable

```
cols_raw_data_filtered %>%
  map(function(x) unique(raw_data[[x]])) %>%
  setNames(cols_raw_data_filtered) -> list_domain
list_domain
```

```
## $`Job Title`
## [1] "Sr Data Scientist"
## [2] "Data Scientist"
## [3] "Data Scientist / Machine Learning Expert"
## [4] "Staff Data Scientist - Analytics"
## [5] "Data Scientist - Statistics, Early Career"
## [6] "Data Modeler"
## [7] "Experienced Data Scientist"
## [8] "Data Scientist - Contract"
## [9] "Data Analyst II"
## [10] "Medical Lab Scientist"
## [11] "Data Scientist/Machine Learning"
## [12] "Human Factors Scientist"
## [13] "Business Intelligence Analyst I- Data Insights"
## [14] "Data Scientist - Risk"
## [15] "Data Scientist-Human Resources"
## [16] "Senior Research Statistician- Data Scientist"
## [17] "Data Engineer"
## [18] "Associate Data Scientist"
## [19] "Business Intelligence Analyst"
## [20] "Senior Analyst/Data Scientist"
## [21] "Data Analyst"
## [22] "Machine Learning Engineer"
## [23] "Data Analyst I"
## [24] "Scientist - Molecular Biology"
## [25] "Computational Scientist, Machine Learning"
## [26] "Senior Data Scientist"
## [27] "Jr. Data Engineer"
## [28] "E-Commerce Data Analyst"
## [29] "Data Analytics Engineer"
## [30] "Product Data Scientist - Ads Data Science"
## [31] "Data Scientist - Intermediate"
## [32] "Global Data Analyst"
## [33] "Data & Machine Learning Scientist"
## [34] "Data Scientist - Machine Learning"
## [35] "Data Engineer (Remote)"
```

```

## [36] "Data Scientist, Applied Machine Learning - Bay Area"
## [37] "Principal Data Scientist"
## [38] "Business Data Analyst"
## [39] "Purification Scientist"
## [40] "Data Engineer, Enterprise Analytics"
## [41] "Data Scientist 3 (718)"
## [42] "Real World Science, Data Scientist"
## [43] "Data Scientist - Image and Video Analytics"
## [44] "Data Science Manager, Payment Acceptance - USA"
## [45] "Data Scientist / Applied Mathematician"
## [46] "Patient Safety- Associate Data Scientist"
## [47] "(Sr.) Data Scientist -"
## [48] "Data Scientist, Kinship - NYC/Portland"
## [49] "Applied Technology Researcher / Data Scientist"
## [50] "Health Data Scientist - Biomedical/Biostats"
## [51] "Staff Data Scientist"
## [52] "Sr Data Engineer (Sr BI Developer)"
## [53] "Lead Data Scientist"
## [54] "RFP Data Analyst"
## [55] "Data Scientist (TS/SCI)"
## [56] "Software Engineer - Data Science"
## [57] "Data Analyst/Engineer"
## [58] "NGS Scientist"
## [59] "Senior Data Engineer"
## [60] "Sr. ML/Data Scientist - AI/NLP/Chatbot"
## [61] "Data Integration and Modeling Engineer"
## [62] "Tableau Data Engineer 20-0117"
## [63] "AI Data Scientist"
## [64] "Research Scientist Patient Preferences (Remote)"
## [65] "Scientist - Biomarker and Flow Cytometry"
## [66] "Analytics Manager"
## [67] "Staff Scientist- Upstream PD"
## [68] "Sr Scientist - Extractables & Leachables"
## [69] "ELISA RESEARCH SCIENTIST (CV-15)"
## [70] "Say Business Data Analyst"
## [71] "Geospatial Data Scientist"
## [72] "Computational Scientist"
## [73] "Senior Data Analyst"
## [74] "Sr Data Analyst"
## [75] "Machine Learning Scientist - Bay Area, CA"
## [76] "Senior Data Scientist - Algorithms"
## [77] "Senior Data & Machine Learning Scientist"
## [78] "Research Scientist - Patient-Centered Research (Remote)"
## [79] "Jr. Business Data Analyst (position added 6/12/2020)"
## [80] "Sr. Data Scientist II"
## [81] "Production Engineer - Statistics/Data Analysis"
## [82] "Statistical Scientist"
## [83] "Computational Behavioral Scientist"
## [84] "Principal Data Scientist - Machine Learning"
## [85] "Principal Machine Learning Scientist"
## [86] "Senior Data Scientist - R&D Oncology"
## [87] "Health Plan Data Analyst, Sr"
## [88] "Principal Scientist/Associate Director, Quality Control and Analytical Technologies"
## [89] "Analytics - Business Assurance Data Analyst"

```

[90] "Senior Data Scientist - Image Analytics, Novartis AI Innovation Lab"
 ## [91] "Data Science Instructor"
 ## [92] "Senior Business Intelligence Analyst"
 ## [93] "In-Line Inspection Data Analyst"
 ## [94] "Data Scientist - TS/SCI FSP or CI Required"
 ## [95] "Data Scientist - TS/SCI Required"
 ## [96] "Data Science Software Engineer"
 ## [97] "ENGINEER - COMPUTER SCIENTIST - RESEARCH COMPUTER SCIENTIST - SIGNAL PROCESSING - SAN ANTONIO"
 ## [98] "AI Ops Data Scientist"
 ## [99] "Intelligence Data Analyst, Senior"
 ## [100] "Analytics Manager - Data Mart"
 ## [101] "Data Modeler (Analytical Systems)"
 ## [102] "Senior Machine Learning Scientist - Bay Area, CA"
 ## [103] "Report Writer-Data Analyst"
 ## [104] "Staff Data Scientist - Pricing"
 ## [105] "Equity Data Insights Analyst - Quantitative Analyst"
 ## [106] "Operations Data Analyst"
 ## [107] "Software Data Engineer"
 ## [108] "Real World Evidence (RWE) Scientist"
 ## [109] "Computer Scientist 1"
 ## [110] "Environmental Data Science"
 ## [111] "Staff BI and Data Engineer"
 ## [112] "Data Scientist - Statistics, Mid-Career"
 ## [113] "Director of Data Science"
 ## [114] "Data Engineer, Digital & Comp Pathology"
 ## [115] "Manager / Lead, Data Science & Analytics"
 ## [116] "Diversity and Inclusion Data Analyst"
 ## [117] "Data Scientist Machine Learning"
 ## [118] "Chief Scientist"
 ## [119] "Development Scientist, Voltaren"
 ## [120] "Principal Data & Analytics Platform Engineer"
 ## [121] "Machine Learning Engineer/Scientist"
 ## [122] "Data Analyst - Unilever Prestige"
 ## [123] "VP, Data Science"
 ## [124] "Data Engineer - Kafka"
 ## [125] "Decision Scientist"
 ## [126] "Data Science All Star Program - Data Engineer Track"
 ## [127] "Scientist - Machine Learning"
 ## [128] "Sr. Data Scientist"
 ## [129] "Applied AI Scientist / Engineer"
 ## [130] "Data Engineer (Analytics, SQL, Python, AWS)"
 ## [131] "Senior Data Analyst - Finance & Platform Analytics"
 ## [132] "Market Research Data Scientist"
 ## [133] "IT Partner Digital Health Technology and Data Science"
 ## [134] "Software Engineer (Data Scientist, C,C++,Linux,Unix) - SISW - MG"
 ## [135] "Senior Clinical Data Scientist Programmer"
 ## [136] "Computer Vision / Deep Learning Scientist"
 ## [137] "Data Solutions Engineer - Data Modeler"
 ## [138] "Data Scientist (TS/SCI w/ Poly)"
 ## [139] "Weapons and Sensors Engineer/Scientist"
 ## [140] "Applied Computer Scientist"
 ## [141] "Cloud Data Engineer (Azure)"
 ## [142] "Lead Certified Clinical Laboratory Scientist - Saturday - Tuesday, 8:00pm - 6:30am shift"
 ## [143] "Sr. Data Analyst"

```

## [144] "Senior Scientist - Toxicologist - Product Integrity (Stewardship)"
## [145] "Senior Machine Learning Engineer"
## [146] "Data Scientist- Industrial Discrete Sector Industry"
## [147] "Senior Principal Data Scientist (Python/R)"
## [148] "Data Scientist(s)/Machine Learning Engineer"
## [149] "Scientist / Group Lead, Cancer Biology"
## [150] "Manager, Field Application Scientist, Southeast"
## [151] "COMPUTER SCIENTIST - ENGINEER - RESEARCH COMPUTER SCIENTIST - SIGNAL PROCESSING"
## [152] "Machine Learning Scientist / Engineer"
## [153] "Data Science Analyst"
## [154] "COMPUTER SCIENTIST - ENGINEER - RESEARCH COMPUTER SCIENTIST - TRANSPORTATION TECHNOLOGY"
## [155] "Software Engineer - Machine Learning & Data Science (Applied Intelligence Services Team)"
## [156] "Clinical Data Analyst"
## [157] "Data Scientist Technical Specialist"
## [158] "Data Science Manager"
## [159] "Big Data Engineer"
## [160] "Data Architect"
## [161] "Aviation AI/ML Data Scientist"
## [162] "Machine Learning Engineer, Sr."
## [163] "Information Systems Engineering Specialist (Engineering Scientist)"
## [164] "Scientist/Research Associate-Metabolic Engineering"
## [165] "Vice President, Biometrics and Clinical Data Management"
## [166] "Enterprise Data Analyst (Enterprise Portfolio Management Office)"
## [167] "Lead Data Scientist - Network Analysis and Control"
## [168] "Sr. Research Associate/ Scientist, NGS prep & Molecular Genomics"
## [169] "Developer III - Data Science"
## [170] "Hydrogen/Tritium Materials Scientist (Experienced)"
## [171] "Data Scientist/Data Analytics Practitioner"
## [172] "AI/ML - Machine Learning Scientist, Siri Understanding"
##
## $`Salary Estimate`
## [1] "$137K-$171K (Glassdoor est.)" "$75K-$131K (Glassdoor est.)"
## [3] "$79K-$131K (Glassdoor est.)" "$99K-$132K (Glassdoor est.)"
## [5] "$90K-$109K (Glassdoor est.)" "$101K-$165K (Glassdoor est.)"
## [7] "$56K-$97K (Glassdoor est.)" "$79K-$106K (Glassdoor est.)"
## [9] "$71K-$123K (Glassdoor est.)" "$90K-$124K (Glassdoor est.)"
## [11] "$91K-$150K (Glassdoor est.)" "$141K-$225K (Glassdoor est.)"
## [13] "$145K-$225K(Employer est.)" "$79K-$147K (Glassdoor est.)"
## [15] "$122K-$146K (Glassdoor est.)" "$112K-$116K (Glassdoor est.)"
## [17] "$110K-$163K (Glassdoor est.)" "$124K-$198K (Glassdoor est.)"
## [19] "$79K-$133K (Glassdoor est.)" "$69K-$116K (Glassdoor est.)"
## [21] "$31K-$56K (Glassdoor est.)" "$95K-$119K (Glassdoor est.)"
## [23] "$212K-$331K (Glassdoor est.)" "$66K-$112K (Glassdoor est.)"
## [25] "$128K-$201K (Glassdoor est.)" "$138K-$158K (Glassdoor est.)"
## [27] "$80K-$132K (Glassdoor est.)" "$87K-$141K (Glassdoor est.)"
## [29] "$92K-$155K (Glassdoor est.)" "$105K-$167K (Glassdoor est.)"
##
## $Rating
## [1] 3.1 4.2 3.8 3.5 2.9 3.9 4.4 3.6 4.5 4.7 3.7 3.4 4.1 3.2 4.3
## [16] 2.8 5.0 4.8 3.3 2.7 2.2 2.6 4.0 2.5 4.9 2.4 -1.0 2.3 4.6 3.0
## [31] 2.1 2.0
##
## $`Company Name`
## [1] "Healthfirst\n3.1"

```

```

## [2] "ManTech\n4.2"
## [3] "Analysis Group\n3.8"
## [4] "INFICON\n3.5"
## [5] "Affinity Solutions\n2.9"
## [6] "HG Insights\n4.2"
## [7] "Novartis\n3.9"
## [8] "iRobot\n3.5"
## [9] "Intuit - Data\n4.4"
## [10] "XSELL Technologies\n3.6"
## [11] "Novetta\n4.5"
## [12] "1904labs\n4.7"
## [13] "PNNL\n3.7"
## [14] "Old World Industries\n3.1"
## [15] "Mathematica Policy Research\n3.4"
## [16] "Guzman & Griffin Technologies (GGTI)\n4.4"
## [17] "Upside Business Travel\n4.1"
## [18] "Buckman\n3.5"
## [19] "Insight Enterprises, Inc.\n4.2"
## [20] "Tower Health\n3.5"
## [21] "Triplebyte\n3.2"
## [22] "PulsePoint\n4.3"
## [23] "Exponent\n3.5"
## [24] "Guardian Life\n3.5"
## [25] "Spectrum Communications and Consulting\n3.4"
## [26] "Oversight Systems\n4.7"
## [27] "LSQ\n4.2"
## [28] "MIT Lincoln Laboratory\n3.8"
## [29] "Kingfisher Systems\n4.5"
## [30] "Formation\n2.8"
## [31] "Cohere Health\n5.0"
## [32] "Acuity Insurance\n4.8"
## [33] "Chef\n3.6"
## [34] "Puget Sound Energy\n3.3"
## [35] "Sandhills Global\n2.7"
## [36] "A Place for Mom\n2.7"
## [37] "Great-Circle Technologies\n2.2"
## [38] "Edmunds.com\n3.4"
## [39] "Cambridge Associates, LLC\n3.1"
## [40] "Liberty Mutual Insurance\n3.4"
## [41] "Cenlar\n2.6"
## [42] "Arsenal Biosciences\n5.0"
## [43] "Eversight\n4.2"
## [44] "Pfizer\n4.1"
## [45] "Klaviyo\n4.8"
## [46] "Intellectual Ventures\n3.3"
## [47] "GovTech\n3.7"
## [48] "Quick Base\n4.3"
## [49] "Giving Assistant\n4.8"
## [50] "Takeda\n3.7"
## [51] "Netskope\n4.0"
## [52] "IT Concepts\n4.8"
## [53] "iSeatz\n3.5"
## [54] "Summa Health System\n3.7"
## [55] "Benson Hill\n3.5"

```

[56] "Twitter\n4.1"
 ## [57] "Postmates - Corporate HQ\n3.2"
 ## [58] "Envision LLC\n4.5"
 ## [59] "Swiss Re\n3.8"
 ## [60] "Systems & Technology Research\n4.5"
 ## [61] "Dermalogica\n3.8"
 ## [62] "Bayview Asset Management\n3.7"
 ## [63] "Via Transportation\n3.7"
 ## [64] "Grid Dynamics\n4.0"
 ## [65] "Tempus Labs\n3.3"
 ## [66] "CareDx\n2.5"
 ## [67] "IZEA\n4.2"
 ## [68] "Autodesk\n4.0"
 ## [69] "Caterpillar\n3.7"
 ## [70] "New England Biolabs\n4.9"
 ## [71] "Allied Solutions\n3.4"
 ## [72] "The Knot Worldwide\n3.5"
 ## [73] "IFG Companies\n2.9"
 ## [74] "Amyris\n3.3"
 ## [75] "AstraZeneca\n4.0"
 ## [76] "Powertek\n3.6"
 ## [77] "Object Partners\n4.7"
 ## [78] "The Mom Project\n4.9"
 ## [79] "Lightspeed Systems\n4.3"
 ## [80] "Stripe\n4.0"
 ## [81] "Comprehensive Healthcare\n2.6"
 ## [82] "Fullpower Technologies, Inc.\n4.5"
 ## [83] "Mars\n3.9"
 ## [84] "NuWave Solutions\n4.4"
 ## [85] "Merrick Bank\n3.6"
 ## [86] "QOMPLX\n3.5"
 ## [87] "GutCheck\n3.8"
 ## [88] "Inter-American Development Bank\n3.5"
 ## [89] "Avlino\n4.9"
 ## [90] "Stratagem Group\n4.4"
 ## [91] "Evidation\n4.1"
 ## [92] "Tecolote Research\n3.8"
 ## [93] "Tivity Health\n3.2"
 ## [94] "hc1\n2.9"
 ## [95] "HP Inc.\n4.1"
 ## [96] "SAIC\n3.7"
 ## [97] "AllianceBernstein\n3.2"
 ## [98] "Big Huge Games\n4.9"
 ## [99] "Maxar Technologies\n3.5"
 ## [100] "Phantom AI\n5.0"
 ## [101] "Noblis\n4.0"
 ## [102] "Spring Health\n3.6"
 ## [103] "ClearEdge\n4.0"
 ## [104] "GetWellNetwork\n4.8"
 ## [105] "TACG Solutions\n4.5"
 ## [106] "Scoop\n4.7"
 ## [107] "Montway Inc\n3.4"
 ## [108] "Juniper Networks\n3.8"
 ## [109] "Notion Labs\n5.0"

[110] "Lendio\n4.9"
 ## [111] "Direct Agents\n4.4"
 ## [112] "NAVEX Global\n3.3"
 ## [113] "Upstart\n4.2"
 ## [114] "AppLovin\n4.8"
 ## [115] "ISO New England\n3.8"
 ## [116] "Relativity\n3.7"
 ## [117] "Tempo Automation\n3.3"
 ## [118] "MITRE\n3.3"
 ## [119] "Expedition Technology, Inc.\n5.0"
 ## [120] "Evidera\n3.8"
 ## [121] "Plymouth Rock Assurance\n3.4"
 ## [122] "Crown Bioscience\n2.4"
 ## [123] "GNS Healthcare\n2.9"
 ## [124] "OneMagnify\n4.4"
 ## [125] "SPECTRUM\n2.9"
 ## [126] "Advanced BioScience Laboratories\n2.7"
 ## [127] "Procore Technologies\n4.2"
 ## [128] "Ritedose\n3.5"
 ## [129] "Covid-19 Search Partners"
 ## [130] "bioMérieux\n4.2"
 ## [131] "Radical Convergence"
 ## [132] "Leidos\n3.5"
 ## [133] "Demandbase\n4.5"
 ## [134] "Shelter Insurance\n4.1"
 ## [135] "USAC\n2.7"
 ## [136] "General Dynamics Information Technology\n3.4"
 ## [137] "Offerpad\n4.4"
 ## [138] "Magna International Inc.\n3.5"
 ## [139] "United BioSource\n2.3"
 ## [140] "Kelly\n3.4"
 ## [141] "C3.ai\n4.7"
 ## [142] "Quartet Health\n3.9"
 ## [143] "Midland Credit Management\n3.3"
 ## [144] "Resurgent Capital Services\n4.4"
 ## [145] "webfx.com\n4.7"
 ## [146] "Argo Group US\n3.5"
 ## [147] "BWX Technologies\n3.3"
 ## [148] "Life360\n3.9"
 ## [149] "MassMutual\n3.7"
 ## [150] "Natera\n3.9"
 ## [151] "Genentech\n4.0"
 ## [152] "Ntrepid\n4.2"
 ## [153] "Constant Contact\n3.6"
 ## [154] "Sage Intacct\n4.7"
 ## [155] "Shape Security\n4.1"
 ## [156] "SkillSoniq\n5.0"
 ## [157] "Joby Aviation\n4.3"
 ## [158] "Cook Children's Health Care System\n3.8"
 ## [159] "Rubius Therapeutics\n3.8"
 ## [160] "GreatAmerica Financial Services\n4.6"
 ## [161] "Coverent\n4.1"
 ## [162] "Mteq\n3.7"
 ## [163] "Rocket Lawyer\n4.4"

[164] "Alion Science & Technology\n3.6"
 ## [165] "Protolabs\n3.7"
 ## [166] "Quest Integrity\n2.9"
 ## [167] "Phoenix Operations Group\n5.0"
 ## [168] "Dice.com\n3.4"
 ## [169] "Southwest Research Institute\n3.9"
 ## [170] "The Buffalo Group\n4.3"
 ## [171] "Central California Alliance for Health\n3.5"
 ## [172] "Security Finance Corporation of Spartanburg\n3.1"
 ## [173] "Opendoor\n3.6"
 ## [174] "Global Data Management Inc\n4.5"
 ## [175] "Photon Infotech\n3.0"
 ## [176] "REE\n5.0"
 ## [177] "Riverside Research Institute\n3.6"
 ## [178] "T. Rowe Price\n3.6"
 ## [179] "Encode, Inc."
 ## [180] "Brighthouse Financial\n3.8"
 ## [181] "II-VI Incorporated\n3.3"
 ## [182] "Surya Systems\n4.6"
 ## [183] "PayPal\n3.8"
 ## [184] "Predictive Research Inc\n3.9"
 ## [185] "1010data\n3.1"
 ## [186] "Gigya\n3.6"
 ## [187] "Genesis Research\n5.0"
 ## [188] "Sanofi\n3.7"
 ## [189] "XP0 Logistics\n3.7"
 ## [190] "Trace Data\n3.9"
 ## [191] "Descript\n4.3"
 ## [192] "Rincon Research Corporation\n4.2"
 ## [193] "Better Hire\n4.0"
 ## [194] "Parker Hannifin\n3.3"
 ## [195] "Gallup\n4.1"
 ## [196] "Insider Inc\n3.3"
 ## [197] "Rapid Value Solutions\n3.9"
 ## [198] "Battelle\n3.1"
 ## [199] "The Drive Media, Inc.\n5.0"
 ## [200] "Pacific Northwest National Laboratory\n3.7"
 ## [201] "US Pharmacopeia\n3.2"
 ## [202] "Itlize Global\n4.6"
 ## [203] "eBay\n3.5"
 ## [204] "Paige\n5.0"
 ## [205] "ABIOMED\n4.1"
 ## [206] "Comcast\n3.5"
 ## [207] "Metronome, LLC\n3.2"
 ## [208] "Lawrence Livermore National Lab\n4.7"
 ## [209] "FHLBank Pittsburgh\n3.8"
 ## [210] "Jacobs\n3.6"
 ## [211] "Underwriters Laboratories\n3.3"
 ## [212] "Altus Group\n3.7"
 ## [213] "Jobot\n5.0"
 ## [214] "Trovetechs Inc"
 ## [215] "Oshkosh Corporation\n4.2"
 ## [216] "Mackin\n3.4"
 ## [217] "PETADATA"

[218] "VBeyond Corporation\n4.4"
 ## [219] "Take-Two\n3.7"
 ## [220] "Colony Brands\n3.7"
 ## [221] "Capio Group\n4.1"
 ## [222] "SleePare\n3.4"
 ## [223] "ShorePoint\n4.5"
 ## [224] "Dolphin\n3.5"
 ## [225] "TE Connectivity\n3.6"
 ## [226] "State of Virginia\n3.2"
 ## [227] "TA Digital\n3.7"
 ## [228] "Market America Inc\n4.0"
 ## [229] "TrueAccord\n3.4"
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 ## [231] "Kollasoft Inc.\n3.2"
 ## [232] "ASRC Federal Holding Company\n3.4"
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 ## [235] "Metromile\n3.8"
 ## [236] "Criteo\n3.9"
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 ## [243] "22nd Century Technologies\n3.7"
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 ## [246] "B4Corp"
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 ## [248] "Jane Street\n4.8"
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 ## [250] "Solving IT International Inc\n3.4"
 ## [251] "The Davey Tree Expert Company\n3.3"
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 ## [253] "Stride Search"
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 ## [255] "TechProjects\n4.8"
 ## [256] "7Park Data\n3.9"
 ## [257] "Ameritas Life Insurance Corp\n3.0"
 ## [258] "Western Digital\n3.5"
 ## [259] "Shimento, Inc.\n2.9"
 ## [260] "Averity\n5.0"
 ## [261] "Praxis Engineering\n4.7"
 ## [262] "Point72 Ventures"
 ## [263] "Johns Hopkins University Applied Physics Laboratory\n4.5"
 ## [264] "Cambridge Mobile Telematics\n4.9"
 ## [265] "Blend360\n4.6"
 ## [266] "Nolij Consulting\n3.9"
 ## [267] "Hatch Data Inc"
 ## [268] "Compass Consulting Group\n4.7"
 ## [269] "SolutionIT, Inc.\n4.4"
 ## [270] "Perspecta\n3.2"
 ## [271] "Smith Hanley Associates\n4.5"

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 ## [273] "Eliassen Group\n4.4"
 ## [274] "Bayside Solutions\n3.1"
 ## [275] "Evolve Vacation Rental\n3.5"
 ## [276] "AgreeYa Solutions\n3.8"
 ## [277] "Carolina Power & Light Co\n3.7"
 ## [278] "New Iron Group, Inc.\n5.0"
 ## [279] "Travelers\n4.0"
 ## [280] "Twitch\n3.6"
 ## [281] "Biogen\n3.6"
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 ## [283] "Mentor Graphics\n4.1"
 ## [284] "WCG (WIRB-Copernicus Group)\n3.6"
 ## [285] "Visionary Integration Professionals\n4.3"
 ## [286] "Dynetics\n4.0"
 ## [287] "Navy Federal Credit Union\n3.9"
 ## [288] "Exact Sciences Corporation\n4.0"
 ## [289] "Community Behavioral Health\n3.6"
 ## [290] "Reynolds American\n3.3"
 ## [291] "LifeOmic\n5.0"
 ## [292] "Visionist, Inc.\n4.9"
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 ## [295] "Evolvinc"
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 ## [309] "Werner Enterprises Inc\n3.1"
 ## [310] "PeopleCom\n5.0"
 ## [311] "VANTA Partners\n5.0"
 ## [312] "Blue Icy Water, LLC"
 ## [313] "Farmer's Business Network, Inc.\n3.5"
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 ## [316] "Change Healthcare\n2.7"
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 ## [320] "Net2Source Inc.\n3.2"
 ## [321] "The Trade Desk\n3.2"
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 ## [325] "HPOne\n3.5"

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 ## [327] "TBWA\\Chiat\\Day\\n2.7"
 ## [328] "ThreeBridge Solutions\\n3.5"
 ## [329] "Numeric, LLC\\n3.2"
 ## [330] "Centraprise\\n4.2"
 ## [331] "DW Simpson\\n4.2"
 ## [332] "LinQuest\\n3.9"
 ## [333] "Trexquant Investment\\n4.0"
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 ## [337] "IntelliPro Group Inc.\\n4.1"
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 ## [358] "Comtech Global Inc\\n4.0"
 ## [359] "Aveshka, Inc.\\n3.8"
 ## [360] "10x Genomics\\n4.2"
 ## [361] "CompuForce"
 ## [362] "1-800-Flowers\\n2.7"
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 ## [364] "JCD Staffing\\n5.0"
 ## [365] "Thumbtack\\n3.9"
 ## [366] "MILVETS Systems Technology, Inc.\\n3.4"
 ## [367] "Apple\\n4.1"
 ## [368] "Kforce\\n4.1"
 ## [369] "OppLoans\\n4.4"
 ## [370] "Brilliant\\n3.9"
 ## [371] "Xator Corporation\\n2.9"
 ## [372] "HAN IT Staffing Inc.\\n4.6"
 ## [373] "Infinitive Inc\\n3.4"
 ## [374] "New Relic\\n4.7"
 ## [375] "ICW Group\\n3.3"
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 ## [379] "Group 0\\n3.1"

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 ## [382] "Kibo"
 ## [383] "AeroVironment\n4.2"
 ## [384] "Applied Research Laboratories\n3.8"
 ## [385] "Conagen\n2.0"
 ## [386] "Alector\n4.8"
 ## [387] "Homology Medicines, Inc.\n4.4"
 ## [388] "Inland Empire Health Plan\n3.3"
 ## [389] "Sandia National Laboratories\n3.8"
 ## [390] "CIA\n3.8"
 ## [391] "Maven Wave Partners\n4.5"
 ## [392] "Ovative Group\n4.3"
 ## [393] "Kognetics\n3.6"
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 ## [395] "ConsumerTrack\n3.2"
 ## [396] "Meridian Knowledge Solutions\n4.4"
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 ## [398] "IMG Systems\n3.2"
 ## [399] "Trident Systems Inc\n3.4"
 ## [400] "GrainBridge, LLC"
 ## [401] "First Health Group\n3.2"
 ## [402] "Sprezzatura Management Consulting"
 ## [403] "Progress Rail, A Caterpillar Company\n2.8"
 ## [404] "Axiologic Solutions\n4.5"
 ## [405] "Indigo Slate\n3.0"
 ## [406] "Cubic\n3.3"
 ## [407] "Advanced Bio-Logic Solutions Corp\n4.0"
 ## [408] "Alignment Healthcare\n3.5"
 ## [409] "WGSN\n3.5"
 ## [410] "ISYS Technologies, Inc.\n3.6"
 ## [411] "TransVoyant\n3.0"
 ## [412] "Geotab\n4.3"
 ## [413] "EGlobalTech\n3.7"
 ## [414] "Central Business Solutions, Inc\n3.0"
 ## [415] "KeHE Distributors\n2.5"
 ## [416] "Moxie Software\n3.0"
 ## [417] "Unicom Technologies INC\n4.7"
 ## [418] "Americo Life\n3.3"
 ## [419] "Tokio Marine HCC\n3.3"
 ## [420] "CACI International\n3.5"
 ## [421] "Berico Technologies"
 ## [422] "Kehe Food Distributors"
 ## [423] "Pactera Edge"
 ## [424] "Qurate Retail Group\n3.6"
 ## [425] "A-Line Staffing Solutions\n4.1"
 ## [426] "Clear Ridge Defense"
 ## [427] "Criterion Systems, Inc.\n3.8"
 ## [428] "Foundation Medicine\n4.0"
 ## [429] "TRANZACT\n3.6"
 ## [430] "JKGT"
 ## [431] "AccessHope"
 ## [432] "ChaTeck Incorporated\n5.0"
 ##

```

## $Location
## [1] "New York, NY"          "Chantilly, VA"
## [3] "Boston, MA"           "Newton, MA"
## [5] "Santa Barbara, CA"    "Cambridge, MA"
## [7] "Bedford, MA"          "San Diego, CA"
## [9] "Chicago, IL"          "Herndon, VA"
## [11] "Saint Louis, MO"      "Richland, WA"
## [13] "Northbrook, IL"      "Washington, DC"
## [15] "Remote"               "Memphis, TN"
## [17] "Plano, TX"            "West Grove, PA"
## [19] "Phoenix, AZ"          "Appleton, WI"
## [21] "Atlanta, GA"          "Orlando, FL"
## [23] "Lexington, MA"        "McLean, VA"
## [25] "San Francisco, CA"    "Sheboygan, WI"
## [27] "United States"        "Bothell, WA"
## [29] "Lincoln, NE"          "Overland Park, KS"
## [31] "Santa Monica, CA"     "Portsmouth, NH"
## [33] "Ewing, NJ"             "South San Francisco, CA"
## [35] "Palo Alto, CA"        "Bellevue, WA"
## [37] "New Orleans, LA"      "Akron, OH"
## [39] "Fort Wayne, IN"       "Woburn, MA"
## [41] "Carson, CA"           "Coral Gables, FL"
## [43] "Santa Clara, CA"      "Brisbane, CA"
## [45] "Winter Park, FL"      "Redwood City, CA"
## [47] "Peoria, IL"           "Ipswich, MA"
## [49] "Carmel, IN"           "Emeryville, CA"
## [51] "Gaithersburg, MD"     "Longmont, CO"
## [53] "Austin, TX"           "Yakima, WA"
## [55] "Santa Cruz, CA"       "Springfield, VA"
## [57] "Alexandria, VA"       "Utah"
## [59] "Reston, VA"           "Denver, CO"
## [61] "New Jersey"           "Aurora, CO"
## [63] "Hill AFB, UT"         "Chandler, AZ"
## [65] "Indianapolis, IN"     "Nashville, TN"
## [67] "Timonium, MD"         "Burlingame, CA"
## [69] "Annapolis Junction, MD" "Bethesda, MD"
## [71] "Dayton, OH"           "Schaumburg, IL"
## [73] "Cupertino, CA"        "Lehi, UT"
## [75] "Culver City, CA"      "Lake Oswego, OR"
## [77] "San Mateo, CA"        "Holyoke, MA"
## [79] "Woodbridge, NJ"       "Dearborn, MI"
## [81] "Maryland Heights, MO" "Rockville, MD"
## [83] "Carpinteria, CA"      "Columbia, SC"
## [85] "Hauppauge, NY"        "Fort Meade, MD"
## [87] "Columbia, MO"         "Vicksburg, MS"
## [89] "Birmingham, AL"      "Blue Bell, PA"
## [91] "Cincinnati, OH"       "Harrisburg, PA"
## [93] "Oak Ridge, TN"        "San Carlos, CA"
## [95] "Waltham, MA"          "Fort Worth, TX"
## [97] "Smithfield, RI"       "Cedar Rapids, IA"
## [99] "Fort Belvoir, VA"     "Linthicum Heights, MD"
## [101] "Maple Plain, MN"      "Tulsa, OK"
## [103] "Baltimore, MD"        "Oklahoma City, OK"
## [105] "Scotts Valley, CA"    "Spartanburg, SC"

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## [107]	"Hartford, CT"	"Beavercreek, OH"
## [109]	"Norfolk, VA"	"Charlotte, NC"
## [111]	"Champaign, IL"	"Texas"
## [113]	"Hoboken, NJ"	"Lebanon, IN"
## [115]	"Oakland, CA"	"Melbourne, FL"
## [117]	"Cleveland, OH"	"Norwell, MA"
## [119]	"San Jose, CA"	"Piscataway, NJ"
## [121]	"Danvers, MA"	"Vienna, VA"
## [123]	"Livermore, CA"	"Pittsburgh, PA"
## [125]	"Irvine, CA"	"Oshkosh, WI"
## [127]	"Menlo Park, CA"	"Dallas, TX"
## [129]	"Arlington, VA"	"Monroe, WI"
## [131]	"Sacramento, CA"	"Hampton, VA"
## [133]	"Richmond, VA"	"Monterey, CA"
## [135]	"Woodlawn, MD"	"Ann Arbor, MI"
## [137]	"Concord, CA"	"Durham, NC"
## [139]	"Kent, OH"	"Laurel, MD"
## [141]	"Columbia, MD"	"Falls Church, VA"
## [143]	"Thousand Oaks, CA"	"Edison, NJ"
## [145]	"Adelphi, MD"	"Seattle, WA"
## [147]	"Sunnyvale, CA"	"Fremont, CA"
## [149]	"Hamilton, NJ"	"Huntsville, AL"
## [151]	"Merrifield, VA"	"Madison, WI"
## [153]	"Philadelphia, PA"	"Winston-Salem, NC"
## [155]	"Raleigh, NC"	"Burbank, CA"
## [157]	"San Ramon, CA"	"Oxnard, CA"
## [159]	"Kansas City, MO"	"Jersey City, NJ"
## [161]	"Manchester, NH"	"Winters, TX"
## [163]	"Brooklyn, NY"	"Germantown, MD"
## [165]	"Omaha, NE"	"Open Fork, VA"
## [167]	"Ashburn, VA"	"Lombard, IL"
## [169]	"Alpharetta, GA"	"Boulder, CO"
## [171]	"Mountain View, CA"	"Trumbull, CT"
## [173]	"Sterling, VA"	"Foster City, CA"
## [175]	"Frederick, MD"	"Colorado Springs, CO"
## [177]	"Southfield, MI"	"San Clemente, CA"
## [179]	"The Woodlands, TX"	"Pleasanton, CA"
## [181]	"Wilmington, DE"	"Fort Sam Houston, TX"
## [183]	"Lexington Park, MD"	"Patuxent, Anne Arundel, MD"
## [185]	"Fairfax, VA"	"San Antonio, TX"
## [187]	"Silver Spring, MD"	"Portland, OR"
## [189]	"Simi Valley, CA"	"New Bedford, MA"
## [191]	"Rancho Cucamonga, CA"	"Collegeville, PA"
## [193]	"Minneapolis, MN"	"Gahanna, OH"
## [195]	"California"	"Wellesley, MA"
## [197]	"Washington, VA"	"Orange, CA"
## [199]	"Bridgeport, WV"	"Oakville, CA"
## [201]	"Naperville, IL"	"Houston, TX"
## [203]	"Redmond, WA"	"West Chester, PA"
## [205]	"Quantico, VA"	"Fort Lee, NJ"
## [207]	"Irwindale, CA"	
##		
##	\$Headquarters	
## [1]	"New York, NY"	"Herndon, VA"

##	[3]	"Boston, MA"	"Bad Ragaz, Switzerland"
##	[5]	"Santa Barbara, CA"	"Basel, Switzerland"
##	[7]	"Bedford, MA"	"Mountain View, CA"
##	[9]	"Chicago, IL"	"Mc Lean, VA"
##	[11]	"Saint Louis, MO"	"Richland, WA"
##	[13]	"Northbrook, IL"	"Princeton, NJ"
##	[15]	"Mays Landing, NJ"	"Washington, DC"
##	[17]	"Memphis, TN"	"Tempe, AZ"
##	[19]	"Reading, PA"	"San Francisco, CA"
##	[21]	"Menlo Park, CA"	"Atlanta, GA"
##	[23]	"Orlando, FL"	"Lexington, MA"
##	[25]	"Falls Church, VA"	"Sheboygan, WI"
##	[27]	"Seattle, WA"	"Bellevue, WA"
##	[29]	"Lincoln, NE"	"Chantilly, VA"
##	[31]	"Santa Monica, CA"	"Ewing, NJ"
##	[33]	"South San Francisco, CA"	"Palo Alto, CA"
##	[35]	"Singapore, Singapore"	"Cambridge, MA"
##	[37]	"OSAKA, Japan"	"Santa Clara, CA"
##	[39]	"Vienna, VA"	"New Orleans, LA"
##	[41]	"Akron, OH"	"Zurich, Switzerland"
##	[43]	"Woburn, MA"	"Carson, CA"
##	[45]	"Coral Gables, FL"	"San Ramon, CA"
##	[47]	"Brisbane, CA"	"Winter Park, FL"
##	[49]	"San Rafael, CA"	"Deerfield, IL"
##	[51]	"Ipswich, MA"	"Carmel, IN"
##	[53]	"Chevy Chase, MD"	"Hartford, CT"
##	[55]	"Emeryville, CA"	"Cambridge, United Kingdom"
##	[57]	"Rockville, MD"	"Minneapolis, MN"
##	[59]	"Austin, TX"	"Yakima, WA"
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##	[63]	"Reston, VA"	"Denver, CO"
##	[65]	"Holmdel, NJ"	"Aurora, CO"
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##	[71]	"Lutherville Timonium, MD"	"Westminster, CO"
##	[73]	"Burlingame, CA"	"Annapolis Junction, MD"
##	[75]	"Bethesda, MD"	"Beavercreek, OH"
##	[77]	"Schaumburg, IL"	"Sunnyvale, CA"
##	[79]	"Lehi, UT"	"Lake Oswego, OR"
##	[81]	"Holyoke, MA"	"Dulles, VA"
##	[83]	"San Diego, CA"	"Detroit, MI"
##	[85]	"Stamford, CT"	"Carpinteria, CA"
##	[87]	"Columbia, SC"	"-1"
##	[89]	"Marcy-l'Etoile, France"	"Columbia, MO"
##	[91]	"Fairfax, VA"	"Chandler, AZ"
##	[93]	"Aurora, Canada"	"Blue Bell, PA"
##	[95]	"Troy, MI"	"Redwood City, CA"
##	[97]	"Greenville, SC"	"Arlington, VA"
##	[99]	"Harrisburg, PA"	"Hamilton, Bermuda"
##	[101]	"Lynchburg, VA"	"Springfield, MA"
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##	[105]	"San Jose, CA"	"Jersey City, NJ"
##	[107]	"Fort Worth, TX"	"Cedar Rapids, IA"
##	[109]	"McLean, VA"	"Lorton, VA"

## [111]	"Maple Plain, MN"	"Kent, WA"
## [113]	"Woodbine, MD"	"San Antonio, TX"
## [115]	"Scotts Valley, CA"	"Spartanburg, SC"
## [117]	"Woodbridge, NJ"	"Chennai, India"
## [119]	"Tel Aviv-Yafo, Israel"	"Baltimore, MD"
## [121]	"Manalapan, NJ"	"Charlotte, NC"
## [123]	"Saxonburg, PA"	"Bristol, PA"
## [125]	"Bangalore, India"	"Hoboken, NJ"
## [127]	"Paris, France"	"Greenwich, CT"
## [129]	"Santa Ana, CA"	"Houston, TX"
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## [155]	"Irving, TX"	"Beltsville, MD"
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## [159]	"Cincinnati, OH"	"Somerset, NJ"
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## [163]	"Leesburg, VA"	"Durham, NC"
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## [167]	"North Brunswick, NJ"	"Benicia, CA"
## [169]	"Laurel, MD"	"Columbia, MD"
## [171]	"Danville, CA"	"Wilmington, MA"
## [173]	"New York, 061"	"Reading, MA"
## [175]	"Folsom, CA"	"Wilsonville, OR"
## [177]	"Huntsville, AL"	"Madison, WI"
## [179]	"Phila, PA"	"Winston-Salem, NC"
## [181]	"Half Moon Bay, CA"	"Los Angeles, CA"
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## [185]	"Kansas City, MO"	"Bengaluru, India"
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## [189]	"Omaha, NE"	"Clifton Park, NY"
## [191]	"Livonia, MI"	"Ashburn, VA"
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## [195]	"Edison, NJ"	"Ventura, CA"
## [197]	"Armonk, NY"	"Trumbull, CT"
## [199]	"Chadds Ford, PA"	"Saint Paul, MN"
## [201]	"Glen Allen, VA"	"Aliso Viejo, CA"
## [203]	"Plainsboro, NJ"	"Fairmont, WV"
## [205]	"Cherry Hill, NJ"	"Itasca, IL"
## [207]	"Coconut Creek, FL"	"Lombard, IL"
## [209]	"Honolulu, HI"	"Carle Place, NY"
## [211]	"Cupertino, CA"	"Tampa, FL"
## [213]	"Totowa, NJ"	"Rome, NY"
## [215]	"Milan, IL"	"Marbella, Spain"
## [217]	"Simi Valley, CA"	"Rancho Cucamonga, CA"

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## [219] "Albuquerque, NM"          "Langley, VA"
## [221] "Plano, TX"                  "Albertville, AL"
## [223] "Orange, CA"                 "Littleton, CO"
## [225] "Oakville, Canada"           "San Bruno, CA"
## [227] "West Chester, PA"           "Utica, MI"
## [229] "Fort Lee, NJ"
##
## $Size
## [1] "1001 to 5000 employees" "5001 to 10000 employees"
## [3] "501 to 1000 employees"  "51 to 200 employees"
## [5] "10000+ employees"       "201 to 500 employees"
## [7] "1 to 50 employees"      "-1"
## [9] "Unknown"
##
## $Founded
## [1] 1993 1968 1981 2000 1998 2010 1996 1990 1983 2014 2012 2016 1965 1973 1986
## [16] 1997 2015 1945 1988 2017 2011 1967 1860 1992 2003 1951 2005 2019 1925 2008
## [31] 1999 1978 1966 1912 1958 2013 1849 1781 1926 2006 1994 1863 1995 -1 1982
## [46] 1974 2001 1985 1913 1971 1911 2009 1959 2007 1939 2002 1961 1963 1969 1946
## [61] 1957 1953 1948 1850 1851 2004 1976 1918 1954 1947 1955 2018 1937 1917 1935
## [76] 1929 1820 1952 1932 1894 1960 1788 1830 1984 1933 1880 1887 1970 1942 1980
## [91] 1989 1908 1853 1875 1914 1898 1956 1977 1987 1896 1972 1949 1962
##
## $`Type of ownership`
## [1] "Nonprofit Organization" "Company - Public"
## [3] "Private Practice / Firm" "Company - Private"
## [5] "Government"             "Subsidiary or Business Segment"
## [7] "Other Organization"     "-1"
## [9] "Unknown"                "Hospital"
## [11] "Self-employed"          "College / University"
## [13] "Contract"
##
## $Industry
## [1] "Insurance Carriers"
## [2] "Research & Development"
## [3] "Consulting"
## [4] "Electrical & Electronic Manufacturing"
## [5] "Advertising & Marketing"
## [6] "Computer Hardware & Software"
## [7] "Biotech & Pharmaceuticals"
## [8] "Consumer Electronics & Appliances Stores"
## [9] "Enterprise Software & Network Solutions"
## [10] "IT Services"
## [11] "Energy"
## [12] "Chemical Manufacturing"
## [13] "Federal Agencies"
## [14] "Internet"
## [15] "Health Care Services & Hospitals"
## [16] "Investment Banking & Asset Management"
## [17] "Aerospace & Defense"
## [18] "Utilities"
## [19] "-1"
## [20] "Express Delivery Services"
## [21] "Staffing & Outsourcing"

```

```

## [22] "Insurance Agencies & Brokerages"
## [23] "Consumer Products Manufacturing"
## [24] "Industrial Manufacturing"
## [25] "Food & Beverage Manufacturing"
## [26] "Banks & Credit Unions"
## [27] "Video Games"
## [28] "Shipping"
## [29] "Telecommunications Services"
## [30] "Lending"
## [31] "Cable, Internet & Telephone Providers"
## [32] "Real Estate"
## [33] "Venture Capital & Private Equity"
## [34] "Miscellaneous Manufacturing"
## [35] "Oil & Gas Services"
## [36] "Transportation Equipment Manufacturing"
## [37] "Telecommunications Manufacturing"
## [38] "Transportation Management"
## [39] "News Outlet"
## [40] "Architectural & Engineering Services"
## [41] "Food & Beverage Stores"
## [42] "Other Retail Stores"
## [43] "Hotels, Motels, & Resorts"
## [44] "State & Regional Agencies"
## [45] "Financial Transaction Processing"
## [46] "Timber Operations"
## [47] "Colleges & Universities"
## [48] "Travel Agencies"
## [49] "Accounting"
## [50] "Logistics & Supply Chain"
## [51] "Farm Support Services"
## [52] "Social Assistance"
## [53] "Construction"
## [54] "Department, Clothing, & Shoe Stores"
## [55] "Publishing"
## [56] "Health, Beauty, & Fitness"
## [57] "Wholesale"
## [58] "Rail"
##
## $Sector
## [1] "Insurance"                "Business Services"
## [3] "Manufacturing"            "Information Technology"
## [5] "Biotech & Pharmaceuticals" "Retail"
## [7] "Oil, Gas, Energy & Utilities" "Government"
## [9] "Health Care"              "Finance"
## [11] "Aerospace & Defense"       "-1"
## [13] "Transportation & Logistics" "Media"
## [15] "Telecommunications"        "Real Estate"
## [17] "Travel & Tourism"          "Agriculture & Forestry"
## [19] "Education"                 "Accounting & Legal"
## [21] "Non-Profit"                "Construction, Repair & Maintenance"
## [23] "Consumer Services"
##
## $Revenue
## [1] "Unknown / Non-Applicable" "$1 to $2 billion (USD)"

```

```

## [3] "$100 to $500 million (USD)"      "$10+ billion (USD)"
## [5] "$2 to $5 billion (USD)"           "$500 million to $1 billion (USD)"
## [7] "$5 to $10 billion (USD)"          "$10 to $25 million (USD)"
## [9] "$25 to $50 million (USD)"         "$50 to $100 million (USD)"
## [11] "$1 to $5 million (USD)"           "$5 to $10 million (USD)"
## [13] "Less than $1 million (USD)"       "-1"
##
## $Competitors
## [1] "EmblemHealth, UnitedHealth Group, Aetna"
## [2] "-1"
## [3] "MKS Instruments, Pfeiffer Vacuum, Agilent Technologies"
## [4] "Commerce Signals, Cardlytics, Yodlee"
## [5] "Square, PayPal, H&R Block"
## [6] "Leidos, CACI International, Booz Allen Hamilton"
## [7] "Slalom, Daugherty Business Solutions"
## [8] "Oak Ridge National Laboratory, National Renewable Energy Lab, Los Alamos National Laboratory"
## [9] "CDW, PCM, SHI International"
## [10] "Crossix Solutions Inc., AppNexus, The Trade Desk"
## [11] "Northwestern Mutual"
## [12] "Puppet, Ansible, SaltStack"
## [13] "Enlivant, Sunrise Senior Living, Brookdale Senior Living"
## [14] "TrueCar, Cars.com, Kelley Blue Book"
## [15] "Travelers, Allstate, State Farm"
## [16] "Novartis, Baxter, Pfizer"
## [17] "Skyhigh Networks, Zscaler, NortonLifeLock"
## [18] "Facebook, Google, Pinterest"
## [19] "DoorDash, Uber, Grubhub"
## [20] "Munich Re, Hannover RE, SCOR"
## [21] "IMAGE Skincare, Aveda, Kiehl's"
## [22] "Luxoft, EPAM, Capgemini Invent"
## [23] "Sequenom"
## [24] "Linqia, Collective Bias"
## [25] "John Deere, Komatsu, CNH Industrial"
## [26] "Thermo Fisher Scientific, Enzymatics, Illumina"
## [27] "CUNA Mutual, SWBC, Overby-Seawell"
## [28] "Zola Registry"
## [29] "Colony Specialty, Markel, RLI"
## [30] "Roche, GlaxoSmithKline, Novartis"
## [31] "Solution Design Group, Intertech (Minnesota)"
## [32] "Braintree, Authorize.Net, PayPal"
## [33] "Nielsen, Zappi, SurveyMonkey"
## [34] "The World Bank, IMF"
## [35] "Booz Allen Hamilton, CACI International"
## [36] "Booz Allen Hamilton, SAIC, LMI"
## [37] "Epic, CipherHealth"
## [38] "Copper River Shared Services, Chenega Corporation, Deloitte"
## [39] "Battelle, General Atomics, SAIC"
## [40] "IQVIA, ICON"
## [41] "Arbella Insurance, Safety Insurance"
## [42] "Engagio, Bombora, Terminus"
## [43] "SAIC, Leidos, Northrop Grumman"
## [44] "Bosch, Lear Corporation, Faurecia"
## [45] "Covance, ICON"
## [46] "Adecco, ManpowerGroup, Allegis Corporation"

```

[47] "GE Digital, Palantir Technologies, Uptake"
 ## [48] "PRA Group"
 ## [49] "Genomic Health, 23andMe, Illumina"
 ## [50] "Bromium, FireEye, Authentic8"
 ## [51] "Drip, iContact, Mailchimp"
 ## [52] "Children's Health, Texas Health Resources, Baylor Scott & White Health"
 ## [53] "Harris, Fibertek"
 ## [54] "Monster Worldwide, CareerBuilder, Craigslist"
 ## [55] "Los Alamos National Laboratory, Battelle, SRI International"
 ## [56] "ManTech, Booz Allen Hamilton, Leidos"
 ## [57] "Lumentum Operations, Keysight Technologies, O-Net Technologies"
 ## [58] "Square, Amazon, Apple"
 ## [59] "Pfizer, GlaxoSmithKline"
 ## [60] "DHL Supply Chain, UPS, FedEx"
 ## [61] "Raytheon Technologies, General Dynamics, MIT Lincoln Laboratory"
 ## [62] "Eaton, SMC Corporation, Bosch Rexroth"
 ## [63] "Advisory Board, Booz Allen Hamilton, McKinsey & Company"
 ## [64] "Amazon, Apple"
 ## [65] "Covidien, Boston Scientific"
 ## [66] "AT&T, Verizon"
 ## [67] "Los Alamos National Laboratory, NASA Jet Propulsion Laboratory, Sandia National Laboratories"
 ## [68] "Fluor, Bechtel, AECOM"
 ## [69] "Intertek, SGS, Bureau Veritas"
 ## [70] "Lockheed Martin, Caterpillar, John Deere"
 ## [71] "Activision Blizzard, Electronic Arts"
 ## [72] "MediaMath, Conversant, AppNexus"
 ## [73] "Pfizer, AstraZeneca, Merck"
 ## [74] "Archibus, iOffice, Planon"
 ## [75] "ACRT Services, Bartlett Tree Experts"
 ## [76] "TASC, Vencore, Booz Allen Hamilton"
 ## [77] "Seagate Technology, Toshiba"
 ## [78] "Raytheon Technologies, Northrop Grumman, Booz Allen Hamilton"
 ## [79] "MIT Lincoln Laboratory, Lockheed Martin, Northrop Grumman"
 ## [80] "Kforce, PageGroup, Robert Half"
 ## [81] "TEKsystems, Kforce, Randstad US"
 ## [82] "South Carolina Electric & Gas, Virginia Electric and Power"
 ## [83] "Cadence Design Systems, Synopsys, Altium Limited"
 ## [84] "CGI (Nevada), Accenture, Deloitte"
 ## [85] "Accenture, Deloitte, PwC"
 ## [86] "Bechtel Jacobs, Black & Veatch, HNTB"
 ## [87] "Adecco, Manpower"
 ## [88] "Acxiom, Merkle, Epsilon (North Carolina)"
 ## [89] "Amazon, Accenture, Microsoft"
 ## [90] "Booz Allen Hamilton, Deloitte, ERPi"
 ## [91] "TEKsystems, Insight Global, Accenture"
 ## [92] "H&M, Inditex, Fast Retailing"
 ## [93] "Novartis, AstraZeneca, Siemens Healthineers"
 ## [94] "Aquent, 24 Seven Talent"
 ## [95] "Google, Microsoft, Samsung Electronics"
 ## [96] "AppDynamics, Datadog, Dynatrace"
 ## [97] "Liberty Mutual Insurance, EMPLOYERS, Travelers"
 ## [98] "KPMG, Accenture, Deloitte"
 ## [99] "General Atomics, Boeing, Northrop Grumman"
 ## [100] "Los Alamos National Laboratory, Lawrence Livermore National Laboratory"

```
## [101] "Cognizant Technology Solutions, Infosys, Wipro"
## [102] "Humana"
## [103] "Accenture, Northrop Grumman, Xerox"
## [104] "United Natural Foods, US Foods, DPI Specialty Foods"
## [105] "LivePerson, Salesforce, SAP"
## [106] "Zurich Insurance, AXA XL, Allianz"
## [107] "CSC, ManTech, SAIC"
## [108] "Genomic Health, Myriad Genetics, The Broad Institute"
```

Limpieza de datos

Puntos a tener en cuenta para la limpieza de datos

A raíz del estudio hecho en el apartado anterior, hay que tener en cuenta los siguientes puntos para la limpieza de datos:

1. Se utiliza el -1 para indicar valores faltantes. Adicionalmente, existen columnas que tienen un valor faltante que se representa de forma distinta a -1 por la forma en la que se han extraído los datos. En la limpieza tendremos que tener en cuenta también esos casos y representar a todos los valores faltantes de forma homogénea mediante NA
2. La columna `Job title` tiene una gran diversidad de trabajos con una mínima variación que sería interesante tratarlos como un mismo trabajo. Para ello, habrá que definir un subconjunto de trabajos a partir del cuál tratar como iguales las variantes. Ese subconjunto será los que consideramos principales : { data scientist, data engineer, data analyst, machine learning, machine learning expert }. Así, por ejemplo, un trabajo de e-commerce data analyst o uno de RFP data analyst será tratado bajo la categoría de data analyst
3. La variable `Company name` tiene la información del rating. Habrá que eliminar esa redundancia
4. Es interesante añadir una nueva variable binaria a partir de `Location` y `Headquarters` para ver aquellas ofertas de trabajo en la que la sede central de la empresa está en el mismo sitio que la oferta
5. Algunas variables como `Salary Estimate`, `Size` y `Revenue` contienen información que pueden ser aprovechadas mejor separándolas en más columnas a partir de las cuáles sacar más información.
6. `Salary Estimate` puede ser considerada una variable cuantitativa ya que, aunque se proporcione un rango variable para todas las ofertas, la realidad es que el salario no es un rango sino un valor concreto dado por un dominio continuo. La decisión que hemos tomado para solucionar esto es considerar el punto medio del rango proporcionado como el salario de la oferta. Esta solución es una aproximación ya que dos ofertas con mismos rangos tendrían el mismo salario y no tendría por qué ser considerados como el mismo. O, incluso dos salarios con rangos distintos pero con una cierta intersección podrían tener en realidad el mismo salario. Sin embargo, aunque lo ideal sería hacer un estudio externo sobre la distribución del salario dado el rango, la empresa particular, etc. Al no disponer de esa información asumimos esta simplificación.
7. `Size` y `Revenue` deben ser consideradas para análisis posteriores como variables ordinales ya que su dominio corresponde a categorías no solapadas en el que el orden importa.

Tratamiento de la variable Job Titles

```
clean_data <- raw_data

# Asignamos el valor NA en todas las celdas de la tabla donde aparece un -1 o un Unknown
# Esto lo podemos hacer porque entre las variables numéricas que tenemos no hay ninguna en la que en su
clean_data[clean_data==-1 | clean_data=="Unknown" | clean_data=="Unknown / Non-Applicable"] <- NA
```

```
data_jobs_titles <- "data scientist|data engineer|data analyst|machine learning"

# Tratamos el nombre de los trabajos para considerar idénticos aquellos que tienen mínimas variaciones
clean_data <- clean_data %>%
  mutate(`Job Title` = tolower(`Job Title`) %>%
    str_extract(data_jobs_titles)
  )
```

Ahora comprobemos qué tipo de trabajos se han quedado fuera:

```
out_jobs_index <- clean_data[is.na(clean_data$`Job Title`),] %>%
  select(index) %>%
  as_vector() %>%
  unname()

out_jobs <- raw_data %>%
  filter(`index` %in% out_jobs_index) %>%
  select(`Job Title`) %>%
  distinct() %>%
  datatable()
```

Consideramos que los trabajos que se quedan fuera son demasiado específicos para el análisis que queremos hacer posteriormente. Además, el número de observaciones que perderíamos si no consideramos el estudio posterior para ninguna de estas profesiones es de 87 lo que consideramos una cifra asumible.

```
clean_data <- clean_data[!is.na(clean_data$`Job Title`),]
```

Tratamiento de la variable Salary Estimate

Esta variable es interesante separarla en dos: una para el rango mínimo y otra para el rango máximo. Adicionalmente, es interesante crear una nueva a partir de estas dos que sea el rango medio.

Para ello, como hay muchas observaciones diferentes de rangos distintos nos aseguramos de forma automatizada que todos los rangos están en miles:

```
all_k <- raw_data %>%
  select(`Salary Estimate`) %>%
  distinct() %>%
  map(function(x) grepl(".*K.*K",x)) %>%
  as_vector() %>%
  all()

if(all_k){
  cat("Todas las observaciones están en miles, no hay que tener ningún cuidado especial")
}else{
  cat("¡Cuidado! Existen algunas observaciones que no están en miles, hay que tratar esas observaciones")
}
```

```
## Todas las observaciones están en miles, no hay que tener ningún cuidado especial
```

```
clean_data <- clean_data %>%
  separate(`Salary Estimate`, sep="-", into=c("Salary Estimate Inf", "Salary Estimate Sup")) %>%
  mutate(
    `Salary Estimate Inf` = gsub("K|\\$", "", `Salary Estimate Inf`),
    `Salary Estimate Sup` = gsub("K|\\$", "", `Salary Estimate Sup`)
  ) %>%
  #Lo separamos de nuevo para evitar poner todas las variaciones posibles Glassdoor est., Employer Est.
```



```

separate(`Salary Estimate Sup`, sep="\\(", into=c("Salary Estimate Sup", "drop")) %>%
select(-drop ) %>%
mutate(
  `Salary Estimate Inf` = as.double(`Salary Estimate Inf`),
  `Salary Estimate Sup` = as.double(`Salary Estimate Sup`),
  `Salary Estimate Med` = (`Salary Estimate Inf` + `Salary Estimate Sup`)/2
)

```

Tratamiento de la variable Company Name

```

clean_data <- clean_data %>%
  mutate(`Company Name`=str_remove_all(`Company Name`, "\\n.*"))

```

Tratamiento de la variable Headquarters y Location

```

clean_data <- clean_data %>%
  mutate(`Same Location Headquarter`= Location==Headquarters)

```

Tratamiento de la variable Size

Esta variable será tratada de forma análoga a Salary Estimate.

```

clean_data <- clean_data %>%
  mutate(
    `Size Ordered`=
      case_when(
        Size=="1 to 50 employees" ~ 1,
        Size=="51 to 200 employees" ~ 2,
        Size=="201 to 500 employees" ~ 3,
        Size=="501 to 1000 employees" ~ 4,
        Size=="1001 to 5000 employees" ~ 5,
        Size=="5001 to 10000 employees" ~ 6,
        Size=="10000+ employees" ~ 7,
      ),
    Size=
      case_when(
        Size=="1 to 50 employees" ~ "1-50",
        Size=="51 to 200 employees" ~ "51-200",
        Size=="201 to 500 employees" ~ "201-500",
        Size=="501 to 1000 employees" ~ "501-1000",
        Size=="1001 to 5000 employees" ~ "1001-5000",
        Size=="5001 to 10000 employees" ~ "5001-10000",
        Size=="10000+ employees" ~ "10000-Inf",
      )
  ) %>%
  separate(Size, sep="-", into=c("Size Inf", "Size Sup")) %>%
  mutate(
    `Size Inf`=as.numeric(`Size Inf`),
    `Size Sup`=as.numeric(`Size Sup`)
  )

```

Tratamiento de la variable Revenue

Para esta variable, aparte de sacar los valores extremos, sería adecuada tratarla como una variable ordinal

```
clean_data <- clean_data %>%
  mutate(
    `Revenue Ordered` =
      case_when(
        Revenue=="Less than $1 million (USD)" ~ 1,
        Revenue=="$1 to $5 million (USD)" ~ 2,
        Revenue=="$5 to $10 million (USD)" ~ 3,
        Revenue=="$10 to $25 million (USD)" ~ 4,
        Revenue=="$25 to $50 million (USD)" ~ 5,
        Revenue=="$50 to $100 million (USD)" ~ 6,
        Revenue=="$100 to $500 million (USD)" ~ 7,
        Revenue=="$500 million to $1 billion (USD)" ~ 8,
        Revenue=="$1 to $2 billion (USD)" ~ 9,
        Revenue=="$2 to $5 billion (USD)" ~ 10,
        Revenue=="$5 to $10 billion (USD)" ~ 11,
        Revenue=="$10+ billion (USD)" ~ 12
      ),
    Revenue =
      case_when(
        Revenue=="Less than $1 million (USD)" ~ "0-1000000",
        Revenue=="$1 to $5 million (USD)" ~ "1000000-5000000",
        Revenue=="$5 to $10 million (USD)" ~ "5000000-10000000",
        Revenue=="$10 to $25 million (USD)" ~ "10000000-25000000",
        Revenue=="$25 to $50 million (USD)" ~ "25000000-50000000",
        Revenue=="$50 to $100 million (USD)" ~ "50000000-100000000",
        Revenue=="$100 to $500 million (USD)" ~ "100000000-500000000",
        Revenue=="$500 million to $1 billion (USD)" ~ "500000000-1000000000",
        Revenue=="$1 to $2 billion (USD)" ~ "1000000000-2000000000",
        Revenue=="$2 to $5 billion (USD)" ~ "2000000000-5000000000",
        Revenue=="$5 to $10 billion (USD)" ~ "5000000000-10000000000",
        Revenue=="$10+ billion (USD)" ~ "10000000000-Inf",
      )
  ) %>%
  separate(Revenue, sep="-", into=c("Revenue Inf", "Revenue Sup")) %>%
  mutate(
    `Revenue Inf` = as.numeric(`Revenue Inf`),
    `Revenue Sup` = as.numeric(`Revenue Sup`)
  )
```

Análisis

Estudio de la normalidad

```
n_bins=clean_data %>%
  distinct(`Salary Estimate Med`) %>%
  as_vector() %>%
  length()
```

```

histogram_salary <- clean_data %>%
  ggplot(aes(x=`Salary Estimate Med`)) +
  geom_histogram(bins=n_bins, fill="lightblue",color="black") +
  theme_bw() +
  scale_x_continuous(breaks=scales::pretty_breaks(n = 10)) +
  scale_y_continuous(breaks=scales::pretty_breaks(n = 10)) +
  labs(x="Salario medio estimado", y="Conteo")

```

```

density_salary <- clean_data %>%
  ggplot(aes(x=`Salary Estimate Med`)) +
  geom_density(alpha=0.6, fill="lightblue") +
  theme_bw() +
  scale_x_continuous(breaks=scales::pretty_breaks(n = 10)) +
  scale_y_continuous(breaks=scales::pretty_breaks(n = 10)) +
  labs(x="Salario medio estimado", y="Probabilidad")

```

```

normality_test_salary <- shapiro.test(clean_data$`Salary Estimate Med`)

```

```

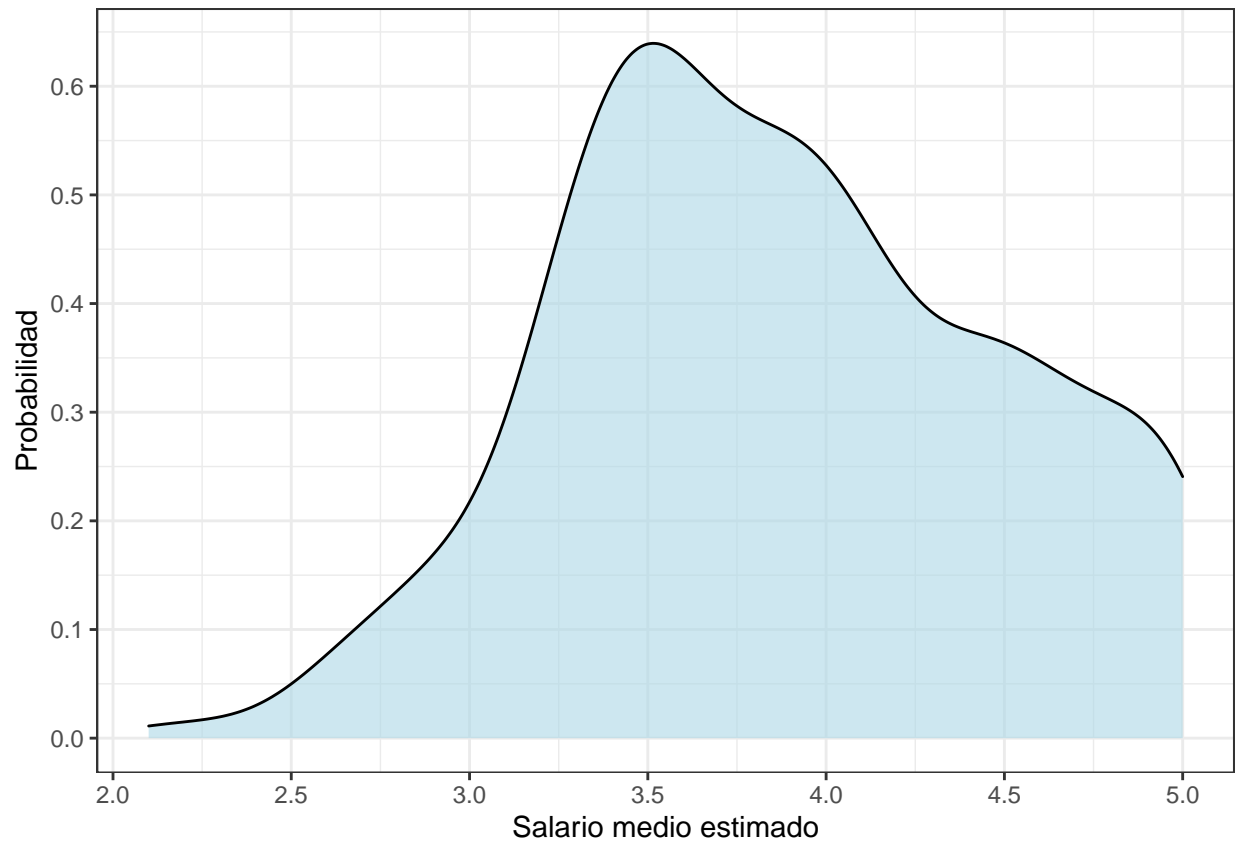
clean_data %>%
  ggplot(aes(x=`Rating`)) +
  geom_density(alpha=0.6, fill="lightblue") +
  theme_bw() +
  scale_x_continuous(breaks=scales::pretty_breaks(n = 10)) +
  scale_y_continuous(breaks=scales::pretty_breaks(n = 10)) +
  labs(x="Salario medio estimado", y="Probabilidad")

```

```

## Warning: Removed 47 rows containing non-finite values (stat_density).

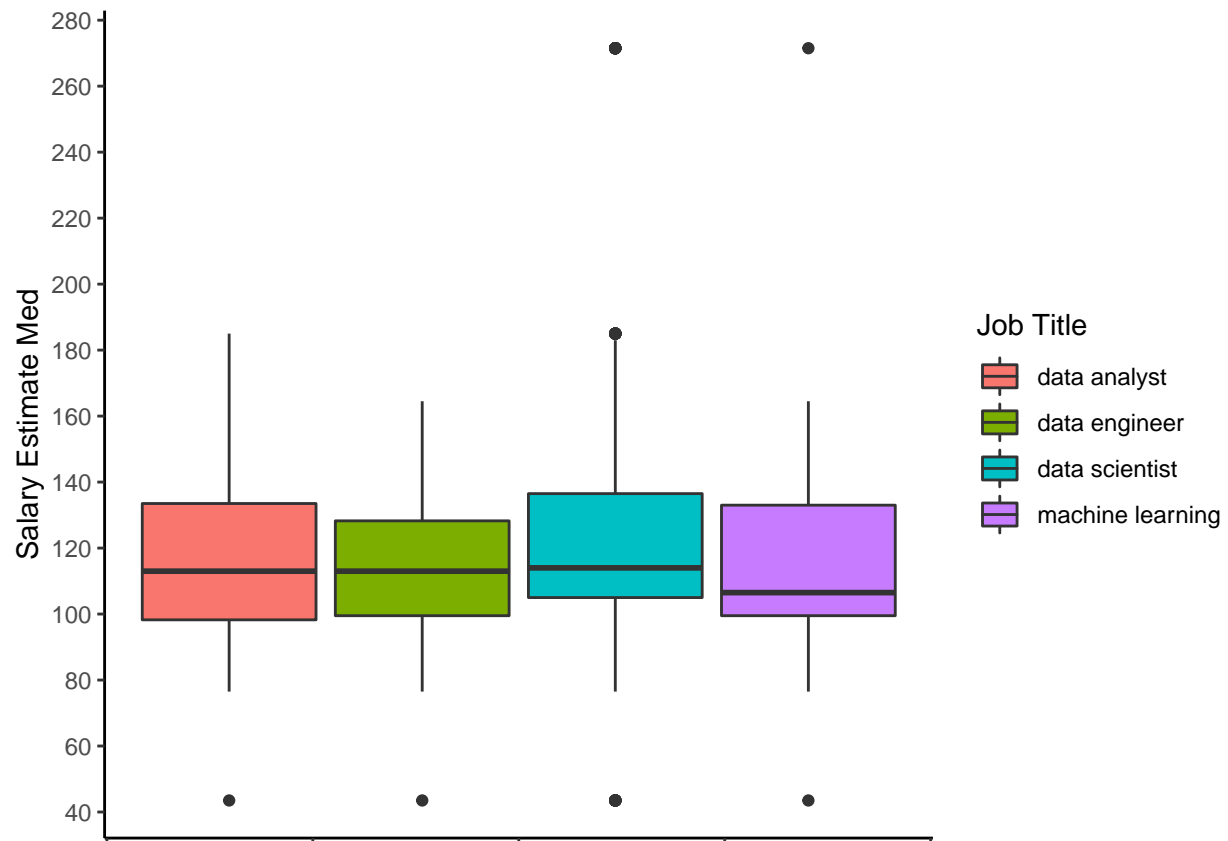
```



```
shapiro.test(clean_data$Rating)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  clean_data$Rating
## W = 0.97766, p-value = 2.529e-07
```

```
clean_data %>%
  ggplot(aes(y=`Salary Estimate Med`, fill=`Job Title`)) +
  scale_x_continuous(labels=NULL) +
  scale_y_continuous(breaks=scales::pretty_breaks(n = 10)) +
  theme_classic() +
  geom_boxplot()
```



```
kruskal.test(`Salary Estimate Med` ~ `Job Title`, data = clean_data)
```

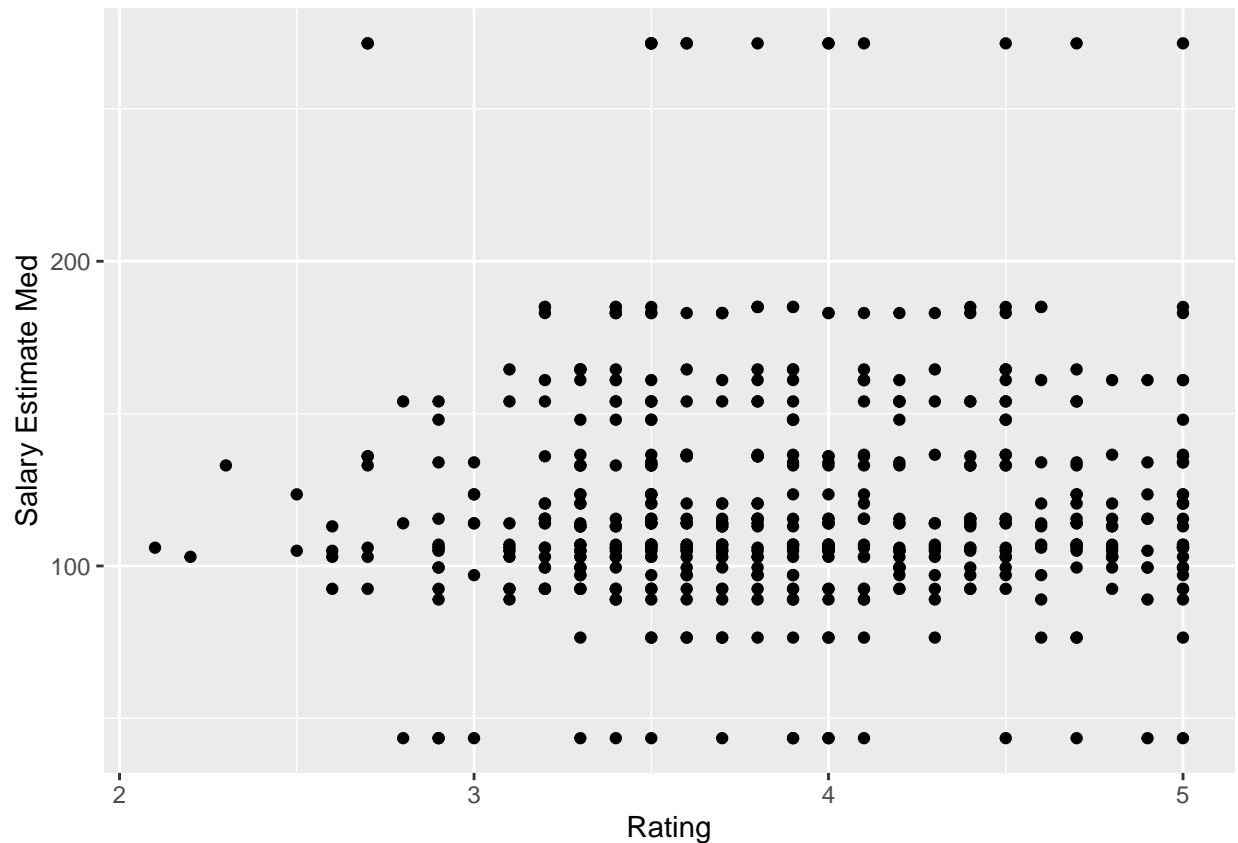
```
##
## Kruskal-Wallis rank sum test
##
## data: Salary Estimate Med by Job Title
## Kruskal-Wallis chi-squared = 6.0209, df = 3, p-value = 0.1106
```

```
kruskal.test(`Salary Estimate Med` ~ `Size Ordered`, data = clean_data)
```

```
##
## Kruskal-Wallis rank sum test
##
## data: Salary Estimate Med by Size Ordered
## Kruskal-Wallis chi-squared = 6.0905, df = 6, p-value = 0.4131
```

```
clean_data %>%
  ggplot(aes(x=Rating,y=`Salary Estimate Med`)) +
  geom_point()
```

```
## Warning: Removed 47 rows containing missing values (geom_point).
```



```
cor(clean_data$Rating, clean_data$`Salary Estimate Med`, use="complete.obs")
```

```
## [1] 0.004244959
```

Más columnas a tener en cuenta para NAs

-Salary Med -Size

Subselección de las variabls de interés (No): -Rating -index -competitors -founded

Pasos previos:

- Estudiar Normalidad Salary -> Robert
- Outlier -> Geovanny

Preguntas:

1- Relación ente el trabajo y el salario -> Robert 1- Relación entre sede central=localización y salary -> Geovanny 1- Comparación entre type of ownerships y salarios -> Robert

1- Relación entre industry y salario -> Geovanny 1- Revenue y salary -> Geovanny 1- Size (máx) y salary -> Robert