Robot Arm Simulation

An Undergraduate Special Problem

Presented to

The Faculty of the Department of Mathematical Sciences and Computer Studies

De La Salle University - Dasmariñas

Dasmariñas, Cavite

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science in Computer Science

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ABSTRACT

NAME OF INSTITUTION: De La Salle University - Dasmariñas

ADDRESS: Dasmariñas, Cavite

TITLE: Robot Arm Simulation

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FUNDING SOURCE: Parents COST: P 15,000

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OBJECTIVES OF THE STUDY:

A. GENERAL

To develop a three-degree of freedom robot arm simulator.

B. SPECIFIC

1. to create a graphical user interface to allow user inpuf of the parameters in the kinematics problem and output for the robot arm object;
2. to create a module for the direct and inverse kinematics problem; and
3. to create a module for the three-dimensional geometrical transformations.

SCOPE AND COVERAGE:

The special problem Robot Arm Simulation encompasses topics on manipulator kinematics and three-dimensional transformation and projection. The project simulates the movement of a three-degree of freedom robot arm.

METHODOLOGY:

The method of Transformational Implementation was used in developing the software that supported the study. This method underwent the nine stages in Software Development Process: requirements analysis, system design, program design, program implementation, unit testing, integration testing, system testing, system delivery and maintenance.

OUTPUT OF THE STUDY:

The output of the study is the robot arm simulator "Nathan RobotSim". The simulator supports topics discussed in the special problem.

CONCLUSIONS:

A robot model can be represented as data in a three-dimensional space and projected in the two-dimensional display plane. Movements of the robot arm can be demonstrated using the direct and inverse kinematics problem.

RECOMMENDATIONS:

The author recommends further studies to include hidden surface removal, depth cueing, illumination, surface rendering and perspective projection. A simulator showcasing customizable robot is also recommended supporting link extension to allow greater versatility of the robot.

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