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Channasandra, Dr. Vishnuvardhan Road, Bengaluru - 560 098

Department of Electronics & Communication Engg.

PROJECT REPORT ON

Assembly and Disassembly Machine (ADAM)

Submitted by Sourav P Adi 1RN16EC147, V Keshav Bharadwaj 1RN16EC164 and Vivek B A
1RN16EC178

Under the Guidance of

Dr. Uma S V, Professor

In the late 1940s during the World War period, Alan Turing and John Von Neuman were exploring the digital computation domains for simulation of human brains. Impetuous increase of interest had emerged in the development of robots to aid humans in all kinds of tasks.

Construction is a term to mean building structures and the process or know how to build one. The industry caters to one of the basic needs of human life, providing a place to stay. The destination of this industry is set at complete automation of the process. Developing high-performance machines and techniques to achieve an autonomous system without human intervention for performing construction of structures is one of the cornerstones of this study.

Structures constructed in the near future have to be portable, which allows a building to be dismantled and assembled elsewhere. Generating such structures provides housing to all humans on a large scale. The expenses and time incurred in such a process would drastically drop, allowing everyone to afford a house and reduce vexations of construction.

Assembly and Dis-Assembly Machine is developed to establish a pattern constructor and deconstructor as instructed by the operator. Enabling construction of a block from the CAD designs and plans of a building or a house. The aim is at developing an algorithm for a robot that will be much efficient and will be of immense applicability in the field of Robotics. The technologies like Image Processing, 3D Geometry, Embedded System Programming, Machine Learning, and Artificial Intelligence will be used efficiently. Prototypical model of ADAM is programmed to perform construction of pattern with reduced blocks dimensions. The method can be scaled upwards for handling bricks and concrete slabs used in construction sites.

Autonomous construction and deconstruction processes are accomplished. An end to end solution for pattern creation, stability analysis, 5-DOF robot De-construction and Re-Construction process and 3D spatial mapping is successfully rendered with ADAM, EVE, SAGE and EDEN systems.

EVE, SAGE, and EDEN systems are established to support in image recognition, analyzing 3D space movements, Stability constraints of the blocks, and exchange of data through the network for profound performance results. ADAM can be utilized to construct a pattern created by the user, or in tasks where the existing structure is to be dismantled to transport elsewhere. These tasks can also be utilized in the stacking and packaging of material in industries. ADAM reduces the downtime of staff and works in a day.