

UNIVERSITI TEKNOLOGI MARA

MACHINE LEARNING USING ROBUST AI TECHNIQUES

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RESEARCH REPORT

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Research Summary

Machine Learning is an area in AI that deals with cognitive ability to assess surrounding area for meaningful actions to pursue. Many algorithms have been applied to aid the assessment process. This research will make use a few AI methods to capture the solution for the robot. The natural environment around us has a lot to offer. From natural resources for the well being of life to the hidden message interactively illustrated by the serenity of the environment. Nature has it all for human beings to live and prosper. One of the branches in computer science is artificial intelligence; which is an area of research that's looking into natural environment to find a mechanism that might be useful as a tool to solve problems. We are very familiar with speech recognition, for example, that looks into how human creates speech and understands it. Pattern recognition learns how human eyes mechanically capture the image, transmit it to the brain and recognise what the eyes are looking at. The way we think has been imitated in many machine learning algorithms. The ability to think, understand and draw conclusions are human capabilities that have drawn many scientists to devote their life in studying and simulating it for some purpose. Making decisions are one of the learned behaviour that humans tend to be good at or improved through time. How does a person make a right decision ? maybe he learns from past experience or new information he receives. The learning process creates knowledge that guides a person to make the decisions. It is important to know how this process is exercised. There is a model that studies the social behavior of humans called genetic algorithms (GA). An artificial neural network uses brain as a model to map decisions out of several inputs. Others have been looking beyond into the animal kingdom to learn how ants find their way to the food source.

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Introduction

Machine learning is a learning paradigm in computer science that deals with cognitive ability to learn before the machine pursues the next course of action. There are many algorithms in a lot of research works have been used to aid the learning process. Machine learning framework in this study is unique in the sense that it emulates the learning mechanism in the natural world. These mechanisms are a few learning paradigms out of many in computer science. The ability to think, understand and draw conclusions are human capabilities that have drawn many scientists to devote their life in studying and simulating it for some purposes, making decisions are one of the learned behaviour that humans tend to be good at or improved through time. How does a person make a right decision? The learning process creates knowledge that guides a person to make the decisions. It is important to know how this process is exercised.

There are also some intelligent behaviour in the animal kingdom that can be simulated into a learning paradigm; such as ant colony optimisation (ACO) that formulate the learning process through the amount of pheromone left behind. The ability that a group of working ants have is immeasurable to the intelligent element that they have contributed to the robust optimisation technique. This study tends to explore these possibilities that presumably will lead us into the engine of their intelligent capabilities.

The platform for testing all these techniques are set to an autonomous mobile robot (AMR) environment take advantage of its non-linearity and multi-objectivity of its moves and actions,