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IDENTIFICATION OF THE ESSENCE OF INTELLIGENCE IN PROBLEM SOLVING BASED ON PRAGMATICISM'S THEORY OF INQUIRY

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ABSTRACT

In Artificial Intelligence (AI), the issue of the essence of intelligence is disputable in which this issue leads to the difficulty in understanding the intelligence. This research enters the challenge of identifying the essence of intelligence by re-visiting the tenet of intelligent behavior due to that intelligent behavior is amenable to reflect intelligence. The investigation into the intelligent behavior leads to the finding that the process and intelligent process are the underpinning principle of behavior. The research progresses to identify the intelligent processes that are said to be truly intelligent. As a result, the problem solving processes are found to be essential source for intelligent processes because problem solving is the key for intelligence. By disregarding the existing problem solving frameworks, this study explores the Pragmaticism's theory of inquiry, a general philosophical idea that penetrated many academic realms such as in AI since 1950s. The re-exploration of Pragmaticims's abduction, deduction and induction yields seven intelligent processes namely invention, selection, entertainment, analysis, demonstration, operation and justification. These intelligent processes are represented using common terminologies of intelligent behaviors namely reasoning, inventing, selecting, adapting, planning, acting and learning in which these processes are identified as the repertoire of intelligent behaviors. The research progresses to examine and validate these intelligent processes or behaviors into actual problem solving domain of fern identification. This kind of examination has made this research fall into qualitative method. The respondents are semi-expert group of which the fern's identification is a challenging subject to them. The think-aloud and structured questions that consist of closed and open-ended has been used for data collection. The Atlas.ti has been used to produce quotations and codes of transcripts of think-aloud and structured questions. The interpretive method of Productive Hermeneutic Analysis (PHA) is used in the data analysis. The analysis and discussion are made based on the magnitude of respondent's conducts exhibited in the think-aloud and their explanations about the present of intelligent processes in the fern's identification exercise coded into the Atlas.ti. By the respondent's validation and acknowledgement of the presence of intelligent processes, this study suggests the repertoire of eight intelligent behaviors as adequately represent the essence of intelligence.

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CHAPTER ONE
OVERVIEW

1.1 INTRODUCTION

This chapter outlines the necessary preliminaries that constitute our research. Overview section introduces the basic considerations pertaining to understanding the intelligence. This will include the issue of association between intelligence and intelligent behavior, the repertoire of behaviors claimed to be representing the intelligence and the inconsistency of suggested behaviors. Problem statement follows to narrowly phrasing the issue we address prior to stating the objectives of our research. In the section of scope of research, we draw some limitation of our study to exclude unnecessary issues to channel our research into our intended direction. Significant of research justifies the needs of this kind of research that we undertake. In the contribution of research, we highlight potential contributions that would be gained from this study. In the last section of this preliminary chapter, we outline the next coming chapters in this thesis with their specified content.

1.2 BACKGROUND

"What is intelligence"? While the answers to this question remain uncertain, such question often followed by consecutive question "What are behaviors [abilities or capabilities] represent intelligence"? These are two questions one frequently found in the reading of literature of intelligence mainly in Artificial Intelligence (AI) and psychology. Addressing the simple question as in the former is considerably critical due to that it gives significant impact on the study of AI as Smith (2006) notes that;

> *It seems worthwhile to revisit the question of "what is intelligence" because a) People want to build computerized artificial intelligences, b) Key questions about the interpretation of Quantum Mechanics depend on notions of "intelligent conscious observers," e.g. the validity of the "many worlds interpretation" rests on unproven speculations about how such observers "feel" in quantum scenarios. Without a definition of "intelligent conscious observer" there surely is no hope to make that rigorous and c) We have now reached the point where, at least according to the crudest estimates of*