Research Study on Pest Control System

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***Abstract*: The intent of the paper is to control the pest. Now a day pest control becomes a serious issue because it provides harm not only to crop but also to human. At farm level it is continuously check by a human operator for adhesive traps, disseminated through the field, where insects remain stuck when attracted. This is a time-taking activity, and it would be of great advantage for farmers to have an affordable system doing this task automatically. This paper illustrates a system based on a wireless sensor network that is able to automatically with the help of induction motor and high tension (HT) mesh.**

***Keywords:* Load (motor) PID (Proportional integral derivative controller), VFD (Variable Frequency Drive), speed reference control , relay unit, sensors, Pest control circuit.**

I. INTRODUCTION

Enormous use of pesticides on crops increases hazard not only to human health but also to environment. According to appraisal of the World Health Organization, each year there are 3 million instance of pesticide poisoning and death of around 220,000 people. Farmers do not have statistics about unambiguous petition of pesticides and it causes harmful effect on other creature including human. Pesticide subjection causes neurological health effects like memory loss, loss of coordination, reduced speed of counter to stimuli, altered or uncontrollable mood and lower ocular ability. Other health problems like hypersensitivity, cancer, asthma and susceptibility can occur as side effects of chemical pesticides. In this paper we are going to discuss pest control system along with the speed control of motor using VFD along with PID controller in our paper we are using fan for the suction of the pest after that it will collect in a bag which can be used for other application. In this paper we are discussing the pest control system for farming application.

II. PRESENT SCENARIO AND NEED OF NEW METHODOLOGY

In present scenario for the pest control basic two method are biological method and chemical method. But each of which has some issue associated with them.

BIOLOGICAL METHOD: Biological control or bio control is a method of controlling such as insects, weeds and plant diseases using other organism. It relies on predation, parasitism or other natural mechanism but typically also involves an active human management role. It can be an important component of integrated pest management (IPM) programs.

There are three basic strategies for biological pest control:

1. *Classical (importation):* - where a natural enemy of a pest is introduced in the hope of achieving control;
2. *Inductive (augmentation):* - in which a large population of natural enemies are administered for quick pest control
3. *Inoculative (conservation):* - in which measures are taken to maintain natural enemies through regular re establishment.

Biological control can have side-effects on biodiversity through attacks on non-target species by any of the same mechanisms, especially when a species is introduced without thorough understanding of the possible consequences.

CHEMICAL METHOD: - Pesticides are substances that are used to control pest, including weeds. The term pesticide the following: herbicide, insecticides (which may include insect growth regulators, termiticides *etc*.) nematicide, molluscicide, pesticide, avicide, rodenticide, bactericide, insect repellent, animal repellent, antimicrobial, fungicide, disinfectant(antimicrobial), and sanitizer. The most common of these are herbicides which account for approximately 80% of all pesticide use. Most pesticides are intended to serve as plant protection products (also known as crop protection products), which in general, protect plants from weeds, fungi, or insects. In general, a pesticide is a chemical or biological agent (such as a virus, bacterium, or fungus) that deters, incapacitates, kills, or otherwise discourages pests. Target pests can include insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms) and microbes that destroy property, cause nuisance, or spread disease, or are disease vectors. Although pesticides have benefits, some also have drawbacks, such as potential toxicity to humans and other species. By using chemical pesticide, crops are protected from pest and parasite but it has toxic effect on the test and quality of food which is dangerous for human beings and the chemicals found in pesticide are

absorbed into the plant and enter the food chain of vegetables and grains. However, the largest health hazard is when the chemical flows into groundwater, which is then extracted for drinking purpose. So looking towards the present scenario it is necessary to developed a methodology which can control the pest without chemicals , so this paper introduce new method to control pest with auto pest o flash control system which fully automatic and free from chemicals.

III. BLOCK DIAGRAM

The block diagram of the system is shown in the fig. below. From the block diagram we are giving 230v supply to PID controller and VFD which basically control the motor. Again in the block diagram we can see the another circuit where we are giving the regulated supply to light source and relay unit. Here the relay unit is used to ON and OFF the motor. We are using the moisture sensor which sense the moisture level of earth according to that there will be the controlling of the motor also we are LDR to control the light source automatically. The basic flow of our system is first we give supply to 230V ac supply to PID control which control the motor with the help of VFD again we will give 230V to step down transformer which step down the voltage into 12V which passes through regulator IC 7805 which gives 5V. Here we are using one more regulator IC , IC 7812 for 12V analog application. Now this 12 V gives to relay which switch its contact and control the system automatically.

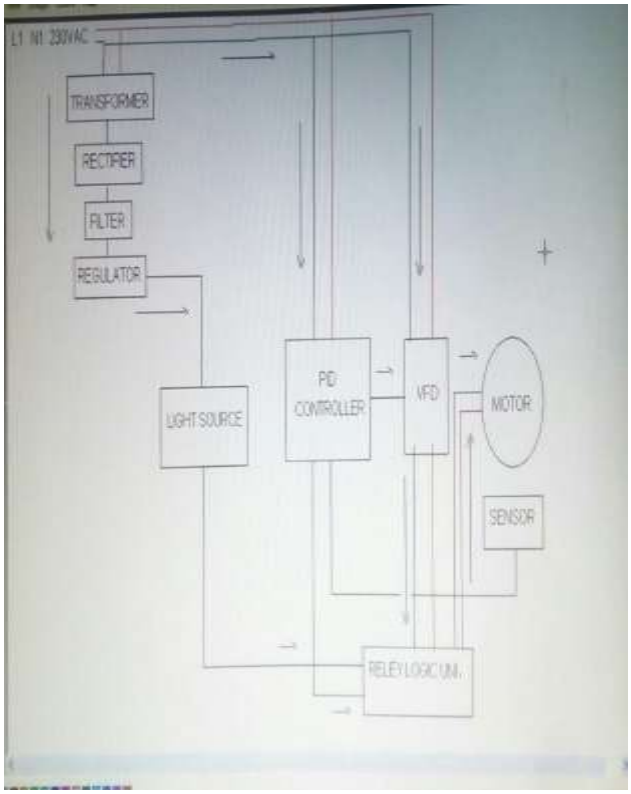

FIG.1. Block diagram of overall system

VARIABLE FREQUENCY DRIVE (VFD):-

To understand the operation of VFD it is understand the basic circuit of VFD which is as shown in figure below. From the circuit diagram the basic component of VFD are rectifier, filter, and inverter. During operation supply voltage first passes through rectifier (full wave bridge rectifier) which convert ac supply into pulsating dc after that this pulsating dc passes through rectifier to get pure dc finally it passes through inverter which convert it into variable frequency ac supply in our construction we are using insulated gate bipolar transistor (IGBT) and by using this variable frequency ac supply we can easily control the speed of induction motor. Because we know that synchronous speed is given by

$$\text{Speed} = \frac{(frequency\ )*120}{poles\ (p)}$$

So from above expression by varying frequency we can easily control speed.

As the drive provide the change in frequency and output voltage to change the speed of motor this is conveniently done by pulse width modulating drive. Pulse width modulation (PWM) inverter provides varying width waveform which combined to give required waveform.

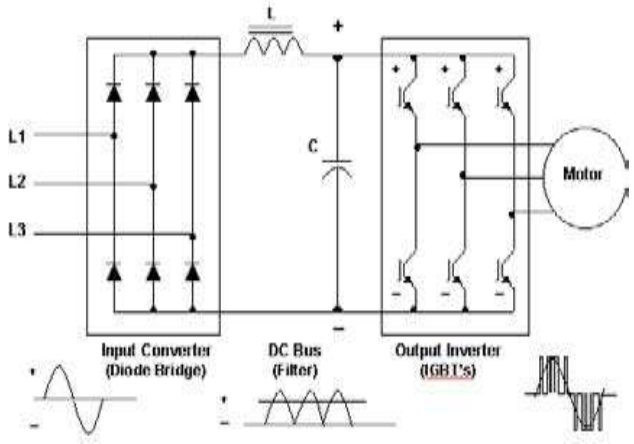

Fig. 2. Circuit diagram of VFD

PID CONTROLLER:-

The PID controllers (proportional integral derivative controller) are widely used in industries for the speed control purpose. A PID controller calculates an “error” value as the difference between the measured process value and the desired set point. The PID controller calculation involves three separate constants and is accordingly sometimes called three-term control i.e. the proportional, the integral and derivative value which is denoted by P, I and D

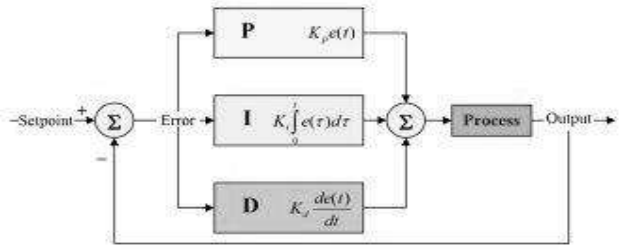

Fig. 3.PID block diagram

A proportional controller may not give steady state error performance which is needed in the system. An integral controller may give steady state error performance but it slows a system down. So the addition of a derivative term helps to cure both of these problem. The final form of PID algorithm is

$$\mathbf{U(t) = MV(t) = K_p U(t) + K_i \int_0^t e(t)dt + K_d \frac{d}{dt} e(t)}$$

IV. CONCLUSIONS

The result of the study demonstrated the feasibility of pest insect automatic monitoring on field by wireless sensor networking. Further research is still needed to improve the robustness of the measurement to obtain more specific information (discriminating insect species or typology) and research to demonstrate the cost and environment benefit of such a system.

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