Modular Automated Transfer System

(Steven L. Gonzales, Professor of Electronics College of San Mateo and Dr. Sheng-Jen (Tony) Hsieh, Dept. of Mechanical Engineering Texas A&M)
Research Experiences for Teachers Program (Summer 2015)
Department of Engineering Technology & Industrial Distribution Department, Texas A&M University

Abstract

In today's manufacturing marketplace throughput and speed is paramount to achieving success in the world's economy. Understanding how a web based automated processing or modular production line is designed and operates is key to this fast paced environment. Manufacturing demands a stable, constant and uniform high speed delivery system free of human interaction. When there is less human to machine interface there is greater productivity and higher quality. The implementation of programmed repeatable scripts or routines using micro controllers, motor controllers and sensors of all types are the tools used to increase production speed and reliability.

Research Objective

The purpose of the research is to create an automated modular transfer system that is web based and can be controlled and monitored remotely. The secondary objective is to design and build different types of Lego machine modules to test their ability to transfer materials at high speeds without failure. Demonstrating a repeatable, constant and uniform operation without human interaction.

Methodology

The training and prior knowledge requirements of all participating students must be strictly adhere to so that a working system can be assembled in the eight week time frame. Students must understand DC motor control and have done minor electronic design projects. Identifying a icon driven program to control the modules is the next step in building the system. This selection will be determined by the software and web server available to the school. Construction will be done by students working in pairs on similar modules, but with a different purpose in the overall system. Modules will be tested individually and assessed for completion, operation and what it will add to the completed machine.
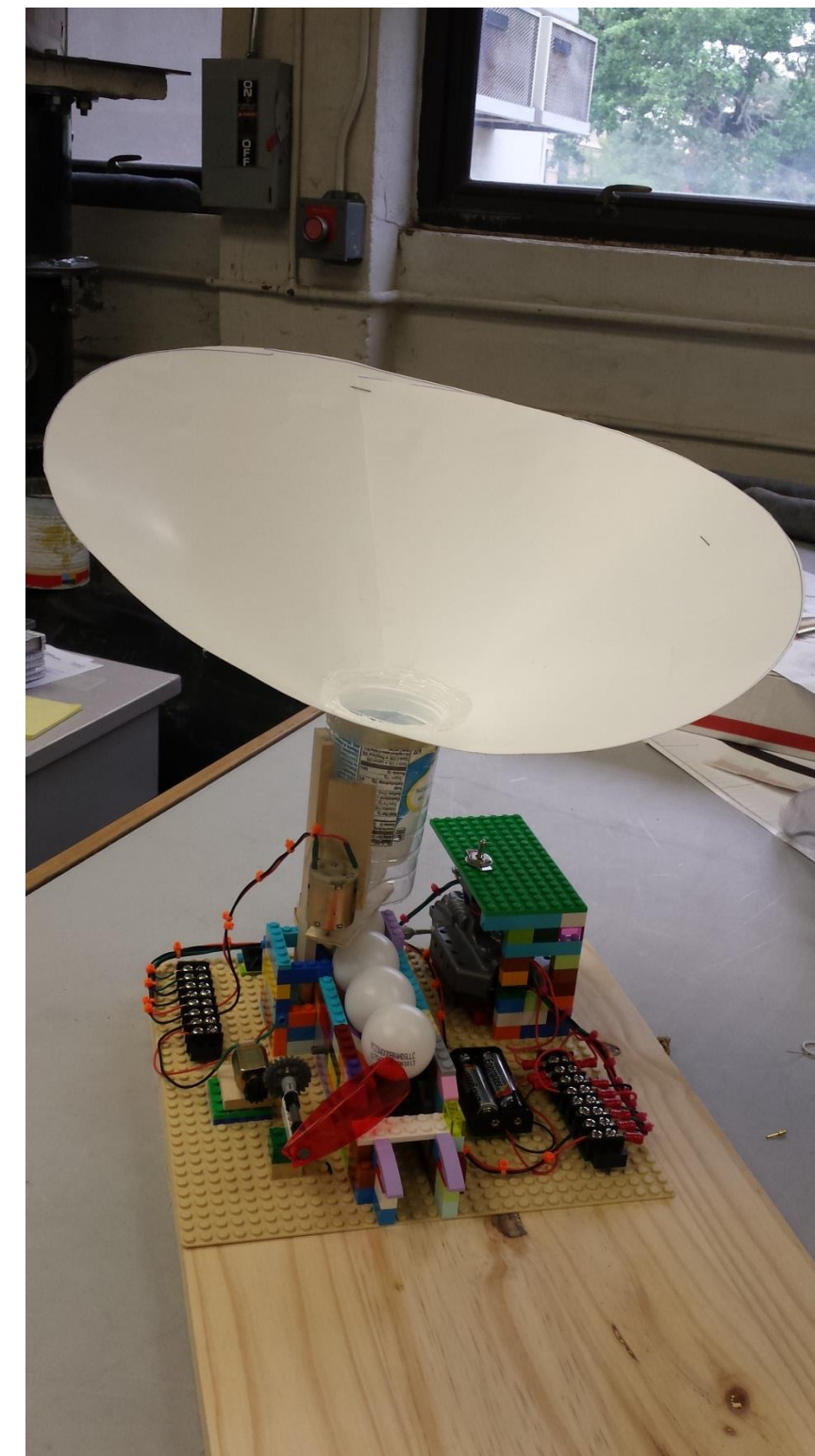
Results and Conclusions

Only one module (a closed loop) has been built at this time. It is not yet set up to be web based because there is no resources available at this location. The module is micro controller (Parallax Inc.) driven and has had limited success. Programming seems to be the major problem with the control system. Also the micro controller might not be powerful enough to adequately run the process in a fast systematic operation. This module does however show proof of concept and with more refinement it could be the learning tool that it was intend to be.

References & Acknowledgements

Hsieh, Sheng-Jen (Tony) and Scott, Wesley. 2006 Web-Based Control of Industrial Robots. 2006 ISFA Symposium pp. 177- 181

Parallax Inc. users manual Version 3.0

ENGINEERING TECHNOLOGY & INDUSTRIAL DISTRIBUTION
TEXAS A&M UNIVERSITY

http://etidweb.tamu.edu/hsieh/ResExp-Teachers/