# Literature Survey on "Smart Farmer - IOT Enabled Smart Farming Application"

## 1.Smart Agriculture Using Internet of Things

( Ibrahim Mat, Mohamed Rawidean Mohd Kassim, Ahmad Nizar Harun, Ismail Mat Yusoff  MIMOS Berhad, Kuala Lumpur, MALAYSIA {ibm, dean, nizar.harun, ismail} @mimos.my)

Recent researches hypothetically shown the potential of Internet of Things (IoT) to change major industries for a better world, which includes its impact towards the agriculture industry. Farming industry must grasp IoT to feed 9.6 billion of global population by 2050. Challenges such as extreme weather conditions and rising climate change shall be overcome to fulfil the demand for food. Smart farming based on IoT technologies will enable growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made. So, what is smart farming? Smart farming is a capital-intensive and hi-tech system of growing food cleanly and sustainable for the masses. It is the application of modern ICT (Information and Communication Technologies) into agriculture. In this paper, the hardware and software of the IoT for smart farming will be presented besides sharing the successful results.

## 2.Design and Implementation of a Smart Farm System

The farming is important for life of most countries in the world and has influence on the economy. In dry or in case of inadequate rainfall areas the irrigation become difficult, therefore, it required to handled remotely for farmer safety the agro-resources and reduce harm the productivity. Farmers tend to over-irrigation the soil. Different kinds of soil required different irrigation schedules and the irrigation also depends on many other factors like wind speed, existing moisture level, temperature season, stage of growth of crop, etc. In This research suggests a smart farm consist of automated irrigation system with programmable schedule, automatic tank level controlling for storage water of irrigation, and temperature measurement of farm based microcontroller with desired sensors and network server (gateway) which was connected to the internet. This system can be monitored and controlled by using a website of network server over the internet from any location in the world.

## 3.IoT-Enabled Smart Agriculture: Architecture, Applications, and Challenge (Vu Khanh Quy 1 , Nguyen Van Hau 1 , Dang Van Anh 1, Nguyen Minh Quy 1 , Nguyen Tien Ban 2, Stefania Lanza 3, Giovanni Randazzo 4 and Anselme Muzirafuti 4,*)

The growth of the global population coupled with a decline in natural resources, farmland,and the increase in unpredictable environmental conditions leads to food security is becomingamajor concern for all nations worldwide. These problems are motivators that are driving the agricultural industry to transition to smart agriculture with the application of the Internet of Things (IoT) and big data solutions to improve operational efficiency and productivity. The IoT integrates a series of existing state-of-the-art solutions and technologies, such as wireless sensor networks, cognitive radio ad hoc networks, cloud computing, big data, and end-user applications. This study presents a survey of IoT solutions and demonstrates how IoT can be integrated into the smart agriculture sector. To achieve this objective, we discuss the vision of IoT-enabled smart agriculture ecosystems by evaluating their architecture (IoT devices,communication,technologies.In addition,we discuss trends and opportunities of IoT applications for smart agriculture and also indicate the open issues and challenges of IoT application in smart agriculture.

## 4.Internet of things for smart agriculture: Technologies, practices and future direction (Partha Pratim Ray Department of Computer Applications, Sikkim University, 6th Mile, PO Tadong, Gangtok, Sikkim 737102, India)

The advent of Internet of Things (IoT) has shown a new direction of innovative research in agricultural domain. Being at nascent stage, IoT needs to be widely experimented so as to get widely applied in various agricultural applications. In this paper, I review various potential IoT applications, and the specific issues and challenges associated with IoT deployment for improved farming. To focus on the specific requirements the devices, and wireless communication technologies associated with IoT in agricultural and farming applications are analyzed comprehensively. Investigations are made on those sensor enabled IoT systems that provide intelligent and smart services towards smart agriculture. Various case studies are presented to explore the existing IoT based solutions performed by various organizations and individuals and categories according to their deployment parameters. Related difficulties in these solutions, while identifying the factors for improvement and future road map of work using the IoT are also highlighted.

# 5.IoT Applications in Smart Agriculture:  Issues and Challenges

(Mohamed Rawidean Mohd Kassim, SMIEEE    Kuala Lumpur, Malaysia  dean@mimos.my )

The rapid development of Internet of Things (IoT) technologies created tsunamis almost in every industry across the world and particularly in agriculture.     This massive changes are shaking the existing agriculture methods and creating new wave of opportunities.  Due to the increase of world population by 30%, agriculture products will have a very high demand by 2050. Human resources for agriculture development is becoming less due to migration of young people to big cities and land use for agriculture cultivation is being used for rapid development. As a result, most of the agriculture activities need to be automated to fulfill the food demand. IoT and related technologies will be the potential solution to solve the above agricultural and food demand issues. This paper will explore the latest trends in IoT agriculture applications and highlight the issues and challenges particularly in network and open source software for smart agriculture.