

**CHENNAI – PONDICHERRY**

**AN INTEGRATED OPTIMIZATION SYSTEM FOR SAFE JOB ASSIGNMENT BASED ON HUMAN FACTORS AND BEHAVIOR**

**Abstract:**

Industrial safety has been deeply improved in the past years, thanks to increasingly sophisticated technologies. Nevertheless, 2.3 million people yearly die worldwide due to occupational illnesses and accidents at work. Human factors can be profitably used for safety improvement because of their influence on the workers' behavior. This paper presents an integrated optimization system to help companies assign each task to the most suitable worker, minimizing cost, while maximizing expertise and safety. The system is made of three modules. A neural module computes each worker's caution for every task on the basis of some human factors and the worker's behavior. To solve the multiobjective job assignment problem, an evolutionary module approximates the Pareto front through the nondominated sorting genetic algorithm II. Pareto-optimal solutions then form the alternatives of a multicriteria decision-making problem, and the best is selected by a decision module jointly based on the analytic hierarchy process and the technique for order of preference by similarity to ideal solution. Validation was carried out involving two footwear companies, where personnel was recruited and reassigned to tasks, respectively. Comparing the worker-task assignment proposed by the system to the one suggested/used by the management, noteworthy low-cost improvement in safety is shown in both scenarios, with low or no decrease in expertise. The proposed system can, thus, contribute to get safer workplaces where risks are less likely and/or less harmful.