

# Categorizing Questions Through the Demonstrative-Intentional Tree

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## 1. Introduction

Our project aims at providing a philosophical analysis of questions. It surveys question-types for investigating whether questions can be categorized based on their identical and distinctive characters with/from each other. It can also be acknowledged as a first step towards an ontology of questions, although implementing a computational ontology is not among our current concerns. This project has the potential for explaining the intrinsic structures of dynamics of science [1]: because of their interrogative form, questions are the fundamentals of scientific inquiries and their investigation could therefore clarify how science works, how scientists explore and benefit the various methods used for different research programs. Our effort can be located at the computational level of Marr's Tri-Level Hypothesis [2], and will be contrasted with alternative strategies.

## 2. Literature

For this study, we have mostly consulted the philosophical or descriptive papers dealing with interrogative quality of questions [1,3,4,5], their formal classifications, alternative logical systems employing questions as premises and conclusions in arguments [6,7,8], and have worked through glossaries of logical and linguistic terms, and different disciplines of social sciences.

## 3. Methodology

Within the study, questions are analyzed according to whether they include question-words or any other interrogative phrase, the complexity of the sentence structures such as including connectives, the prevalence of reference to the required information over different scientific domains, etc. We devised on this basis ten conceptual trees for categorizing questions: Question-Type Tree, Question-Domain Tree, Universal-Particular Tree, Qualitative-Quantitative Tree, Demonstrative-Intentional Tree, Structural-Functional-Organizational Tree,

Modality Tree, Operator Bounded Tree, Problem-Model Based Tree, and Agentive Tree.

One of the conceptual trees built for categorizing questions is based on the distinction between *demonstrative* and *intentional* questions. The main classification principle of this tree is to consider whether questions seek for an explanation or a description or imply a specific intention. Accordingly, the tree encompasses the two main categories *demonstrative* and *intentional*. The questions falling under the category *demonstrative* ask for a description or explanation such as “Why does supernova threaten our world?”. This category further divides into the two subcategories: *descriptive* and *explanatory*. The latter consists of questions supported by a specific method of inference to find the required information, either *inductively*, *deductively* or *abductively*, e.g., “Does smoking increase the risk of cancer?”, “Why did the apple fall on Newtons head?”, and “To what extent, is the reason of increase in car accidents a rainy season?”. The former is composed of the categories *commentary* (“Do you think that Kuhn was right in his criticism to Popper about how science proceeds?”) and *definitional*. The nature of the latter varies with respect to whether they ask for *attributions* (“What was the expected structure of Mars’ surface before the probes sent to gather samples?”), *properties* (“What will be the size of a meteorite that can give an irreversible damage to the life on Earth?”), and *relations* (“Are there any differences between a plant based and vegan diet?”).

The other second main category of the tree is *intentionality*. It encompasses questions which have a sort of directedness towards an entity or refer to a specific content, for instance, “Why does John take cooking classes?”. This category has two other subcategories: *purposiveness* and *novelty-based*. While the subcategory *purposiveness* consists of questions which ask the intention of the agent as plans respecting daily routine, professions or any other domain (“Why do couples prefer to spend their honeymoon in exotic places?”), the subcategory *novelty-based* looks for the intention of the agent when doing something innovative. The latter is also divided between *discovery-leading* (“What is the evidence for the existence of liquid water on Mars?”) and *inventional* (“What are the requirements for building an operating system for the Internet of Things?”).

## References

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