

Claims:

1. A method, comprising:

computing a trajectory with a planning, sequence and trajectory manager in
 5 combination with an intelligence module that utilises an imaging system, using spline
 interpolation and fitting multiple low-degree polynomials between two neighbouring
 waypoints from a begin state to an end state through one or more intermediate waypoints;

updating the trajectory to a database in the computing system or on the cloud, for quick
 retrieval of trajectory paths and fast processing of objects in a working environment for a robot
 10 arm driven environment, according to kinematic limits and dynamic limits of an automated
 system to obtain a final trajectory; and

operating the robot arm from the begin state through one or more intermediate
 waypoints to the end state according to the final trajectory as communicated by a robot
 controller.

15 2. The method of claim 1, wherein computing the trajectory comprises computing, with
 PID (Proportional-integral-derivative), MFC (Model predictive control), and adaptive control
 algorithms, a plurality of trajectories for an input command specifying the one or more begin
 states of the robot arm and the one or more end states of the robot arm, each trajectory path of
 20 the plurality of trajectories with a different duration and different distances.

3. The method of claim 2, wherein the planning and sequence manager computes the
 plurality of trajectories according to the degrees of freedom related to the robot arm in the one
 or more begin states and the one or more end states.

25 4. The method of claim 2, wherein the planning and sequence manager computes the
 plurality of trajectories in conjunction with the intelligence module according to degrees of
 freedom related to the robot arm in the one or more begin states and the one or more end states.

30 5. The method of claim 2, further comprising updating the trajectory path to minimise
 jerking in the robot arm by repeated fine tuning through application of artificial intelligence
 and machine learning combined with reinforced learning techniques to achieve optimum speed
 and accuracy over time.

6. The method of claim 2, further comprising updating the trajectory paths according to respective input states and end states to the database for storage and retrieval.

5 7. The method of claim 1, wherein the robot arm is mounted on an industrial machine configured for repetitive and non-repetitive motion in the working environment.

8. The method of claim 7, wherein a repetitive motion trajectory path is acquired from pre-stored trajectory paths residing in the database in the computing system or the cloud.

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9. The method of claim 7, wherein a non-repetitive motion trajectory path is calculated by utilising 3D positions of all waypoints of the working environment acquired by the imaging system and determining the roll, pitch and yaw required for the robot arm to move from the begin state to the end state.

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10. The method of claim 7, wherein if a non-repetitive motion trajectory path is non-existent in the database from a given begin state to an end state, the computing system primarily identifies the nearest waypoint to the begin state and the nearest waypoint to the end state and subsequently acquires a trajectory path between these two repetitive waypoints which may be pre stored in the database.

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11. The method of claim 10, wherein the computing system calculates the trajectory path to the nearest waypoint from the begin state followed by another trajectory path from the nearest waypoint to the end state to arrive at a full trajectory path from the begin state to the end state, effectively combining a predetermined trajectory path acquired from the database and a set of calculated trajectory paths.

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12. A system, comprising:
an automated machine utilising a robot and operated by a robot controller configured
for automatic, repetitive and non-repetitive motion;
the robot controller configured with software applications that when executed cause the robot controller to:

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compute, with PID (Proportional-integral-derivative), MFC (Model predictive

control) and adaptive control algorithms, trajectory paths from one or more begin states of a working environment to one or more end states;

update the trajectory path with relevant constraints and limitations to a database residing on a computing system or on a cloud for subsequent storage and retrieval and;

5 automatically control the automated machine from a begin state of the one or more begin states to an end state of the one or more end states according to the trajectory path.

13. The system of claim 12, wherein to compute the trajectory path, the robot controller is further configured with algorithms that cause the robot controller to:

10 compute a plurality of trajectory paths for an input specifying the one or more begin states of the automated machine and the one or more end states of the automated machine, each trajectory path of the plurality of trajectory path with a different duration, velocity, acceleration and curvature.

15 14. A system, comprising:

an automated machine utilising a robot and operated by a robot controller incorporating an imaging system and configured for automatic, repetitive and non-repetitive motion;

20 the robot controller configured with software applications that when executed cause the robot controller to:

acquire images of a working environment using the imaging system and identify waypoints;

25 compute trajectory paths using PID (Proportional-integral-derivative), MFC (Model predictive control) and adaptive control algorithms, from one or more begin states of the working environment to one or more end states navigating through intermediate waypoints;

update the trajectory path with relevant constraints and limitations to a database residing on a computing system or on a cloud for subsequent storage and retrieval; and

automatically control the automated machine from an begin state of the one or more begin states to an end state of the one or more end states according to the trajectory path.