Hi, I hope you are doing alright. I would like you to help me with my assignment by doing data analysis in **Python.**

# General information

First, some background information. For my research I collected data of service robots in retail and hospitality settings. I want to study the influence that distance has on the non-verbal communication signs of a human. This leads to the main question of the research:

*‘How does the distance between a service robot and the person interacting affect the person’s nonverbal communication signs of eye contact, smiling behavior and facial expression in retail and hospitality settings?’*

I developed 3 hypotheses during my literature review that I want to test

Diagram

Description automatically generated

**H1: Distance affects the facial direction of the person interacting with the service robot.**

**H2: Distance affects smiling behavior towards the robot**

**H3: Distance affects facial expression towards the robot**

I am not sure which statistical tests to use due to the nature of the variables. Therefore, I was hoping that you could also provide a part of the methodology in terms of operating the variables and why you use that specific statistical test (e.g., its advantages compared to other tests). Would be nice if you could use some (scientific) APA references in that part, but that is up to you.

# Variables

*Distance*

Measured in meters at the start of the interaction (each row is 1 interaction).

*Facial Expression / Attention*

The direction the person was looking at during interaction and classified it in their dataset as:

* “LOOKING\_AT\_ROBOT”
* “LOOKING\_DOWN”
* “LOOKING\_UP”
* “LOOKING\_LEFT”
* “LOOKING\_RIGHT”
* “LOOKING\_UP\_LEFT”
* “LOOKING\_UP\_RIGHT”
* “LOOKING\_DOWN\_LEFT”
* “LOOKING\_DOWN\_RIGHT”

*Smiling behavior*

Smiling behavior shows whether the person interacting with the service robot was smiling with:

* “BROADLY\_SMILING”
* “SMILING”
* “NOT\_SMILING”

*Facial direction*

Measured the direction the person was looking at during interaction and classified as:

* “LOOKING\_AT\_ROBOT”
* “LOOKING\_DOWN”
* “LOOKING\_UP”
* “LOOKING\_LEFT”
* “LOOKING\_RIGHT”
* “LOOKING\_UP\_LEFT”
* “LOOKING\_UP\_RIGHT”
* “LOOKING\_DOWN\_LEFT”
* “LOOKING\_DOWN\_RIGHT”

*Gender & age*

Self-explanatory ☺

# Data analysis

Start with demographic and descriptive statistics about the dataset. Maybe develop another hypothesis based on the descriptive statistics? I was thinking about adding age and/or gender as a moderating variable and use that as another hypothesis.

Second, perform the inferential statistics (hypothesis testing) for all 3 hypotheses based on the (previous mentioned) methodology of your choice.

State the results of the above and please interpret them. I want the detailed report as a word document.

# Summary deliverables & evaluation

***Part of methodology of how you operationalize the variable and which tests you will be using and why***

* Justification of the research methodology is exceptionally clear, complete and correct, and is based on an explicit comparison of advantages and disadvantages of multiple research techniques.

***Detailed results and interpretation of the data analysis to answer the main research question in a word document***

* Analyses are exceptionally objective, thorough, clear and convincing.
* Analyses completely match the described research methodology and yielded only correct and relevant results.
* Conclusions are clear, correct, nuanced and convincingly related explicitly to the research results and research questions.
* Discussion of limitations of used methods

***The python file you used (preferably as a jupyter notebook)***