**HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT POWERED BY IOT**

**LITERATURE SURVEY**

IoT is a platform which has varied applications in day-to-day life ranging from domestic to industrial. The model which we are going to implement aims to ensure the safety of workers in the industries. The model is of low cost, low maintenance and robust architecture for analysing the hazardous situations in the industries. This model brings safety to lives of the workers. Various papers published in the field of IoT have touched different aspects of this project.

Industrial safety is one of the major issues in hazardous environment, specially industries like fireworks, chemical, foundry and manufacturing etc. In hazardous environment, safety is a very important factor. To avoid any types of unwanted phenomena all hazardous area follows some basic preventative measure and phenomena. Warning and alerting are the factor for any industry today to monitor different parameters and take necessary actions accordingly to avoid any type of hazards.

Every day synthetic, toxic chemicals are released into the environment. It affects our water, land and air. These pollutants may cause serious health effects such as birth defects, development disorders, respiratory problems, cancer and in some cases can lead to death.

Apart from this, it can also have adverse effect on wildlife and environment. The main polluting industries in India where hazardous gases evolve are waste water treatment plant, tanneries, coal mining industries, textile dye processing, and pesticide pollution. Consider few industries and their problem.

* Each year millions of people are affected by the toxic chemicals, primarily iron, limestone, pyrite and zinc that are released into the air by the dozens of lead smelting sites around the world. Lead smelting uses furnaces and other chemical agents to remove impurity from lead ores. Lead Smelting puts approximately 2.5 million people at risk at 70 polluted lead smelting sites worldwide, according to Blacksmith Institute.
* Pesticides are substances necessary for agriculture to destroy targeted pests. An approximate 2 million metric tons of pesticides are used annually on fields. As a result, millions of tons of pesticides are dumped every year on our fields. Unfortunately, the health effects pesticides have on us are disastrous, from simple skin irritation to hurting to nervous system to even causing cancer. Apart from this, stockpiles of old and outdated pesticides add to the trouble. Most of the farmers are illiterate and use expired products. An estimated six to nine million metric tons of such pesticides are improperly stored.
* Tanning industries are primarily used to turn animal hides into leather for consumers, in places called tanneries, which are primarily centered in South-East Asia. Such tanneries are still operating with little control and produce daily 7.7 million litres of waste water and 88 million tons of solid waste and hazardous gases. Cr IV is dangerous and can cause health problems as in respiratory and heart failure and cancer in the brain and kidneys.

**Hydrogen Sulfide Gas**

* Hydrogen sulfide is a colorless, flammable, hazardous gas with a rotten egg smell. It is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system.
* Its health effects can vary depending on the level and duration of exposure. Repeated exposure can result in health effects occurring at levels that were previously tolerated without any effect.

**Carbon Monoxide Gas**

* Carbon monoxide is a poisonous, colorless, odourless, and tasteless gas. CO is a common industrial hazard resulting from the incomplete burning of natural gas and any other material containing carbon such as gasoline, kerosene, oil, propane, coal, or wood.
* Forges, blast furnaces and coke ovens produce CO, but one of the most common sources of exposure in the workplace is the internal combustion engine.
* Most of the industries work with boilers for heating purpose, this consumes high amount of wood products which also releases CO during burning.

**Methane Gas**

* Methane is a colorless, tasteless gas which is the primary component of natural gas. It is present beneath the earth’s surface in vast quantities, but levels in the atmosphere are relatively low. Methane is produced naturally by volcanoes, ruminant animals such as cattle and sheep, decaying plants, extraction of natural gas, coal mining and waste disposal such as landfills.

**Ammonia Gas**

* Ammonia gas is a pungent smelling gas. It is a basic nutritional need for all terrestrial organisms. It act as a precursor to food and fertilizers. Ammonia is a primary building block of various pharmaceuticals, pesticides and cleaning products. The ammonia gas presences can be found in various fossil decaying products.
* Ammonia is transported in bulk as a pressurized gas. Ammonia is used as a refrigerant gas, for purification of water supplies, and in the manufacture of plastics, explosives, textiles, pesticides, dyes and other chemicals. Exposure to ammonia may occur in industrial settings or following an accidental spill or leak during transport.

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