De-Colorization and Colorization of Video Using GAN and ConvNet.

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ABSTRACT

Under the limited storage, computing and network bandwidth resources, the video compression coding technology plays an important role for visual communication. To efficiently compress raw video data, a colorization-based video compression coding method is proposed in this work. In the proposed encoder, only the video luminance components are encoded and transmitted. To restore the video chrominance information, a generative adversarial network (GAN) model is adopted in the proposed decoder. To make the GAN work efficiently for video De-colorization and colorization. We investigate GAN as a general-purpose solution to image-to-image translation problems for video. These networks not only learn the mapping from input image to output image, but also learn a loss function to train this mapping. This makes it possible to apply the same generic approach to problems that traditionally would require very different loss formulations. We demonstrate that this approach is effective at synthesizing video frame from label maps, reconstructing objects from edge maps, and colorizing images, among other tasks. Indeed, since the release of the pix2pix software associated with this work, many internet users (many of them artists) have posted their own experiments with our system.

Keywords: Keywords— GAN, De-colorization and colorization, pix2pix

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I. INTRODUCTION

The aquaponics system is the successful integration of aquaculture and hydroponics system. in aquaculture, the fish are fed fish arrays that either ponds or tanks or enclosures and the fish are fed and the fish, of course, produce waste and dealing with that waste becomes a real problem in aquaculture systems; very elaborate filtration systems are used to try and keep the water pure, but eventually, the water has to be discarded and the water is pumped out into dams or into rivers or local streams or some way have been disposed of which can become a problem. hydroponics has a similar problem in that hydroponics use uses nice clean water that they add nutrient chemicals to and as it is circulated and the plants are grown some of those nutrients become out of balance and eventually that water nutrient mixture has to be replaced and water has to be discarded and once again that nutrient rich water is discarded in creeks or rivers or dams or and some kind of implosion it becomes a problem for those kind of technologies but in aquaponics we don't have those problems because we can continuously never-ending and recirculate the work because the water has comes from the fish tank nutrient-rich those nutrients are converted by good bacteria to nutrients that the plants can use the plants consume the nutrients and the water is returned to the fish tank clean for the fish to use it again so it's a closed-loop system and that must be understood from day one and that's what makes aquaponics so absolutely wonderful especially in a dry thirsty land like Australia where water is at our absolute minimum we can produce to have a high density food production system that produces both plant matter and fish in the one system to the absolute minimum of water usage.

II. LITERATURE SURVEY

Hari Kumar et al [1] say the aquaponics system can be done as a self-regulating system with the help of a wireless sensor network with an open standard of WSN called 6LoWPAN. The system which is developed using this wireless sensor device can be used to sense and collect the information of the water PH level involved and the corresponding data can be stored in the cloud database. This system requires very little human interaction when compared to the traditional aquaponics system. Megumi U et al [2], says that in a small place we can grow the plants using the idea of aquaponics. VEGILAB is mainly an indoor system that grows vegetables, to overcome fundamental issues such as expensive manufacturing cost, limited growth, and food quality. Wang et al [3] proposed the system for remote monitoring and remote controlling Based on OpenWRT, which Propose about pH, water flow, sonar sensor, and digital temperature sensors, as well as signal conditioning and closed-loop control. This is a smart interactive application, where the data that are gathered by webcam and some sensors are investigated and processed for human-machine interface. The hardware consists of Arduino UNO and WRTnod, and WRTnode is based on Wi-Fi Access Point, which is an open-source development board hardware. M.F. Saaid et al [4] studied that in Autonomous Indoor Aquaponics Cultivation Technique, 30% protein produced by fish waste can provide almost all nutrients required for plant growth. Auto fish food feeder is used in the system to provide automatic food for the fish that helps to maintain the growth rates of the fishes. The water filter system that is available in the model will remove the unnecessary waste material from the water. To provide sustainability due to climatically changes in the system, a setpoint is used to monitor the temperature in the tank using a temperature sensor. The sensed values will be received by the Arduino Uno which responses by regulating the water temperature using a heater coil. Hence this setup works unaffected by the climate change issues.

III. PROPOSED ARCHITECTURE

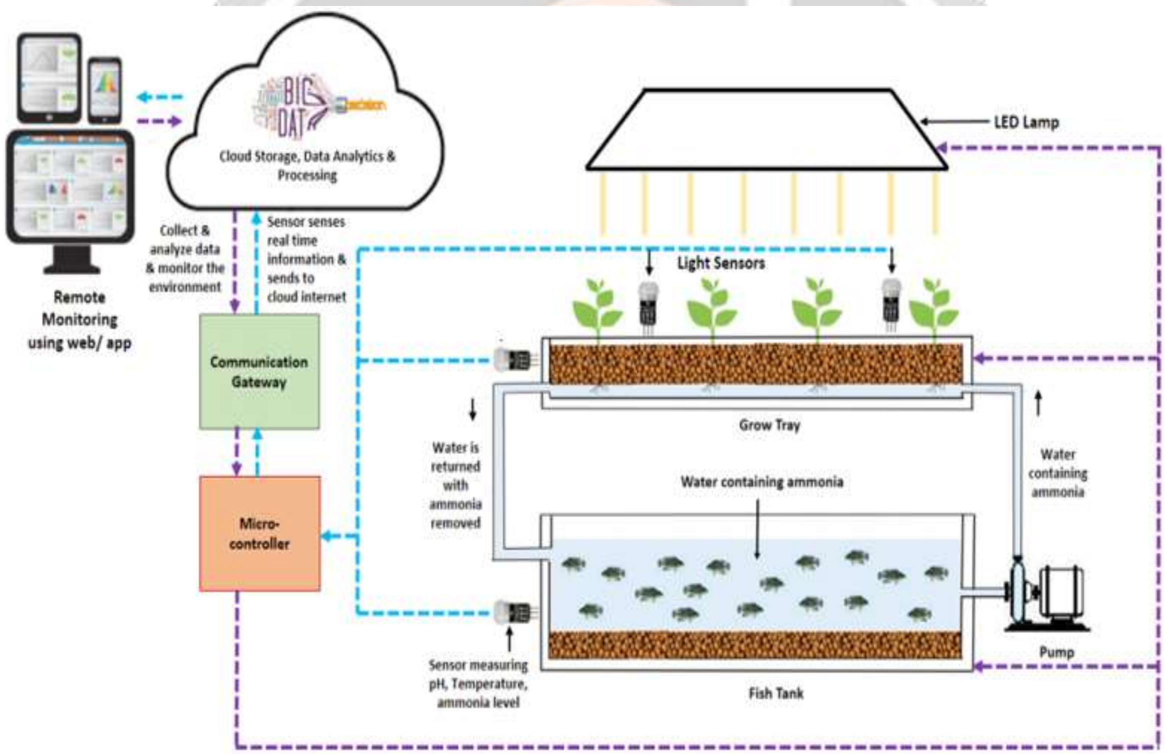

Figure 1 - System Architecture

The main goal of this system is to understand the existing available aquaponics systems implemented using various techniques and to propose a novel smart aquaponics system with all the requirements and very-less human intervention with the system.[7]The main technology used is the Internet of Things and machine learning by which the authors have automated fish feeding at a regular interval of time, automated water supply to the plants is done by using a connected system. Nutrients that plants use in this system are a byproduct of fish waste and uneaten fish feed.

In proposed aquaponics there are 2 modules namely 1) Automatic water supply, food feeding, and grow lights 2) cloud and application. The first module has three features out of which the first one includes supply water to the plants and checks the water level in the aquarium and turn on and off the pump, second is supplying food using food feeder and the third is control grow-lights. The second module use for connectivity, cloud storage, and mobile application for remote monitoring and controlling.

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In the proposed system, various services of Amazon AWS are utilized like Simple Storage service to store application data, datasets, Amazon DynamoDB is used as a database to store data, Amazon Elastic beanstalk to deploy python application. Mobile application for end user developed using Flutter framework and Dart programming language. Flutter is the latest framework developed by Google for building attractive, natively compiled mobile and web applications from a single codebase.

IV. CONCLUSION

In comparison to traditional agriculture, smart and connected agriculture uses about 40% less energy per unit crop yield. The proposed system promises economic strength for farmers to lead a superior quality of life. The concept of the smart and connected farm with aquaponics and vertical farming is soon to be a reality. A green, smart, user-friendly infrastructure that provides autonomous decision making and control is the need of the hour. The proposed Internet of Things and machine learning-based automated farming system using the wireless technique is a real-time feedback control system that monitors and controls all the activities of the farm efficiently.

V. REFERENCES

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