

This report highlights the methodology taken to implement the planning and execution aspects as it concerns the manufacturing behaviour of a robot. The Planner refers to the capability of a robot in a Human Robot Collaboration Team about to embark on a job (Inspection, repair, maintenance etc.) to generate a shared plan for the job to be performed. In this case the planner focuses on assigning the right agent (Human or robot or both) to each task within a job. There's more focus on the behavioural aspect for planning the job rather than usual motion or path planning that we are used to.

The goal is to get a shared plan for the team, so both the human and the robot can work based on the plan. The essence of this is to bring a semblance of the behaviour of workers in a traditional human only manufacturing team but in this scenario a robot would make the plan on how the task would be carried out and then share it with the human.

This would be based on the already programmed reasoning that has been given to it by a human. Another important fact to consider is that since the robot provides the plan and therefore it already possesses it in its own database it doesn't need the human to tell it what to do at every instance and this breeds room for some level of autonomy for the robot which would be a contributory factor to increasing productivity in the manufacturing industry.

The planner is to be embedded as one of the sub systems of the robot. It is designed in such a way that the human team member would be able to interact freely with it. The human simply needs to give the robot key information about the work to be done and in turn the robot uses this acquired information and uses it to generate a shared plan.

The robot will be a mobile robot that could perform certain operations depending on the field of application.

The robot could have a monitor where the human can input the initial description of the job. It will use that same screen to display the shared plan

Or the robot has a language recognition capability, and it understands the human. In this case it can share the plan via cloud. (All this can be hypothesized)

So, let's say there's an inspection job to be done

This job will involve a set of tasks to be done in sequence. Depending on certain factors the Robot is meant to assign each task to either the human agent or itself (Robot Agent)

The Factors such as

1. The Safety risk of doing the job  
In this case if the job is unsafe the robot automatically assigns the job to itself
2. The skills set that is required to do the job

OUTPUT of the Planner will be a shared plan (simply a list of sequential tasks showing who a particular task has been assigned to)

A very simple example will be

If the job to be done is Calibration of a flowmeter and the tasks involved are

1. Loosening of the flowmeter cover
2. Connecting the Verification kit to the flowmeter
3. Executing the verification
4. Downloading of Results
5. Disconnecting of the verification kit from flowmeter
6. Tightening of the flowmeter cover

The assignment based on the factors be

1. Robot
2. Robot
3. Human
4. Human
5. Robot
6. Robt