

# ARTIFICIAL INTELLIGENCE BASED ONLINE RTOS SYSTEM ANALYSIS FOR SIX AXIS INDUSTRIAL MANIPULATION

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## Abstract

Artificial Intelligence system is the current high level front focus technology used to emulate the human thoughts. It is the integration from the six axis industrial articulated robot through the system optimization and root based computation in controlling Industrial Manipulators and suggesting the heuristic best brain approach. Here we use the root system analysis behavior of artificial intelligence for RTOS. RTOS means Real time operating system provided many valuable functions for the embedded and basic input and output lay outing based system's applications. RTOS is the process of optimization and system calculation approach to simulate a specific predefined set database parameter programmed system with respect to the industrial applications. Centralized Communication Control unit mounted on a multilayer VLSI chip to control all the operations in the integration of the hardware (remove components), AI and RTOS based root programmed and performing the actual set trajectory operation. Here we are going to simulate and analyze the real time operating system to reduce the time cycle using the root system analysis time reduction technique of Artificial Intelligence.

**Keywords-** Artificial Intelligence, RTOS, Online Programming, Trajectory Planning, Root System Analysis, Manipulator, Six Axis Industrial Robot, Root Lay outing, Communication Control Unit (CCU), Integration.

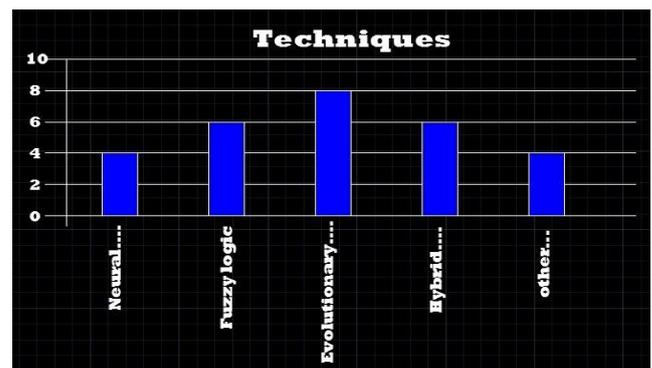
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## 1. INTRODUCTION

**Artificial Intelligence** -Artificial intelligence is the innovational approach used to integrate the capability of the RTOS analysis. It is the optimization used to manipulate the industrial parameters.

Artificial Intelligence is the heuristic approach and development of the intelligent machines and advancement of the software that can reasoning, learning, gather of the knowledge, communication, and manipulation and used objects. It manipulates to the machine smarter and intelligent in terms of its performance with respect to the time cycle. Its working is based on the artificial neurons network and it is different form of the computer science in terms of its perception and reasoning. It can be used as the Root system analyzer. It is the software package to analyze the two dimensional image sequence of the plants root.

The various technic applied in artificial intelligence are based on the neural networks, fuzzy logic and evolutionary computing and hybrid artificial intelligence. Figure shows the various techniques of AI.



The many areas of the Artificial Intelligence are:

### Language Understanding

Ability to understand and act to the natural languages. It is the formation of the spoken language to the written language. It is the transformation of the one natural language to the other natural language.

### Learning and Adapting Systems

Ability to adapting behavior bagged on the previous experience, developing to the world based general rules.

### Problem Solving

It is the formation of a problem in a suitable representation and to plan its solutions.

## Perception (Visual)

Ability to analyze the sensed scene by relating it to an internal modeling, representing the preserving organism's knowledge of the world.

## Modeling

Ability to develop the internal representation and the set of information rules can be predicted by some set of real world entities.

## Robots

Combination of all of the above ability, moving over the terrain and manipulate different objects.

## Games

Accepting formal set of rules for the games like chess, Go Kalah, Checkers etc.

## 2. USAGES OF AI

- 1- AI demonstrates the Power system stabilization.
- 2- Artificial Neural Network in Power stabilization system
- 3- Fuzzy logic network is used for the stabilization of the power system.
- 4- Application of Artificial Intelligence Techniques in Network obtrusion Detection.
- 5- Artificial Neural networking used in Obtrusion Detection framework.
- 6- Fuzzy Interference system in Obtrusion detection framework
- 7- Application of Artificial Intelligence in medical areas
- 8- Application of AI in Games

## 3. REAL TIME OPERATING SYSTEM

An Operating system is a set of system programs; provided the interfacing between the user application programs to the system hardware, interfacing between the software and hardware or user and machine. RTOS, as a system with accuracy not only depends upon computation on the logical correctness but also on time. Timelessness is the important parameter of the industrial robot, Advance RTOS is an integration of the components using millions of components on a single silicon chip. In the present scenario the system usage is on silicon, provided the controlling action to the specific design applications. Centralized RTOS called CPU based system performs multiple tasks simultaneously.

There are mainly four main tasks of the operating system:

1. Process management
2. Interposes communication and synchronization
3. Memory Management
4. I/O management

### 3.1 Process Management

Process Management is responsible for the process creation, process loading and execution control, Interaction of process

with execution control. CPU allocation and process termination is also done in this block.

### 3.2 Functions of the Inter-operation communication:

1. Synchronization and coordination.
2. Dead lock and live lock detection and handling process.
3. Process protection and data exchange mechanism.

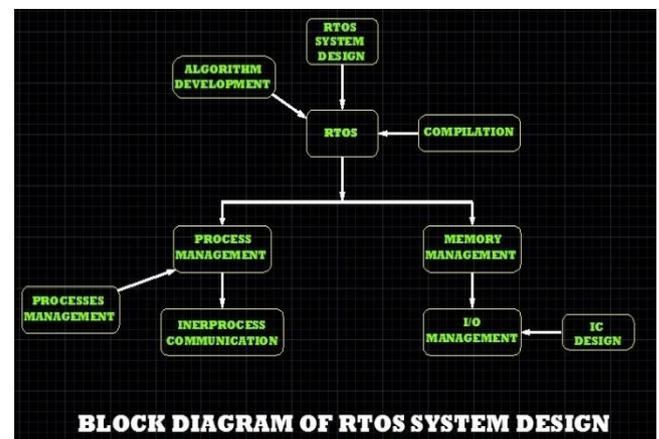
### 3.3 Memory Management Unit

Memory management unit manages the creation of files, deletion of files, reposition and protection.

- I/O manages the subroutine to correlate with the peripherals devices and the read, write and reposition program.

Hence the RTOS provides the proper accuracy and the synchronization between the I/O with respect to the time.

## 4. BLOCK DIAGRAM OF RTOS SYSTEM DESIGN



Present scenario of the RTOS is integrated in the form of SOS. SOS provides the wide collection of electronics components, improves the performance of the devices in terms of their cost and the time cycle reduction.

SOS is the system on silicon. It is the integration of the millions of components on the single chip which can be of single layered or multi layered.

Their integration on basis of components is as follows:-

SSI- Small scale integration: - It contains less than 100 components (about 10 gates)

MSI- Medium scale integration-It contains less than 500 components more than 10 but less than 100 gates.

LSI- Large scale Integration-It contains 500 to 300000 components or has 100 gates.

VLSI- Very large scale integration- It contains more than 100 gates.

ULSI- Ultra large scale Integration- It is the integration of the VLSI.

SOS is the part of the ULSI.

Internal Structure of the RTOS is in the form of online programming. Online programming used to operate system on the real time performance such as reservation system, weather forecasting, surveillance, industrial manipulator. Their latest version of RTOS is LynxOS. It is the open standard High Performance embedded software. LynxOS providing symmetric multi-processing support advantages of the multi-threading/multicore processors. LynxOS designed for the absolute deterministic system i.e. hard RTOS. It means it performs for the unknown period of time. The very latest version of it is LynxOS 7.0, which is basically used for the embedded systems.

### Trajectory Planning

Trajectory path planning is a revolution of Robot from one point to another point with respect to the time, means each part of the path is covered by the Robot within the certain time. So that to understand the trajectory planning in a joint space & Cartesian-space, considering 2-DOF Robot Mechanism.

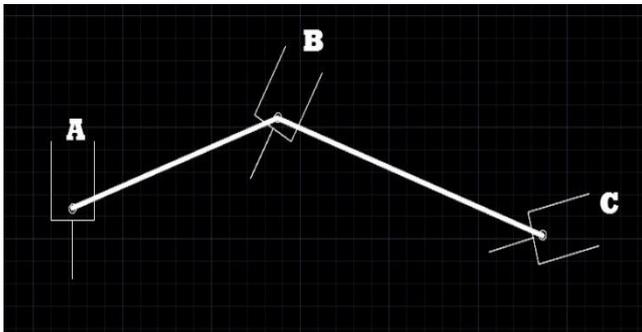


Fig.1 Movements of Robot

From the figure we desire to move robot from point A to B. The configuration the robot at point A is with two angle  $\alpha$  and  $\beta$  shown in the figure.

Angle  $\alpha = 20^\circ$ ,  $\beta = 30^\circ$  degree it supposed to that at point B,  $\alpha = 40^\circ$ ,  $\beta = 80^\circ$

Hence from the above configuration, Robot movement from one point to another point shows the maximum rate of change in robot movement.

Means that the robot move from point A to point B is to run both joints at their maximum angular velocity. For fastening this angular velocity analysis on the basis of AI used advanced RTOS system.

Manipulator is a Robot Arm All the activities has been done by the Robot arm which programmed with respect to its task, has to be performed. Hence the manipulator is programmed on the online RTOS based system to improve accuracy with respect to the time performance of the Six Axis Real time Industrial Robot.

Six Axis Industrial robot is the articulated robot that follow the trajectory path on the basis of advanced controlled CCU.

### Communication Control Unit

CCU is the Communication control unit. CCU is used to activate, monitor & control all the activities of the system. Figure shows the control convertor.

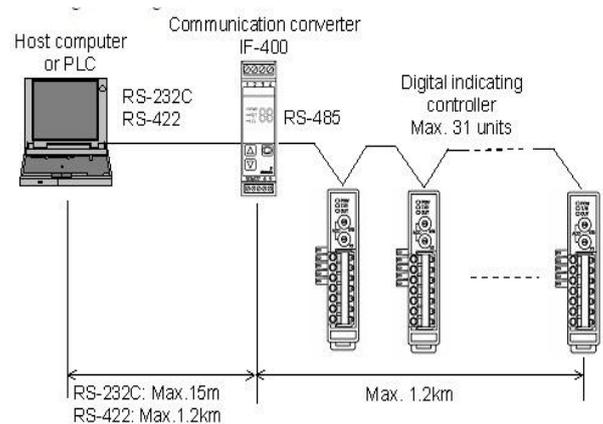


Fig.1 Monitoring and setting via shinko communication converter IF 400

### Artificial Intelligence Based RTOS Program for Communication Control Unit Lead Time

```

DEFDAT $OPTION PUBLIC
CHAR $V_OPTION[32]
$V_OPTION[]="V1.0.0/KUKA8.2"
;VERSIONSKENNUNG
BOOL $TECH_OPT=TRUE ;FUNKTIONSGENERATOR
BOOL $TCP_IPO=TRUE ;GREIFERBEZOGENE
INTERPOLATION
BOOL $$SEP_ASYNC_OV=FALSE ;Schalter fuer
asynchrone Hand-Overrides
BOOL $LOOP_CONT=FALSE
CHAR $LOOP_MSG[128]
BOOL $IDENT_OPT=TRUE
INT $SINGUL_STRATEGY=0 ;0=NONE, 1=APPROX
BOOL $MOT_START_OPT=TRUE ; OFFROUTE
VALUE
BOOL $MOVE_VAR_CCU.DEC_VALUE=TRUE ;
$VERT_CORE_SYS
BOOL $COLLISAVOID=FALSE ;
BOOL $MOTIONCOOP=FALSE ;
BOOL $PROGCOOP=FALSE ;
BOOL $T2_OV_REDUCE=TRUE ;TRUE =
Overridereduzierung auf 10 % in Mode T2
BOOL $VAR_TCP_IPO=FALSE
BOOL $SPL_VEL_MODE_OPT=TRUE ;
DefaultEinstellung fuer $SPL_VEL_MODE
ENDDAT

```

### 5. CONCLUSION

Artificial Intelligence based online RTOS Digital machine Configuration system is used to reduce the time cycle of industrial robot. It is gives advent effect on the Six Axis Industrial Robot. AI based Online RTOS opens the new avenues for the Real Time Operating system operated by the CCU/SCU and also improved the Integration of Industrial

parameters, thereby reducing the intellectual burden through the use of root analysis process. We can calculate the lead time with precision through the CCU.

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