**Introduction to AI 60-570-01**

**Project Proposal**

**Project Title**

A Group-based Approach to Improve Multifactorial Evolutionary Algorithm

**Project Overview**

Multifactorial evolutionary algorithm (MFEA) exploits the parallelism of population-based evolutionary algorithm and provides an efficient way to evolve individuals for solving multiple tasks concurrently. Its efficiency is derived by implicitly transferring the genetic information among tasks. However, MFEA doesn’t distinguish the information quality in the transfer compromising the algorithm performance. We propose a group-based MFEA that groups tasks of similar types and selectively transfers the genetic information only within the groups. We also develop a new selection criterion and an additional mating selection mechanism in order to strengthen the effectiveness and efficiency of the improved MFEA. We conduct the experiments in both the cross-domain and intra-domain problems.

**Project Objectives**

1. To implement a multifactorial evolutionary algorithm.
2. To apply grouping and selection based on the paper.
3. To optimize grouping to accommodate highly variable tasks in the cross-domain problem.