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Overcoming the Instability Defects with Reliability Using Alpha Ramda Humanoid Robot for Flexible Trajectory with High Precision Using Generative Adversarial AI Model

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Abstract:
It is well known that during different movements of humanoid robot due to the lag in the concurrency of data received through sensing with various sensors while the robot moves errors are generated and the distance and time factors varies. Hence, it is desired to make them concurrency thereby avoiding the robots difference in time factor, arising in the same distance moved with sensor error lags This is a crucial problem which is overcome by introducing the correction factor derived from the error of movement into the humanoid robot's microcontroller through the algorithm which reduces error and thereby a concurrency is achieved after several experiments and evidenced through the implementation of the correction factor Fast and flexible walking is necessary for humanoid robots in the Robocup soccer competition, Instability is one of the major defects in humanoid robots. Recently, various methods on the stability and reliability of humanoid robots have been actively studied and proposed a next fuzzy-logic control scheme that would enable the robot to realize flexible walking or turning with high standard of stability by restricting the step length and inclining the body of robot to an appropriate extent. In this paper, a stabilization algorithm is proposed using the balance condition of the robot, which is measured using accelerometer sensors during standing, walking, and turning movement are estimated from these data. From this information the robot selects the proper motion pattern effectively by using Generative Adversarial Model with respect of other AI Models.

Keywords: Genetic fuzzy optimisation, EfuRiO, Subjective listening, DOF, Phonetic accuracy, Gen AI

1. INTRODUCTION

In order to generate the proper reaction under various bodies of robot situations, a fuzzy algorithm is applied in finding the proper angle of the joint. The performance of the proposed algorithm is verified by walking, turning tap and ball kicking movement experiments on an 18-DOFs humanoid robot, called EFuRIO. Genetic fuzzy optimisation model was developed present a computational model of human vocalization which aims at learning the articulator mechanisms which produce spoken phonemes. It uses a set of fuzzy rules and genetic optimization. The former represents the relationships between places of articulations and speech acoustic parameters, while the latter computes the degrees of membership of the places of articulation. That is, the places of articulation are considered as fuzzy sets whose degrees of membership are the articulator features. Subjective listening tests of sentences artificially generated from the articulator description resulted in an average phonetic accuracy of about 76%. Through the analysis of a large amount of natural speech, the algorithm can be used to learn the places of articulation of all phonemes with the multimodal AI Model over Gen AI model.

2. Methodology Adopted

Comparison between a fuzzy logic controller and classic controller applied to stabilize a humanoid robotic platform. Between classical control and control strategies with a fuzzy modified control. Control strategies were tested using a mathematical model to emulate robot behaviour and dynamical performance called dDARwIn-OP Computer. Computer simulations are shown to demonstrate fuzzy modified controller improvements over the classic controller applied on mathematical robot model. Gait generation of two-legged robot by using adaptive network based fuzzy logic controller as a control strategy was proposed for gait generation for a two-legged robot by using adaptive network based fuzzy logic. Generation for a two legged humanoid robot was assuming as a 3-dimensional robot with 5-links. Gait generation was performed by assuming motions in the saggital and lateral planes. Dynamic model of the robot was obtained by using Sim mechanics toolbox. A fuzzy logic controller (FLC) is established for gait generation. The rule base of the controller is optimized offline by using artificial neural network (NN). The neural networks are trained by using the reference joint trajectories obtained from clinical gait analysis.[1-12]. Development of fuzzy logic controller for the active controlling humanoid robot locomotion on uneven terrains with IMY feedbacks. Locomotion on uneven terrains with IMU feedbacks on locomotion controller which is an important and essential aspect for bipedal robots. Typically, a linear inverted pendulum model (LIPM) is a mathematical approach to generate the Centre of Mass (CoM) trajectory of a bipedal robot. By combining the swing foot trajectory, the Omni-directional walking command is capable of generating point angle control commands in terms of Inverse kinematics (IK).

3. Significant Implementation of IMU

To improve bipedal locomotion stability on eleven terrain situations, and Inertia Measurement Unit (IMU) was desired to place on the robot's chest was used to measure the body's tilt posture on uneven terrains. The robot body's tilt posture provided an indication of locomotion stability. The body's tilt posture information was further evaluated with a fuzzy logic controller (FLC) to generate appropriate offset angles to be applied on the corresponding [13] joints so that the body's tilt posture can be adjusted accordingly to meet a stable situation. Finally a kid-size bipedal robot, named Huro Evolution JR, was used as the experiment a kid size bipedal robot, was used as the experiment platform. Transformation, Position and velocity of a serial kinematics robot are derived and discussed. Finally it was proposed an aggregation operator to extract robot behaviours with the highlight of the impact of proposed methods to intelligent robotics. Artificial robot interaction learning mechanism and experiment in soft computing. Fuzzy logic based reinforcement learning architecture and experimental results for the interaction between an artificial robot and a artificial intelligence.. The main goal is to drag the Gen AI t towards the desisted goal area without any human aid. To achieve the goal, we seek to design robot intelligence architecture such that the robot can drag the [14] AI using its own knowledge paradignm. One of the factors in humanoid robots is mitigation planning arising due to the anticipation in various movement. As human beings has lot of data in their brain, they anticipate which one to do in the priority basis resulting in the existing work to get into potential impact , thereby falling down due to lag in data concurrency. One of the main drawbacks in the humanoid robot movement is emphasizing sensory concurrency thereby achieving data concurrency. In a multi-sensory data powering a data warehouse, transactions are executed simultaneously from a wide array of input sources. Each of these transactions has the potential to interfere with other running transactions within the datasets. So, it is a good practice to isolate transactions from each other within the multi sensory environment but there must be a way of collating the transaction data so that the data can come up with aggregated reports. Allowing more than one application or other data to access the same data simultaneously while being able to maintain data integrity and database consistency is the main essence of data concurrency and because the transactions are isolated from each other, data will definitely be replicated for the impact minimization that is comparable with the anticipation error and the cognitive potential of the movement of the Humanoid robot is identified.[15,16]. There are three common ways that manage data currency and they are as follows:1. Cognitive concurrency control – In this method, a row is available to the memory of microcontroller when the record is being fetched and stays with the tasks until it is updated within the data set.2. Systematic concurrency control – With this method, a row cannot be available to other tasks while the data is currently being updated. During updating is the database examining the row in the database to determine whether or not any error correction or change has been made. An attempt to update a record that has already been changed can be flagged as concurrency violation in internal Correction of Dead-reckoning errors 3. Schematic concurrency control – with this method, any row can never be available to the memory of microcontroller while the data is currently being updated but there is no effort made to compare updates with the original data set of record. The record is the potential effect which is overwritten by any changes that are being made by other concurrent data while using the correction factor since the last record gets refreshed. In modern Robotic research, encountering unexpected relationships between inputs and outputs are very important with the model simplification thereby fixing model inputs that have no effect on the output, or identifying and removing redundant parts of the model and enhancing communication from modellers to decision makers (e.g. by making recommendations more credible, understandable, compelling or persuasive). So this chapter is designed to focus on all the aspects as discussed above under the collection of literature review.

4. Observations from experimental evaluation.

Based on the above literature review on various aspects related to the fuzzification, the following observations are made.The main draw back in the fuzzification of tracking problem is the locomotion error which is handled by dedicated palletizing movement in emphasizing sensory concurrency which was necessary for achieving data concurrency. In a multi-sensory data powering a data warehouse, transactions are executed simultaneously from Figure.1 a wide array of input sources. Each of these transactions has the potential to interfere with other running transactions within the datasets in a monotonic relation. The approach handled with a good practice was to isolate transactions from each other within the multi sensory environment using fuzzy crisp relations using Non Monotone relations.It was observed that there is a way of collating the transaction data so that the data can come up with aggregated reports [17-19].

5. Need for present investigation for choosing humanoid robot for the analysis of Gen AI

As identified from the literature most of the researchers proved fuzzification representation by comparing using approximation with fuzzy logic controller. But the properties need to follow detailed enumeration to analyse for both crisp and the monotonocity in fuzzy relations. Even if the robot is trained in a local environment for module learning, it is needed to arrive an objective point with no collision with obstacles in the static or dynamic environment or this adaptive fusion strategy in needed for selecting sensor information.In fuzzy expert systems, Figure.2 fuzzy input and output controllers are required for achieving universal approximate, for this continuous activation function in each neuron with membership function is needed to symbolise and improve enumeration for the Non Monotone approximation with fuzzy logic controller association.[20]. Hence sampling of data analysis is to be set for the training conditions and it is essential to make the Humanoid robot to reach all the objective points.Also it is necessary to relate fuzzification with the fuzzy implications. A concept is needed for adaptive fusion unit in the fuzzy behaviour in the control system [21.22]. To achieve this Neural networks are to be improvised for incorporating neural weights and for this the study of neural schema is required for choosing humanoid robot for the analysis. motion environment which could be enumerated. Assessing fuzzy neural schema by quantization. Study the representation of the degrees of association by membership grades in a fuzzy relation in the same way as degrees of set membership are4ehave4ented in the fuzzy set.

6. Graphical Representation with respected to Multimodal Models in Gen AI

Here the objective is to analyze learning behaviour for the concluded knowledge. Evaluate the fuzzy relations that all fuzzy set pairs have corresponding homomorphism characteristics to relate fuzzification using approximation that extracts structure and was activated for Gen AI model.

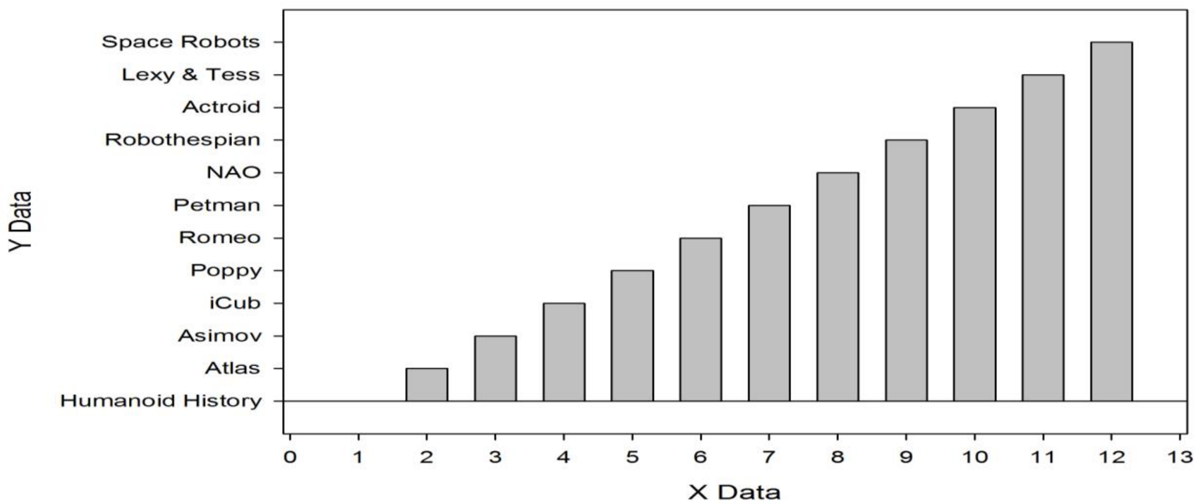

Figure.1 Significant developments in humanoid robot history

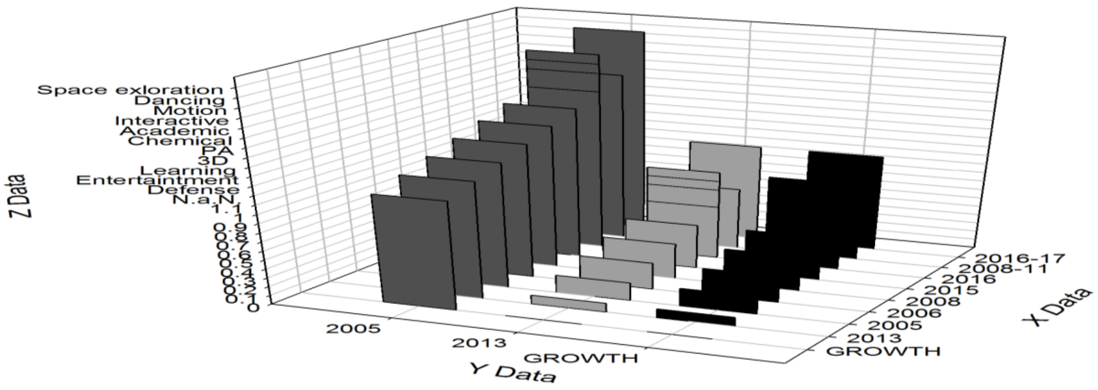

Figure. 2 Developments with fuzzification in humanoid robot History

Figure 2 depicts the variation in the x Data for various robot history with Y Data for the parameters involved where the transformation from the past history to the current in implementation the Gen AI with this classical representation and in Figure.2 the development with fuzzification in human robot goes widely activated with the recent trends of fostering the needs like cluster innovation technologies in the edge computing technologies thereby till the quantum computing over Agentic AI where the technical collaboration not only in activities of algorithms but also in the generative AI model in involving the data centric approach for the representation of the model with their decision making in the pattern 5ehave5ionn in the analysis of the data where the algorithms are trained and not the data.

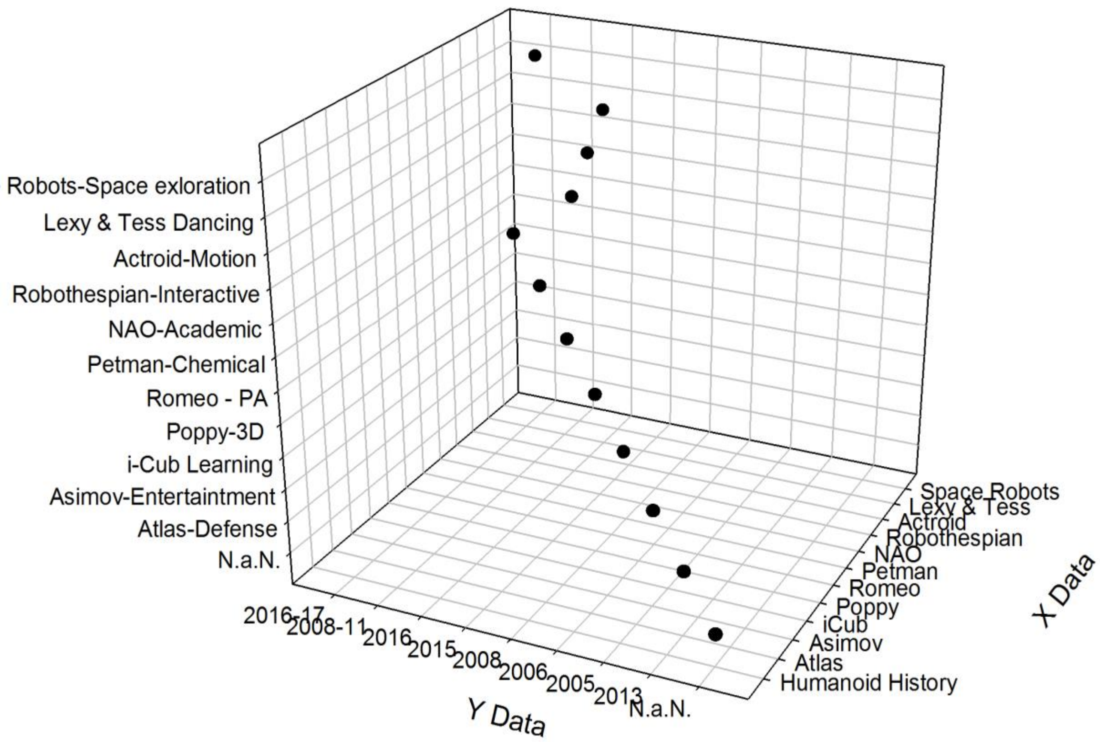

Figure.3 Analytical investigations on humanoid robot

Cognitive humanoid endows a robot with the intelligent behaviour by providing a design that will allow it to learn and how to behave in response to complex goals in complex environment. Human machine learning and human machine interaction is necessary in qualitative and quantitative analysis of humans with machines, thereby making them understand the concepts that is used to teach learning intelligence to robot in a adaptive manner where the human machine should interact with knowledge transferring in learning systems.[23-26] Figure.3 It is adaptive to consider machine learning as a parameter used for interactive behaviour intelligence systems used in human machine interaction, where the knowledge transfer is needed with an interface like software's to adopt learning mechanisms inside the humanoids like developing neural schema which has to be made as the neural parameters with the study of neural weights and schema representation in learning and knowledge intelligence systems to behave in complex and tough environment which recognises actively [27,28]. Adaptive knowledge transfer can be achieved by models like speech recognition techniques and virtual reality in image processing systems. Also cognitive behaviour is attained by repeated learning systems in the study of neural schema as a prototype developed with various algorithms to reach the complex goal in complex world.

7. Experimental investigations on humanoid robot

Interactive studies proved that recent humanoids interacted with the human intervention by understanding the needs of humans and performing the task assigned to perform critical work by various machine learning programs with the interface like sensing behaviours, that can calculate the distance travelled with the sensors like ultrasonic range finder sensors allows robots to detect obstacle and direction calculation with angular velocity using gyroscope sensors measuring change in the rotational angle per unit time expressed in degrees per second. Recent humanoid robots used in the defence services find enemy target locations using the above discussed sensors and act accordingly with human interaction, also in unmanned space exploration interaction is effective with the signals received from humans perform tasks and response it by signal transfer through the space as medium with satellite link. Experimental investigation proved effective in communication with human machine interaction. This is embodied further in the investigations that led to several effective learning mechanisms incorporated in the6ehaveiour streams of robots with human interface. Figure.4 The Alpha Ramda Humanoid Robot (Alpha 1s series abbreviated as ARHR) is used as a technical humanoid robot with a potential for development and interactive entertainment. It's perfectly designed with high-precision servo joints and editing software for 3D visual motions, which can be seamlessly controlled in one APP.

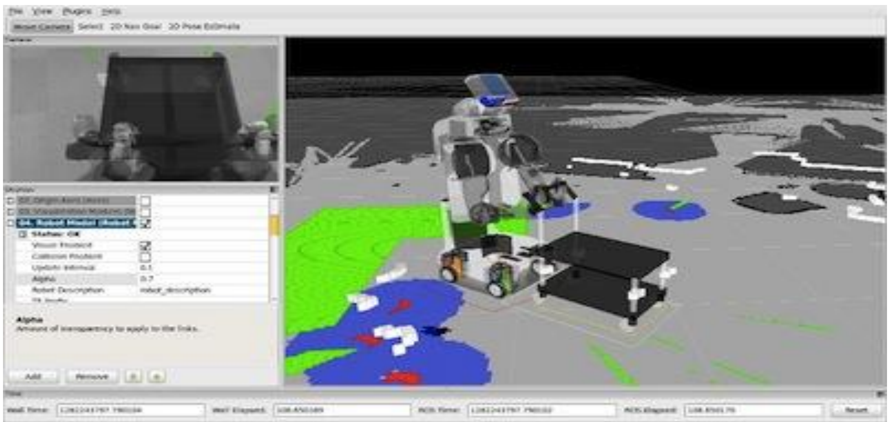

Figure.4 Picture of ROS, rviz – 3D visualization

8. Results and Discussions

The Alpha 1S APP allows users to program the robot in the software. Sequences of movements can be saved directly in the APP, making it much easier to program the robot as shown in Figure.4 in ROS environment. Once the report is generated the data are studied and investigated for various sensor analyses of data that is optimised and then the results are found to be efficient, thus data concurrency is achieved by minimising the errors by the recommendation of correction factor as discussed in earlier chapters. From Figure.5 shows the Gen AI models in the functional relation between two variables for quantization in non monotonise which results as A referencing B as a factor representing for the variables x and X to take an important part in fuzzy relations for the fuzzy implications. It is observed that the Fuzzy implications with X Data increases with that of Y Data which shows clear relations. It is seen that the fuzzy relations in Figure.4 by assigning values to the variables from Y to B for values x representing to Variable X.

9. Implementing serial protocols compatibility

Many hardware devices communicate with a normal computer using serial protocol which is simple ASCII based protocol and others are more complex binary. This cumbersome work can be overcome by both the above and can easily be created in flowbotics platform. The data derived and obtained from the serial protocol for monotonic representation using quantization for the two variable for fuzzy implications and fuzzy relations respectively are shown in Figure.4 as the Functional relation between two variables x → y, where y = f(x) and in Figure.5 it is shown that A → B, where B = {ÿ ϵ k|y = f(x), x→X}. From the above relations it is proved that implementing serial protocols are compatible.

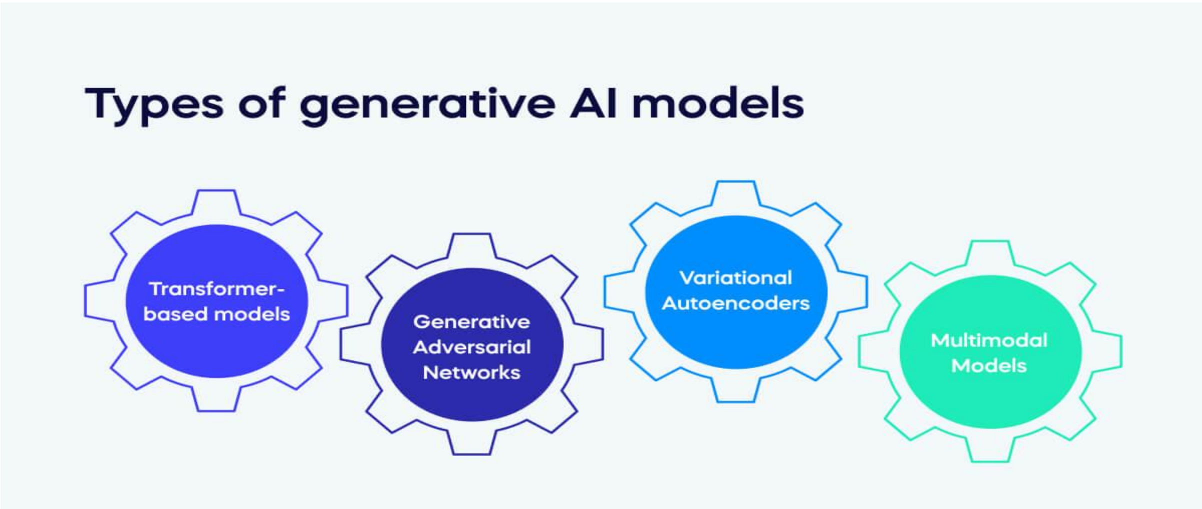

Figure 5. Generative AI models incubated but Generative Adversarial model was moderated

10. Conclusion

Software used for robotic applications like ROS was explained, writing the node and receiving messages from the robot using python is done. Diagnosing issues were overcome using roswtf package and the examining were done. Solving the problems experienced during warnings and errors by using advanced Roswtf plug-in were executed. Key features of ROS technology were studied. Testing and verification of ROS technologies were done. Selecting appropriate platform using ubuntu linux and python with application software flowbotics studio application software version 3.0.7 were studied. Implementations of experimental hardware of ARHR were investigated. Design and development of robot with interactive environment were explained. Implementation of protocols, API, Sensors and Phidgets were also explained where from Figure 5. Generative Adversarial model

11. Future Work

This interactive environment can be used in the quantum computing age so that the zero error in accuracy in decision making can be established. This can be established with the Generative AI Adversarial network where which can be optimized and moderated since the active participant of all the models were incubated with transformer, multimodal and variational model were used but the optimization was moderated only with the Generative Adversarial Model which the data can be brought together so that it can be used in quantum computing and the edge computing in future to get precision in prediction of the patterns thereby getting the algorithm to train.

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