**ABSTRACT ( HACKCOVIT )**

**TEAM NAME : SPECTRA**

**IDEA THEME:** Agriculture

**PROJECT DISCRIPTION**

As soil health is important for the plant growth and productivity of the Farming. There is an important need to determine NPK (Macro nutrients), Microclimate (Air temperature and Humidity), organic content, soil moisture, pH value to determine the soil health. We have created the most comprehensive soil probe measuring everything from NPK to soil moisture and microclimate, all season long. Sensors are located at depth reporting on real-time soil conditions throughout the day and the collected data is send to the cloud via either cellular, satellite or a standard internet connection which can be securely accessed on any cellular device or desktop computer.

# OUR TECHNOLOGY

An **optical transducer** is developed to measure and to detect the presence of Nitrogen (N), Phosphorus (P) and Potassium (K) of soil. Such transducer is needed to decide how much extra contents of these nutrients are to be added to the soil to increase soil fertility. This can improve the quality of soil and reduces the undesired use of fertilizers to be added to the soil. The N, P, and K value of the sample are determined by absorption light of each nutrient. The optical transducer is implemented as a detection sensor which consists of three LEDs as light source and a photodiode as a light detector. The wavelength of LEDs is chosen to fit the absorption band of each nutrient. The nutrient absorbs the light from LED and the photodiode convert the remaining light that is reflected by reflector to current. The system utilizes an Arduino microcontroller for data acquisition therefore the output from the transducer is converted into a digital display reading. Testing on various samples of soils, showed that the optical transducer can evaluate the amounts of NPK soil content as High, Medium and Low. Microclimate (Air temperature and humidity) is measured by **DHT11** . The soil moisture is measured with the help of the **Soil moisture sensor** and the PH is measured with the help of the **PH sensor**. Our dashboard features data analytics and customized recommendations, giving farmers the info they need, when they need it, with mobile alerts. This will be done by **Node MCU.**

# APPLICATION OF OUR PROJECT

This project has wide application in agriculture, as it helps to determine fertility of soil (by measuring NPK, soil pH, soil moisture) on real time basis that would help farmers to decide about crops, fertilizers and irrigation.

Furthermore, the product involves the concept of IOT as a web page is included in it for review and analysis of all the data collected by the farmer, in both Hindi and English. The same can be accessed in a mobile phone easily solving problems listed at the beginning. The page includes useful suggestions regarding the type of nutrients the soil is lacking and how to enrich the soil organically. Also specific crops are targeted individually and the required nutrients for a healthy growth of the crop are suggested.