**Chapter 1**

**Introduction**

After the era of industrial revolution there’s a vast change had seen in industries and their working process. As industries growing widely and rapidly. The government started creating policy and law that are need to maintain by all industries, from all this law and policy there is one law which deal with the safety and security of worker working in industries. So, to ensure this safety of worker an organization is form which is called International Labour Organization (ILO). As per them after providing security and protection millions of workers die while working with heavy machinery. Technological intervention in industrial sector is from a long time, which is a great help in addressing different challenge.

In this report we represent a system which will provide an extra protection to those workers. We propose a motion capture controller system. In this system we will create a miniature scale model of actual machine. By making change in scale model the actual machine will imitates its action.

* 1. **Introduction to Domain**

**Robotics:**

The modern definition of a robot can be an electro-mechanical device which follows a set of instruction to carry out certain jobs, but literally robot means a ‘slave’. Robots find wide application in industries and thus are called there as industrial robots and also sci-fi movies as humanoids.

This machine can be a simple example of a very basic robot. It performs the specified sequence of operations repeatedly with the same accuracy. It was programmed and provided with the required material and then started.

**1.1.1 Branch of Robotics**

Aerial robotics: Development of unmanned aerial vehicles (UAVs), commonly known as drones, aircraft without a human pilot aboard. Their flight is controlled either autonomously by onboard computers or by the remote control of a pilot on the ground or in another vehicle.

Bio-inspired robotics: making robots that are inspired by biological systems. Biomimicry and bio-inspired design are sometimes confused. Biomimicry is copying the nature while bio-inspired design is learning from nature and making a mechanism that is simpler and more effective than the system observed in nature.

Artificial Intelligence: the intelligence of machines and the branch of computer science that aims to create it.

Degree of Freedom: in mechanics, the degree of freedom (DOF) of a mechanical system is the number of independent parameters that define its configuration. It is the number of parameters that determine the state of a physical system and is important to the analysis of systems of bodies in mechanical engineering, aeronautical engineering, robotics, and structural engineering.

1.1.1.1 Example

When we think about robotics first thing that come to our mind is automation. Robots are known to perform tasks automatically without much human intervention, except for initial programming and instruction set being provided to them. The first machine, what I have seen in my childhood when we were on a visit to a milk processing plant, most close, to be called as a robot was a milk packaging machine. There was roll of packaging material running through the machine, each time half a litre of milk falls into the roll and then a mechanism in the machine seals and cuts the packet

**1.2 Motivation**

In India most of the raw materials is produced by industries like coal mine for thermal power plant, Iron ore for steel production, Silica for glass production and so on. Worker safety is one of the major issues in the Indian industries. Workers are the backbone of an Industry. So, a security system is needed which will provide an extra edge to worker life and secure it.

This miniature controller can play an important role in increasing the security measure of worker on duty time.

**1.3 Problem statement**

According to international labor organization (ILO) every year more than 2.3 million people die while working with heavy machinery.

**1.4 Scope**

* Its use can be extended and exploited by few modifications to do difficult and hazardous tasks for industrial applications.
* It can be used to small assembly work effectively due to its great added accuracy for placement of parts, which is further extended scope of our project.

**1.5 Objectives**

* This miniature controller, a manipulator designed to perform many difficult tasks and capable of repeated, variable programming.
* To perform its assigned tasks, the robot moves parts, objects, tools, and special devices by means of Programmed