Advanced Chicks Hatching Incubator with AI Techniques

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ABSTRACT

The advanced technology by using Artificial intelligence in chicks hatching incubator allows Real-time monitoring the vital signs such as temperature, humidity, and oxygen levels remotely by using a smart phone. This technology can improve the survival rate of the chicks and thereby increase the hatchability percentage of the chicks by incorporating IoT and Arduino with a digital camera, it is possible to designed a smart incubator which are not only useful to farmers but also to those researchers who wants to study and monitor embryonic development of chicks accurately.

INTRODUCTION

The Internet of Things (IoT) create an advance technique for operating the incubator for hatching chicks which can be used to enhance the monitoring and recording the patterns of embryonic developments of chicks during incubation by observing the temperature and humidity level throughout the incubation process by using a smart phone (Ariffin *et. al*. 2025). IoT technology allows monitoring for vital signs such as temperature, humidity, and oxygen levels remotely by using a smart phone (George *et. al*. 2009). AI techniques like Arduino nanao to monitor Oxygen and carbon dioxide level and can control the overall operation of the incubator remotely (Sivamani *et. al*. 2018).

Uses and Importance

The Internet of Things (IoT) in incubators can be used in monitoring and recording the

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developmental stage of chicks during incubation period by observing the temperature and humidity level throughout the incubation process. IoT technology allows Real-time monitoring the temperature, humidity, and oxygen levels remotely by using a smart phone. In case of deviations from the ideal range, the system can trigger emergency alerts to notify the observers thus minimizing the chances of fail incubation. These applications of IoT in incubators improve the survival rates of developing chicks more efficiently and responsively.

As a trial, the incubator was incorporated with a WiFi enable **amiciSense Temperature/ Humidity Sensor** and placed inside the incubator after connecting to internet router through WiFi. Since the connection was made using wireless routers, this method avoids disturbing the overall incubation environment. The user can download already available apps like **SmartLife** to an android phone or a computer and can monitor remotely. Since the sensor selected was only for monitoring humidity and temperature, this device shows the real time information of humidity and temperature and can alert the user if ideal set range is exceeded. However, we can further upgrade the IoT using AI techniques like Arduino nanao to monitor Oxygen and carbon dioxide level and can control the overall operation of the incubator remotely.
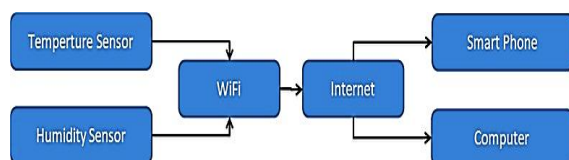
Arduino is a digital device that designs and manufactured single-board microcontrollers and microcontroller kits that can sense and control objects in the physical and digital world. The device are distributed as open-source hardware and software which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution. Arduino boards are available commercially in pre-assembled form, or as do-it- yourself (DIY) kits**.** The internet of things (IoT) is the internetworking of physical devices and other items, embedded with electronics, software, sensors and network connectivity that enable these objects to collect and exchange data.

So, by incorporating IoT and Arduino with a digital camera, it's possible to designed a smart incubator which are not only useful for farmers, commercial hatcheries but also to those researchers who wants to study and monitor embryonic development of chicks accurately. This method can give precise data of all the information i.e. temperature, humidity, CO_2 or O_2 throughout the incubation process with graphical representation as the data are automatically stored in the phone/computer memory and will synchronize every second.

CONCLUSION

In future it has a great scope and it will have greater impact in veterinary society and the survival rate of the chicks will be increase as they will be under the control by observation 24/7.

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