# Exercise 1: Formation of Research Problem

*(Continuation of Exercise 1)*

### Step IV

Under step four, the question raised during research for the chosen subarea are as below.

**Natural Language Processing**

* How can NLP be applied in digital communications?
* What are the techniques available in NLP to improve the performance of the application?
* How can NLP contribute to the development of better language tutoring systems?
* How can we improve the features of application through NLP on different domains?
* How can NLP be used to enhance the detection and prevention of cyberbullying and harassment online?
* What role can NLP play in aiding cross-cultural communication and understanding?
* How can NLP be integrated with other AI technologies (e.g., computer vision, robotics) for more comprehensive applications?

**Design and Optimisation of Expert Systems**

* What methods can improve the accuracy of knowledge-based expert systems?
* How can expert systems integrate with other AI systems for better performance?
* What are effective techniques for validating and verifying expert system outputs?
* How can we optimize the training of expert systems for specialized domains?
* How can expert systems be designed to handle uncertainty and incomplete information?
* How can expert systems be optimized for real-time decision-making?
* How can expert systems benefit from feedback and continuous learning mechanisms?

### Step V

By analysis the questions created under Natural language processing, the main objective as the subobjective of my study would be as given below.

**Main Objectives**

The main objective of doing research is to make a good understanding about NLP along with how to design and build the models with AI technologies by integrating NLP.

**Subobjectives**

Following are the subobjectives derived from the main objective stated above.

* To create a deep understanding of Natural language processing.
* To gain knowledge of different domains available for NLP integration.
* To design NLP based systems.
* To apply NLP based functionalities with the AI implementations available today.

### Step VI

To do the research, several steps are involved from literature review to final report. The purpose of each step, time needed, cost expected, technical expertise needed, and knowledge and skills need to be acquired has been summarised below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **What is involved** | **Time needed** | **Approx. Cost** | **Technical Expertise Needed** | **Gaps in Knowledge and Skills** |
| Literature Review | Make a comprehensive understanding about the NLP models. | 5 weeks | 0 | Internet – access to generals, papers, and library | Knowledge about NLP, NLP models. |
| Instrument Construction | Configure environment for implementing NLP | 2 weeks | £150 | Computer with good specifications. | Not Applicable |
| Data Collection | Making questionnaires or sourcing data from authentic persons. | 5 weeks | £200 | Use framework for easy data collection | Knowledge about making questionnaire |
| Data Analysis | Analyze data using known algorithms. | 4 weeks | Not Applicable | Software tools and capable machines | Knowledge about tools and programming languages |
| Draft Report | Organizing the work done in to document. | 2 Weeks | 0 | Latex/ Microsoft Word | Latex |
| Final Report | Refining Draft Report | 1 Week | 0 | Latex/ Microsoft Word | Latex |

### Step VII

By answering the above questions, the research chosen in the field of AI is found to be interesting.

|  |  |
| --- | --- |
| Are you really interested in the study? | YES |
| Do you agree with the objectives of the study? | YES |
| Are you certain you want to pursue the study? | YES |
| Do you have adequate resources? | YES |
| Do you have access to an appropriate study population? | YES |

Relevance to theory:

* Sharing the current state of development in the field of NLP.
* Improving the design and implementation of novel approaches
* Contributing to upcoming research the field of Artificial Intelligence and Machine Learning

Relevance to practice:

* Enhancing the user experience in real world applications
* Contributing positively to the field of education.