

A world map is centered on the slide, showing the continents of North America, South America, Europe, Africa, Asia, and Australia. The map is rendered in a light blue color against a darker blue background. The title text is overlaid on the map.

Predicting Life Expectancy Across Countries Based on Demographic Indicators

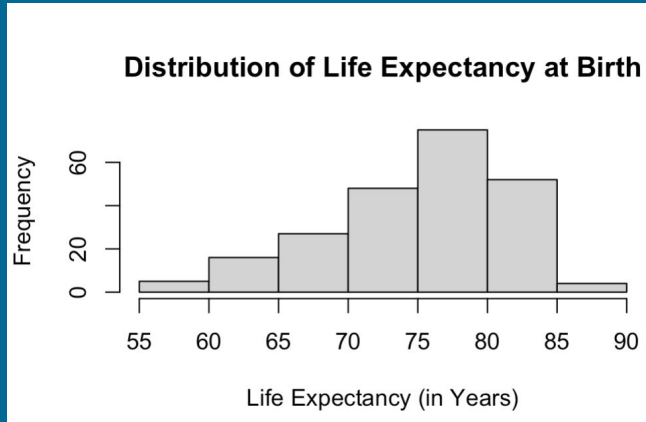
Stat 418 - Tools in Data Science
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Data Collection

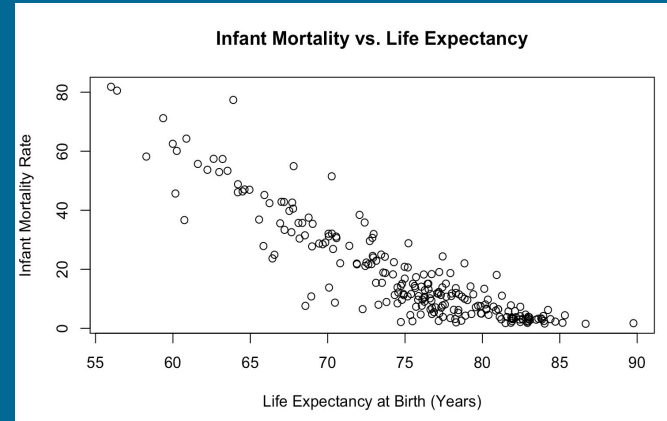
- Data Source
 - U.S. Census Bureau International Data Base (IDB), accessed public API
- Access & Processing
 - Convert the raw JSON response into R and transformed into tabular dataset
- Demographic Variables
 - POP, GR, RNI, POP_DENS, TFR, CBR/CDR, IMR
- Target Variable
 - Life Expectancy at Birth as the model output

```
url <- paste0(
  "https://api.census.gov/data/timeseries/idb/5year?",
  "key=", "eac1e11f909802a93ae6d0fcc1b8cbe987f6a5df",
  "&get=GENC,POP,GR,RNI,POP_DENS,TFR,CBR,E0,IMR,CDR",
  "&YR=2024",
  "&for=gencland+countries+and+areas:",
  "AF,AL,DZ,AS,AD,AO,AI,AG,AR,AM,AW,AU,AT,AZ,BS,BH,BD,BB,BY,BE,BZ,BJ,BM,BT,BO,BA,BW,BR,BN,BG,BF,MM,BI,CV,KH
,CM,CA,KY,CF,TD,CL,CN,CO,KM,CG,CD,CK,CR,CI,HR,CU,CW,CY,CZ,DK,DJ,DM,DO,EC,EG,SV,GQ,ER,EE,SZ,ET,FO,FJ,FI,FR,P
F,GA,GM,XG,GE,DE,GH,GI,GR,GL,GD,GU,GT,GG,GN,GW,GY,HT,HN,HK,HU,IS,IN,ID,IR,IQ,IE,IM,IL,IT,JM,JP,JE,JO,KZ,KE,
KI,KP,KR,XK,KW,KG,LA,LV,LB,LS,LR,LY,LT,LU,MO,MG,MW,MY,MV,ML,MT,MH,MR,MU,MX,FM,MD,MC,MN,ME,MS,MA,MZ,NA,NR,NP
,NL,NC,NZ,NI,NE,NG,MK,MP,NO,OM,PK,PW,PA,PG,PY,PE,PH,PL,PT,PR,QA,RO,RU,RW,BL,SH,KN,LC,MF,PM,VC,WS,SM,ST,SA,S
N,RS,SC,SL,SG,SX,SK,SI,SB,SO,ZA,SS,ES,LK,SD,SR,SE,CH,SY,TW,TJ,TZ,TH,TL,TG,TO,TT,TN,TR,TM,TC,TV,UG,UA,AE,GB,
US,UY,UZ,VU,VE,VN,VG,VI,WF,XW,YE,ZM,ZW"
)
```

Exploratory Data Analysis



- Most countries have life expectancy between **70 and 85 years**
- A few countries have life expectancy **below 65 years**
- The chart is slightly **skewed to the left**



- Strong negative relationship
- Countries with **low infant mortality** tend to have **longer life expectancy**

Goals and Plans

- Modeling
 - Using the linear regression model to predict the life expectancy
 - Explore the model evaluation
- Build tool
 - Allow user to input demographics data for a country
 - Tool returns predicted life expectancy based on model output