

IBM Watson classifier

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Now, let's get a score for best-answering

```
##initialize; one row per img/transform
scored <- aggregate(data$corr,list(baseimg=data$baseimg,transform=data$transformation),length)

scored$bestanswer <- aggregate(data$bestanswer,list(baseimg=data$baseimg,transform=data$transformation)
scored$topresponse <- NA
scored$best <- NA
scored$any <- NA
for(row in 1:nrow(scored))
{
  set <- scored[row,]$transform
  img <- scored[row,]$baseimg

  tmp <- data[data$transformation==set &
              data$baseimg==img,]
  #print(tmp)

  ##tmp might not be in order.
  tmp <- tmp[order(-tmp$score),]

  ##pick the best answer; a correct one if possible
  highest.0 <- tmp[tmp$score==max(tmp$score),]
  ##if there are more than one, pick the correct one if possible.
  highest <-highest.0[which.max(highest.0$score+highest.0$corr),]

  scored$best[row] <- any(highest$corr)
  scored$any[row] <- any(tmp$corr)

  scored$topresponse[row] <- highest$Name[1]
}

error.tab <- table(scored$bestanswer,
                  scored$topresponse
                  )

response.tab <- table(data$bestanswer,data$Name)

for(i in 1:nrow(error.tab))
{
  print("-----")
  print(row.names(error.tab)[i])
  sorted <- sort(error.tab[i,][error.tab[i,]>0],decreasing=T)
  print(sorted[sorted>0])
}
```

```
}

```

```
## [1] "-----"
## [1] "AXE"
##          AX          CUTLERY REDDISH BROWN COLOR
##          32          10          7
##          GRAY COLOR          IVORY COLOR          ALABASTER COLOR
##          5          5          4
## BOTTLE GREEN COLOR          COAL BLACK COLOR          LIGHT BROWN COLOR
##          4          4          3
## PALE YELLOW COLOR          TOOL          MICROORGANISM
##          3          3          2
## ULTRAMARINE COLOR          ASH GREY COLOR          BEIGE COLOR
##          2          1          1
##          COPPER COLOR          EMERALD COLOR          FLORIST SHOP
##          1          1          1
##          GLOW TUBE          GREENISHNESS COLOR          HOOK
##          1          1          1
##          INVERTEBRATE          KNIFE          LEMON YELLOW COLOR
##          1          1          1
##          PANTILE          PURPLE COLOR          ROTIFER WORM
##          1          1          1
##          SHOVEL          UTENSIL
##          1          1
## [1] "-----"
## [1] "FLASH"
## COAL BLACK COLOR          ASH GREY COLOR          BOTTLE GREEN COLOR
##          20          14          9
##          EMERALD COLOR          FLASHLIGHT          MUSICAL INSTRUMENT
##          6          5          5
##          BLACK COLOR          CHARCOAL COLOR          ELECTRICAL DEVICE
##          4          4          4
##          GRAY COLOR          TOOL          BLUE COLOR
##          4          3          2
## GREENISHNESS COLOR          UTENSIL          ALABASTER COLOR
##          2          2          1
##          CROSS          DARK RED COLOR          ELECTRIC BATTERY
##          1          1          1
##          FASTENER          FLASHLIGHT BATTERY          FRAMEWORK
##          1          1          1
##          GLOW TUBE          IVORY COLOR          LASER
##          1          1          1
##          MAROON COLOR          NEON LAMP          PURPLE COLOR
##          1          1          1
##          ROD          SKYLIGHT          ULTRAMARINE COLOR
##          1          1          1
## [1] "-----"
## [1] "HAMMER"
##          HAMMER          GRAY COLOR          TOOL
##          17          13          12
## COAL BLACK COLOR          REDDISH ORANGE COLOR          BOTTLE GREEN COLOR
##          10          8          6
##          CHARCOAL COLOR          ASH GREY COLOR          LEMON YELLOW COLOR
##          4          3          2

```

```

##      PALE YELLOW COLOR  REDDISH BROWN COLOR      SAGE GREEN COLOR
##              2              2              2
##      ULTRAMARINE COLOR              ANIMAL              BEIGE COLOR
##              2              1              1
##              BLACK COLOR              DISCO              EMERALD COLOR
##              1              1              1
##      GREENISHNESS COLOR      INDIAN RED COLOR              LAMP
##              1              1              1
##      LIGHT BROWN COLOR      LINOCUT DESIGN              OPENER
##              1              1              1
##      SHOULDER HOLSTER              SPRAY GUN              SWIZZLE STICK
##              1              1              1
##              TOMAHAWK              WEAPON
##              1              1
## [1] "-----"
## [1] "PLIER"
##              TOOL      COAL BLACK COLOR      ASH GREY COLOR
##              24              12              9
##      LEMON YELLOW COLOR      BLACK COLOR      ULTRAMARINE COLOR
##              9              8              6
##              IVORY COLOR      GRAY COLOR      AZURE COLOR
##              5              4              3
##              CUTLERY      GREENISHNESS COLOR      CHARCOAL COLOR
##              3              3              2
##      PAIR OF SCISSORS      COAT HANGER      DRAFTING INSTRUMENT
##              2              1              1
##              FRAMEWORK      HALTER (HORSE)      PAIR OF PLIERS
##              1              1              1
##              PURPLE COLOR      T-SQUARE      TINE (FORKED OBJECT)
##              1              1              1
##              WEAPON      WRENCH
##              1              1
## [1] "-----"
## [1] "SAW"
##              SAW      PRUNING SAW      TOOL
##              13              11              8
##              IVORY COLOR      LEMON YELLOW COLOR      ALABASTER COLOR
##              7              6              4
##              GRAY COLOR      GREENISHNESS COLOR      COAL BLACK COLOR
##              4              4              3
##              EMERALD COLOR      PURPLE COLOR      REDDISH BROWN COLOR
##              3              3              3
##              MITER BOX      PALE YELLOW COLOR      ANGULAR DISTANCE
##              2              2              1
##              ASH GREY COLOR      AZURE COLOR      BOTTLE GREEN COLOR
##              1              1              1
##              CHARCOAL COLOR      COLD CATHODE      CUTLERY
##              1              1              1
##      DRAFTING INSTRUMENT      FAN BELT      FIGURE
##              1              1              1
##              FRAMEWORK      HAIR SLIDE      JADE GREEN COLOR
##              1              1              1
##              JOINT      NEMATODE WORM      ORANGE COLOR
##              1              1              1

```

```

##          PANTILE          PERSON    SAGE GREEN COLOR
##          1              1          1
##          SQUARE          STABILIZER BAR    STEEL BLUE COLOR
##          1              1          1
## SUPPORTING STRUCTURE    ULTRAMARINE COLOR    WALL BRACKET
##          1              1          1
##          WORM          WRENCH
##          1              1
## [1] "-----"
## [1] "SCISSOR"
##    PAIR OF SCISSORS    ASH GREY COLOR    TOOL
##          38              7          7
##          GRAY COLOR    ULTRAMARINE COLOR    CUTLERY
##          4              4          3
##          FLORIST SHOP    FRAMEWORK    IVORY COLOR
##          3              3          3
##          PURPLE COLOR    BLUE COLOR    COAL BLACK COLOR
##          3              2          2
##    JADE GREEN COLOR    LEMON YELLOW COLOR    MEDICAL INSTRUMENT
##          2              2          2
## ALIZARINE RED COLOR    BEIGE COLOR    COOKIE CUTTER
##          1              1          1
##          ENVELOPE    FIGURE    FIRE TONGS
##          1              1          1
## GREENISH BLUE COLOR    GREENISHNESS COLOR    HEDGE TRIMMER
##          1              1          1
##          INVERTEBRATE    MAROON COLOR    MICROORGANISM
##          1              1          1
##          PERSON    THINNING SHEARS    WEAPON
##          1              1          1
## [1] "-----"
## [1] "SCREW"
##          TOOL    COAL BLACK COLOR    BOTTLE GREEN COLOR
##          35              11          4
##          GRAY COLOR    GREENISHNESS COLOR    INDIGO COLOR
##          4              4          4
##          SCREWDRIVER    ASH GREY COLOR    BLACK COLOR
##          4              3          3
##    LEMON YELLOW COLOR    BRUSH    LAVENDER COLOR
##          3              2          2
##          ORANGE COLOR    TINE (FORKED OBJECT)    BLUE COLOR
##          2              2          1
##          CHARCOAL COLOR    CLARET RED COLOR    EMERALD COLOR
##          1              1          1
##          FRAMEWORK    FURNITURE    IVORY COLOR
##          1              1          1
##    JADE GREEN COLOR    KEYHOLE    MECHANICAL DEVICE
##          1              1          1
##          PADDLE (BOAT)    PALE YELLOW COLOR    REDDISH ORANGE COLOR
##          1              1          1
##          TRIANGLE    WEAPON    WORM
##          1              1          1
##          YELLOW COLOR
##          1

```

```

## [1] "-----"
## [1] "SHOVEL"
##          SHOVEL    COAL BLACK COLOR    ASH GREY COLOR
##          26          20          13
##          GRAY COLOR BOTTLE GREEN COLOR          TOOL
##          8          6          5
##          BEIGE COLOR          BLACK COLOR    ALABASTER COLOR
##          3          3          2
##          EMERALD COLOR          FASTENER    CHARCOAL COLOR
##          2          2          1
##          CLAW          FLORIST SHOP          HAND SHOVEL
##          1          1          1
##          IVORY COLOR    JADE GREEN COLOR    METAL DETECTOR
##          1          1          1
## MUSICAL INSTRUMENT    STEEL BLUE COLOR    ULTRAMARINE COLOR
##          1          1          1
## [1] "-----"
## [1] "TAPE"
##          TAPE MEASURE          IVORY COLOR    ULTRAMARINE COLOR
##          17          7          7
##          ASH GREY COLOR    LEMON YELLOW COLOR    BOTTLE GREEN COLOR
##          6          6          5
##          COAL BLACK COLOR MEASURING INSTRUMENT    CHARCOAL COLOR
##          5          5          3
##          FRAMEWORK          GRAY COLOR    GREENISHNESS COLOR
##          3          3          3
##          EMERALD COLOR          GLOW TUBE          HEDGE TRIMMER
##          2          2          2
##          MAROON COLOR          MICROORGANISM          ORANGE COLOR
##          2          2          2
##          SAGE GREEN COLOR          YELLOW COLOR          ANIMAL
##          2          2          1
##          BLACK COLOR          FLORIST SHOP          GARDEN TOOL
##          1          1          1
##          KEY          MAGNIFIER          MICROPHONE BOOM
##          1          1          1
##          MOUTHPIECE    PALE YELLOW COLOR          PLUMB LEVEL
##          1          1          1
##          PURPLISH BLUE COLOR          RADIOGRAM REDDISH PURPLE COLOR
##          1          1          1
##          STAMP
##          1
## [1] "-----"
## [1] "WRENCH"
##          WRENCH          GRAY COLOR
##          45          9
##          TOOL          LEMON YELLOW COLOR
##          5          4
##          ASH GREY COLOR          BOTTLE GREEN COLOR
##          3          3
##          COAL BLACK COLOR          GREENISHNESS COLOR
##          3          3
##          IVORY COLOR          FIGURE
##          3          2

```

##	GREENISH BLUE COLOR	REDDISH BROWN COLOR
##	2	2
##	SWORD	ULTRAMARINE COLOR
##	2	2
##	UTENSIL	ALABASTER COLOR
##	2	1
##	ARABESQUE (ORNAMENT)	ARROWWORM
##	1	1
##	BLACK COLOR	FRAMEWORK
##	1	1
##	PURPLE COLOR	SAGE GREEN COLOR
##	1	1
##	SQUEEGEE (CLEANING EQUIPMENT)	TRIANGLE
##	1	1

Find score by transform:

```
print(aggregate(cbind(scored$best,scored$any),list(scored$transform),mean))
```

##	Group.1	V1	V2
## 1	Blur-Tools	0.400	0.56
## 2	BW-Tools	0.100	0.52
## 3	Charcol-Tools	0.160	0.30
## 4	Edge-Tools	0.200	0.30
## 5	Edge-White-Tools	0.060	0.22
## 6	Frame-Blue	0.420	0.78
## 7	Frame-Leaves	0.160	0.58
## 8	Frame-Nature	0.000	0.04
## 9	Frame-Wood	0.040	0.10
## 10	Implode-Tools	0.080	0.24
## 11	Masking-Tools	0.400	0.82
## 12	Original-Tools	0.580	0.82
## 13	Rainbow-Tools	0.080	0.30
## 14	Resize	0.240	0.54
## 15	Roll-Tools	0.500	0.80
## 16	Rotation	0.420	0.76
## 17	Shear-Tools	0.060	0.16
## 18	Sketch-Tools	0.200	0.44
## 19	Splice	0.100	0.26
## 20	Wave-Tools	0.125	0.25