There is a need for an enhanced automated order picking system with high efficiency in a bid to stay afloat in today’s competitive business world. This thesis presents a new automated full-case order picking system. A dynamic fuzzy logic will be used to determine the average expected throughput time of the system and to find the mathematical equations for its description. It has been developed as a new technique that minimizes order picking time and other non-value adding tasks and maximizes performance. This new system will improve productivity, accuracy and speed of delivery in comparison with conventional automated full-case picking systems.

Thesis Objectives

Automated storage and retrieval system (AS/RS) is an equipment supported order picking system which is considered when the need for order accuracy is a critical factor. In pursuit of perfection and high throughput level during order picking operations in warehouses, there is a need for the design of a new automated full case order picking system. Automated cell storage and retrieval system (ACS/RS) is the new state-of-the-art design and it can simply be described as an enhanced version of the conventional automated order picking systems found in the market nowadays. The basic requirement for the system to function effectively in warehouses is high quantity and low variety of products.

A dynamic fuzzy logic will be used to determine the throughput of the new system. This logic describes the expert’s opinion about a statement A, instead of a single value a ∈ [0; 1], we need to use a function a(t) that describes how this degree changes with time t unlike the traditional fuzzy logic which assumes that the experts degree of confidence do not change (Fanzhang Li 2001). When dynamics is taken into consideration, we can get a more adequate description of “and” and “or” operations, in which it is possible to distinguish between the cases when the statements are independent and when they are strongly dependent.