

Artificial Intelligence Opinion Survey

DATA 490 Independent Study

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1. Load Data

```
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.2 --
## v ggplot2 3.4.1    v purrr   1.0.1
## v tibble  3.1.8    v dplyr   1.1.0
## v tidyr   1.3.0    v stringr 1.5.0
## v readr   2.1.4    v forcats 1.0.0
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(ggplot2)

# Load data. Top row is column name.
edu <- read.csv("prolific_edu.csv")
health <- read.csv("prolific_health.csv")
retail <- read.csv("prolific_retail.csv")
tech <- read.csv("prolific_tech.csv")
qualtrics <- read.csv("qualtrics_data.csv")
```

2. Data Cleaning

```
# Combine data into one data frame after mutating Age to be one data type
```

```
edu <- edu %>% mutate(Age = as.character(Age))
```

```
health <- health %>% mutate(Age = as.character(Age))
```

```
retail <- retail %>% mutate(Age = as.character(Age))
```

```
tech <- tech %>% mutate(Age = as.character(Age))
```

```
combined <- bind_rows(edu, health, retail, tech)
```

```
# export combined data to csv
```

```
# write.csv(combined, "combined_non_qualtrics.csv")
```

```
# combine qualtrics and combined data using qualtrics data's
```

```
# ProlificID column and combined data's Participant id
```

```
combined <- left_join(qualtrics, combined, by = c("ProlificID" = "Participant.id"))
```

```
# rename "Duration..in.seconds." column to "Duration"
```

```
colnames(combined)[colnames(combined) == "Duration..in.seconds."] <- "Duration"
```

```
# remove Age.x and keep only Age.y column and rename Age.y to Age
```

```
combined <- combined %>%
```

```
  select(-Age.x) %>%
```

```
  rename(Age = Age.y)
```

```
# remove Status.x and Status.y columns
```

```
combined <- combined %>%
```

```
  select(-Status.x) %>%
```

```
  select(-Status.y)
```

```
# remove Finished, Progress, UserLanguage, DistributionChannel,
```

```
# Nationality, and Consent columns
```

```
combined <- combined %>%
```

```
  select(-Finished) %>%
```

```
  select(-Progress) %>%
```

```
  select(-UserLanguage) %>%
```

```
  select(-DistributionChannel) %>%
```

```
  select(-Nationality) %>%
```

```
  select(-Consent)
```

```
# remove rows where Submission.id is NA
```

```
combined <- combined %>% filter(!is.na(Submission.id))
```

```
# Keep only rows which say "United States" in "Country.of.residence" column
```

```
combined <- combined %>% filter(combined$Country.of.residence == "United States")
```

```
# Replace all cells that say "Information Technology" and "Science, Technology, Engineering & Mathematics"
```

```
combined$Employment.sector[combined$Employment.sector == "Information Technology"] <- "STEM/IT"
```

```
combined$Employment.sector[combined$Employment.sector == "Science, Technology, Engineering & Mathematics"] <- "STEM/IT"
```

```
# change all cells in column EnhanceHurt that say "AI will neither enhance nor detract from my work" to
```

```
combined$EnhanceHurt[combined$EnhanceHurt == "AI will neither enhance nor detract from my work"] <- "neither"
```

```
combined$EnhanceHurt[combined$EnhanceHurt == "AI will enhance my work"] <- "enhance"
```

```
combined$EnhanceHurt[combined$EnhanceHurt == "AI will detract from my work"] <- "detract"
```

```
# export data to csv
```

```
# write.csv(combined, "combined_qualtrics.csv")
```

```
# Keep only rows which say "Compose an email" in "Attention" column
```

```
combined <- combined %>% filter(combined$Attention == "Compose an email")
```

```
# remove Attention column
combined <- combined %>% select(-Attention)
# export data to csv
# write.csv(combined, "combined_qualtrics_attentive.csv")
```

3. Data Exploration

The columns in the dataset are:

- *StartDate* - Date and time survey was started
- *EndDate* - Date and time survey was completed
- *IPAddress* - IP address of participant
- *Duration* - Duration of survey in seconds
- *RecordedDate* - Date and time survey was recorded
- *ResponseId* - Response ID
- *LocationLatitude* - Participant's location latitude
- *LocationLongitude* - Participant's location longitude
- *ProlificID* - Identification of the response on Prolific
- *Gender* - Gender of the participant
- *Education* - Education level of the participant
- *Salary* - Salary of the participant
- *AIKnowledge* - Knowledge of AI of the participant
- *UsedAI* - Whether the participant has used AI
- *TimeEnergy* - How much time and energy AI has saved the participant
- *SimilarTasks* - How much of the participant's tasks they think AI can do
- *EnhanceHurt* - Whether the participant thinks AI can enhance or hurt their work efficiency.
- *Comments* - Comments from the participant
- *Submission.id* - Submission ID
- *Started.at* - Date and time survey was started
- *Completed.at* - Date and time survey was completed
- *Reviewed.at* - Date and time survey was reviewed
- *Archived.at* - Date and time survey was archived
- *Time.taken* - Duration of survey in seconds
- *Completion.code* - Completion code
- *Total.approvals* - Total number of approvals
- *Employment.sector* - Employment sector
- *Age* - Age of the participant
- *Sex* - Sex of the participant
- *Ethnicity.simplified* - Ethnicity of the participant

- *Country.of.birth* - Country of birth of the participant
- *Country.of.residence* - Country of residence of the participant
- *Language* - Language of the participant
- *Student.status* - Whether the participant is a student
- *Employment.status* - Whether the participant is employed

4. Data Analysis

4.1. EnhanceHurt vs. Industry (proportions)

```
# Create a new data frame with only the columns we need
enhancehurt_vs_industry <- combined %>% select(EnhanceHurt, Employment.sector)

# Remove rows where Employment.sector is NA
enhancehurt_vs_industry <- enhancehurt_vs_industry %>% filter(!is.na(Employment.sector))
# Remove rows where EnhanceHurt is NA
enhancehurt_vs_industry <- enhancehurt_vs_industry %>% filter(!is.na(EnhanceHurt))

# For each industry, calculate the proportion of respondents who think AI can enhance their work effici
enhancehurt_vs_industry <- enhancehurt_vs_industry %>%
  group_by(Employment.sector, EnhanceHurt) %>%
  summarize(count = n()) %>%
  mutate(prop = count / sum(count))

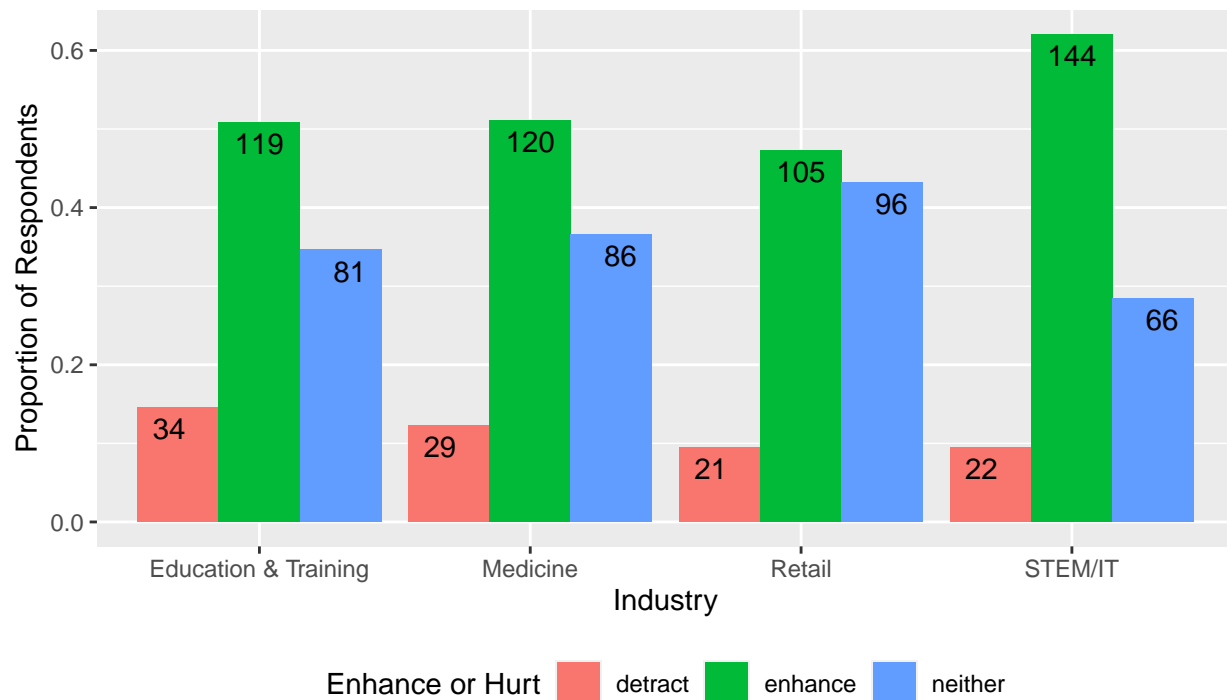
## `summarise()` has grouped output by 'Employment.sector'. You can override using
## the `.groups` argument.

# Visualize using different histogram for each industry.
# Show the number of respondents inside each bar.
# make legend bottom. Wrap x axis labels without changing plot size.
enhancehurt_vs_industry_plot <- ggplot(enhancehurt_vs_industry, aes(
  x = Employment.sector,
  y = prop, fill = EnhanceHurt
)) +
  geom_bar(stat = "identity", position = "dodge") +
  geom_text(aes(label = count),
    position = position_dodge(width = 1),
    vjust = 1.5
  ) +
  labs(
    x = "Industry", y = "Proportion of Respondents",
    fill = "Enhance or Hurt"
  ) +
  ggtitle("Proportion of Respondents Who Think AI Can\nEnhance Their Work Efficiency by Industry") +
  theme(
    plot.title = element_text(hjust = 0.5),
    legend.position = "bottom"
  )

enhancehurt_vs_industry_plot
```

Proportion of Respondents Who Think AI Can

Enhance Their Work Efficiency by Industry



4.2. EnhanceHurt vs. Education (proportions)

```
# Create a new data frame with only the columns we need
enhancehurt_vs_education <- combined %>% select(EnhanceHurt, Education)

# Remove rows where Education is NA
enhancehurt_vs_education <- enhancehurt_vs_education %>% filter(!is.na(Education))
# Remove rows where EnhanceHurt is NA
enhancehurt_vs_education <- enhancehurt_vs_education %>% filter(!is.na(EnhanceHurt))

# For each education level, calculate the proportion of respondents who think AI can enhance their work
enhancehurt_vs_education <- enhancehurt_vs_education %>%
  group_by(Education, EnhanceHurt) %>%
  summarize(count = n()) %>%
  mutate(prop = count / sum(count))

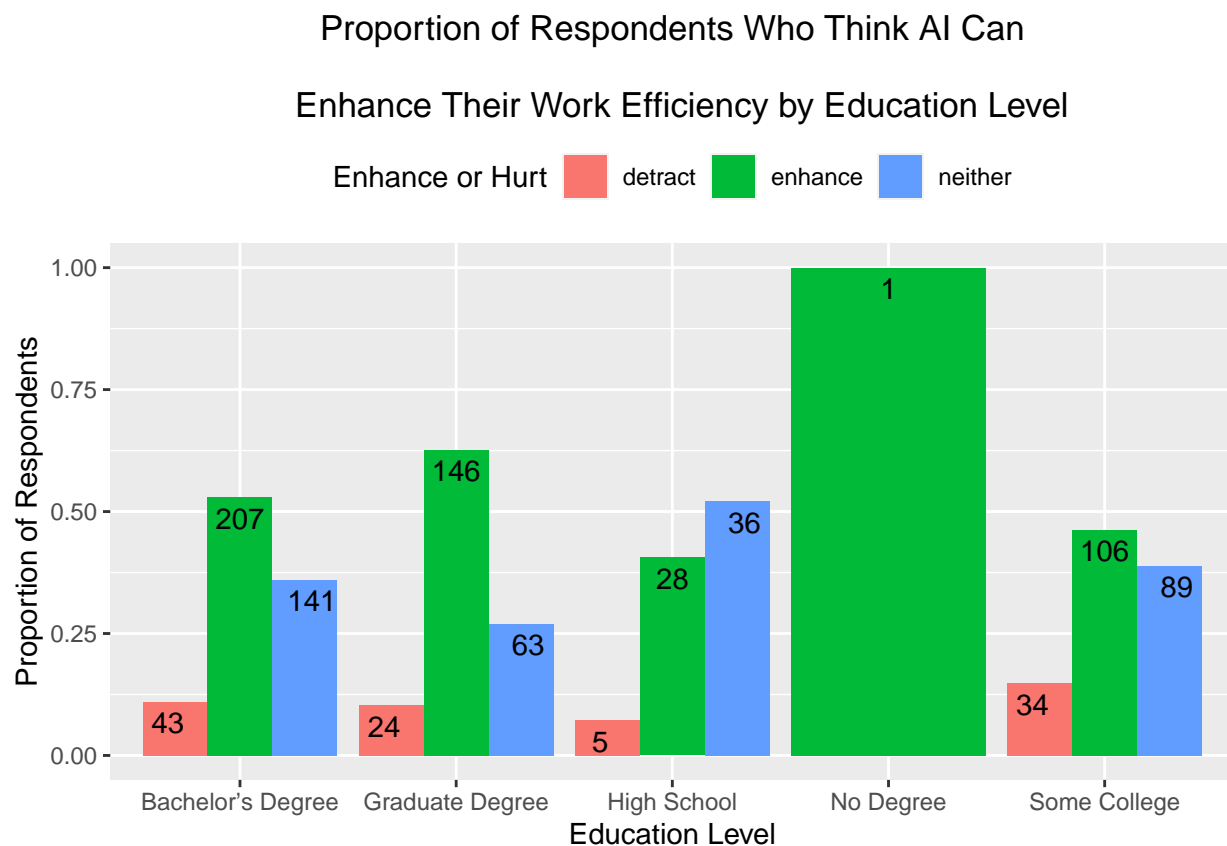
## `summarise()` has grouped output by 'Education'. You can override using the
## `.groups` argument.

# Visualize using different histogram for each education level.
# Show the number of respondents on each bar.
enhancehurt_vs_education_plot <- ggplot(enhancehurt_vs_education, aes(
  x = Education, y = prop,
  fill = EnhanceHurt
)) +
  geom_bar(stat = "identity", position = "dodge") +
```

```

geom_text(aes(label = count),
  position = position_dodge(width = 1),
  vjust = 1.5
) +
labs(
  x = "Education Level", y = "Proportion of Respondents",
  fill = "Enhance or Hurt"
) +
ggtitle("Proportion of Respondents Who Think AI Can\n
Enhance Their Work Efficiency by Education Level") +
theme(plot.title = element_text(hjust = 0.5)) +
theme(legend.position = "top")
enhancehurt_vs_education_plot

```



4.3 EnhanceHurt vs. Age (proportions)

```

# Create a new data frame with only the columns we need
enhancehurt_vs_age <- combined %>% select(EnhanceHurt, Age)
# Remove the Ages which say "DATA_EXPIRED" and "923"
enhancehurt_vs_age <- enhancehurt_vs_age %>% filter(enhancehurt_vs_age$Age != "DATA_EXPIRED")
enhancehurt_vs_age <- enhancehurt_vs_age %>% filter(enhancehurt_vs_age$Age != "923")

# Remove rows where Age is NA
enhancehurt_vs_age <- enhancehurt_vs_age %>% filter(!is.na(Age))

```

```

# Remove rows where EnhanceHurt is NA
enhancehurt_vs_age <- enhancehurt_vs_age %>% filter(!is.na(EnhanceHurt))

# Convert Age to numeric
enhancehurt_vs_age$Age <- as.numeric(as.character(enhancehurt_vs_age$Age))
# group ages by 5 years
enhancehurt_vs_age$Age <- cut(enhancehurt_vs_age$Age, breaks = seq(18, 80, by = 10))
# remove NA
enhancehurt_vs_age <- enhancehurt_vs_age %>% filter(!is.na(Age))

# create a new dataframe with the proportion of respondents who think AI can enhance their work efficiency
enhancehurt_vs_age <- enhancehurt_vs_age %>%
  group_by(Age, EnhanceHurt) %>%
  summarize(count = n()) %>%
  mutate(prop = count / sum(count))

## `summarise()` has grouped output by 'Age'. You can override using the `.groups`
## argument.

# Visualize using different histogram for each age group.
# Show the number of respondents on each bar.
enhancehurt_vs_age_plot <- ggplot(enhancehurt_vs_age, aes(
  x = Age, y = prop,
  fill = EnhanceHurt
)) +
  geom_bar(stat = "identity", position = "dodge") +
  geom_text(aes(label = count),
    position = position_dodge(width = 1),
    vjust = 1.5
  ) +
  labs(
    x = "Age Group", y = "Proportion of Respondents",
    fill = "Enhance or Hurt"
  ) +
  ggtitle("Proportion of Respondents Who Think AI Can\nEnhance Their Work Efficiency by Age Group") +
  theme(plot.title = element_text(hjust = 0.5)) +
  theme(legend.position = "top")

enhancehurt_vs_age_plot

```

Proportion of Respondents Who Think AI Can Enhance Their Work Efficiency by Age Group

