Practical Task 5

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# EXERCISE 1: Formulation of Research Problem

## Step VIII: Operationalize your concepts.

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| Objectives/Research Questions/Hypothesis | Major Concepts | Indicators | Variables | Unit of Measurement |
| **Efficient Human-Machine Interaction** | Natural Language Processing (NLP) | Knowledge of NLP Concepts | Familiarity of | understanding some NLP techniques |
| Awareness of NLP Models | NLP Toolbox  Awareness | Extensive knowledge of state of art tools |
| Use of NLP Models | Adaptability  Extensiveness | extensive knowledge of NLP models and their applications |
| Multimodal Functionalities | Awareness of Multimodal Functionalities | Awareness of  Frequency of usage | Different interaction modes and applications  Preference of users |
| Knowledge about Cross Modal Understanding | Consistency  Integration Efficiency | Efficiency in integrating the cross-modal information |
| Knowledge about User centric Designs | Application of Principal  Flexibility of Design | Gain general understanding of user-centric designs and how to implement it in practice. |
| Feedback Mechanisms | Understand Response Accuracy | NLP Task Coverage  Consistency of NLP Models | Different aspect of accuracy with consistency |
| Knowledge about Error Handling | Awareness of  Effectiveness of | strong understanding of error handling strategies and how can it be applied on various situations. |

## Step IX: Operationally define your study population.

The study population means the group of users who use or interact with the systems developed or the research has focused on.

In this study, the study population is any machines or tools that have been designed based on NLP concepts for their academic, professional, or personal achievements. The systems can be anything which is available such as, chatbots, personnel (virtual) assistants on devices, text to speech or speech to text tools, tools that does the translation of language, or others.

## Step X: Construct your hypothesis or hypotheses for each subobjective/research question.

Based on the preliminary analysis before the research to be conducted, hypotheses based on the subobjectives stated have been constructed as given below.

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|  | Subobjectives | Hypothesises |
| 1 | To understand Natural Language Processing and Human centric models. | The features of Natural Language Processing systems can have a significant effect in human-machine interactions. |
| 2 | To understand Natural Language Generation which gives efficiency to the machine responses. | Applying natural language generation model can make a major positive impact in the accuracy of machine responses. |
| 3 | To design personalize Interactions which makes the machines engage according to the situations arrived. | Making machine interactions more personalised improves the usability and user satisfaction compared to traditional systems. |
| 4 | To implement systems with multimodal Functionalities which includes voice, text, video, and motion. | The implementation of multimodal functionalities such as text, voice, video, and motion) increases the efficiency of user engagement and capabilities of human-centric systems. |