POWER CONSUMPTION IN THE AVERAGE HOME

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“Over 40% of energy-related carbon dioxide (CO2) emissions are due to the burning of fossil fuels for electricity generation.”

By World Nuclear Association

The Data

- Location Specific
  - Region
  - State
  - Geographic
- Power Consumption
  - Kilowatts per Hour
- House Information
  - Stories
  - Material
  - Age
  - Bedrooms

ATTIC	Num	Attic above the housing unit	1 Yes 0 No -2 Not applicable
ATTICFIN	Num	Finished attic	1 Yes 0 No -2 Not applicable
STORIES	Num	Number of stories in a single-family home	1 One story 2 Two stories 3 Three stories 4 Four or more stories 5 Split-level -2 Not applicable
PRKGPLC1	Num	Attached garage	1 Yes 0 No -2 Not applicable
SIZEOFGARAGE	Num	Size of attached garage	1 One-car garage 2 Two-car garage 3 Three-or-more-car garage -2 Not applicable
KOWNRENT	Num	Own or rent	1 Own 2 Rent 3 Occupy without payment of rent
			1 Before 1950 2 1950 to 1959 3 1960 to 1969 4 1970 to 1979 5 1980 to 1989 6 1990 to 1999

Prepping the Data

- There is quite a bit of missing information
- -2 represents N/A
- 10,000 N/A's ≥ Non-Valid column
- Table representation of what the variable truly represent (yes and no, a number, location, etc.)

['HDD65', 'CDD65', 'HDD30YR_PUB', 'CDD30YR_PUB', 'TYPEHUQ', 'CELLAR', 'CRAWL', 'CONCRETE', 'BASEOTH', 'BASEFIN', 'ATTIC', 'ATTICFIN',"STORIES', 'PRKGPLC1', 'SIZEOFGARAGE', 'KOWNRENT', 'YEARMADERANGE', 'BEDROOMS', 'NCOMBATH', 'NHAFBATH', 'OTHROOMS', 'TOTROOMS', 'STUDIO', 'WALLTYPE', 'ROOFTYPE', 'HIGHCEIL', 'DOOR1SUM', 'WINDOWS', 'TYPEGLASS', 'ORIGWIN', 'WINFRAME', 'TREESHAD', 'ADQINSUL', 'DRAFTY', 'UGASHERE', 'SWIMPOOL', 'MONPOOL', 'POOLPUMP', 'FUELPOOL', 'RECBATH', 'MONTUB', 'FUELTUB', 'SQFTEST', 'SQFTRANGE', 'SQFTINCB', 'SQFTINCA', 'SQFTINCG', 'TOTSQFT_EN', 'TOTHSQFT', 'TOTCSQFT', 'ZADQINSUL', 'ZATTIC',"ZATTICFIN', 'ZBASEFIN', 'ZBASEOTH', 'ZBEDROOMS', 'ZCELLAR', 'ZCONCRETE', 'ZCRAWL', 'ZDOOR1SUM', 'ZDRAFTY', 'ZFUELPOOL', 'ZFUELTUB', 'ZHIGHCEIL', 'ZKOWNRENT', 'ZMONPOOL','ZMONTUB', 'ZNCOMBATH', 'ZNHAFBATH', 'ZORIGWIN', 'ZOTHROOMS', 'ZPOOLPUMP', 'ZPRKGPLC1', 'ZRECBATH', 'ZROOFTYPE', 'ZSIZEOFGARAGE', 'ZSQFTEST', 'ZSQFTINCA', 'ZSQFTINCB', 'ZSQFTINCG', 'ZSQFTRANGE','ZSTORIES', 'ZSWIMPOOL', 'ZTREESHAD', 'ZTYPEGLASS', 'ZUGASHERE', 'ZWALLTYPE', 'ZWINDOWS', 'ZWINFRAME', 'ZYEARMADERANGE', 'ZTOTROOMS',"ZTYPEHUQ","ZSTUDIO","DBT1","DBT99","GWT', 'KWHbins']

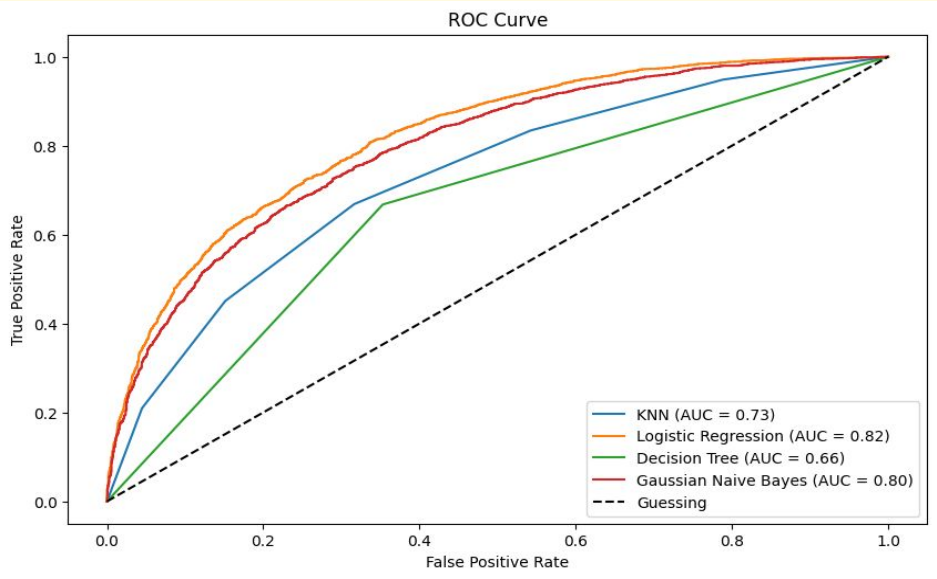
Statistical Analysis – IAMB

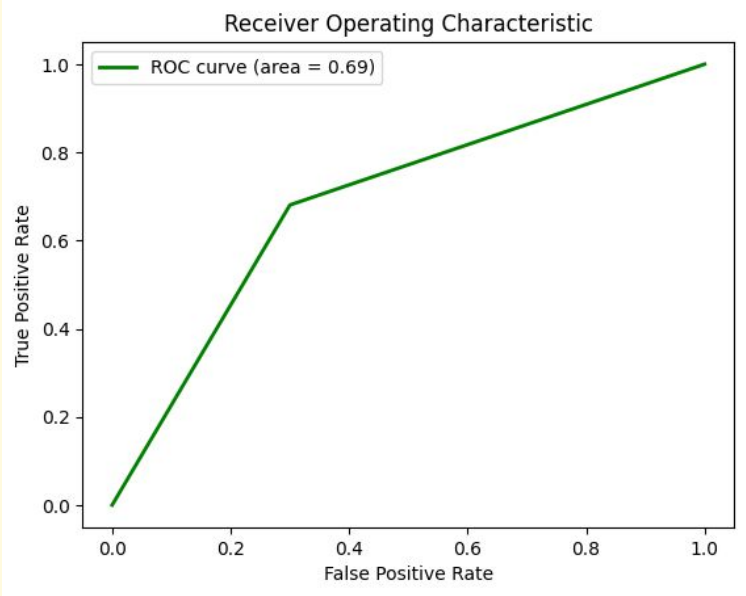
- Using partial correlation function
- Selects the most important variables
- Bin the KWH into two different bins
- Select the important variables

['WINDOWS', 'TOTCSQFT', 'UGASHERE', 'CDD30YR_PUB', 'TYPEHUQ', 'BEDROOMS', 'SQFTRANGE', 'DRAFTY', 'DBT1', 'CDD65', 'TOTROOMS', 'GWT', 'DBT99', 'KOWNRENT', 'NCOMBATH', 'TOTSQFT_EN', 'HDD30YR_PUB', 'TOTHSQFT', 'STORIES', 'OTHROOMS', 'TREESHAD', 'WINFRAME', 'TYPEGLASS']

Statistical Analysis – ROC

- View the ratio of False Positives to True Positives
- Determines which model is ideal for use, where graphs that are closer to the top left are more useful as we have less false positives.





Why is this Useful?

- Estimate power consumption for consumer
- Building homes w/ power consumption in mind
- Find outliers who spend extra on power
- Estimate power consumption cost

Why is this Useful?

- Company built estimations
- See when houses need insulation renovations
- Reward people who save energy
- Send over-consumers flyers
- Cut down on emissions