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Intelligent Packing Solution for Safe and Secured Delivery

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A b s t r a c t: ***The Internet of Things (IoT) is a scenario in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS) and the Internet. With IoT, devices typically gather data and stream it over the Internet to a central source, where it is analyzed and processed. With IoT, devices typically gather data and stream it over the Internet to a central source, where it is analyzed and processed. As the capabilities of things connected to the Internet continue to advance, they will become more intelligent by combining data into more useful information. To handle such situations, we propose a solution by automating the parcel collection unit. This paper discusses about the part of IoT in home sophistication, the proposed approach.***

Keywords: IoT, MEMS, Analyzed and Processed, Automation

I. INTRODUCTION

The Intelligent Packaging solution aims to use an electronic packaging solution to combat the problem of opening packages during transportation as well as to measure the
characteristics of the product, the inner and outer atmosphere of the package. The project IPS aims to use electronic packaging solutions to effectively trigger an alert when a package is opened. This is done by using many sensors in a fail-safe system. The problem with single sensor-based systems is that they do not correlate data from different means. IPS uses many sensors that continuously track the physical parameters inside the package to ascertain if the package has been opened or there has been some rise in temperature (for pharmaceutical and temperature-sensitive products). Once this alert has been sent to those concerned, they can take necessary action. If there is no alert and a normal delivery takes place, the customer uses his/her mobile phone to scan a QR code displayed on the IPS kit. This will result in an OTP that is received at the customer's mobile and entering the OTP with the kit will reset the device. The IPS kit is then removed from the box and given to the delivery executive to be reused again.

Internet of thing (IoT) is not only a promising research topic but also a blooming industrial trend. Although the basic idea is to bring things or objects into the Internet, there are various approaches because an IoT system is highly application oriented. Some problems that often arise in the packaging of products are difficulty and inaccuracy in determining appropriate packaging options according to type and condition the product to be packaged. Incorrect decision of packaging option can cause quality loss, physical damage, spoilage of the packed products, especially perishable and time sensitive products. The smart locker is a modular and expandable solution developed especially for parcel collection. The functionality can be managed locally. Security of data is of primary concern and the system is fully compliant with all data protection standards. No resident data is stored locally thanks to the enterprise-level cloud based control system. With the rise of e-commerce, there is an increasing need to manage online purchase deliveries effectively. Now here is this more apparent than within apartment complexes nationwide.

Today, Internet is migrating from connecting people to connecting things, leading to the new concept of Internet of thing (IoT). This new trend brings things or objects into the Internet and generates new applications and business. It is predicted that 212 billion devices will be installed by 2020. These things, ranging from indoor wearable devices to outdoor environmental sensors, become new sources generating data on Internet, together making the entities on Internet more aware of the real world. This brings new applications or revolutions in many fields such as transportation, healthcare, home/industrial/agriculture automation freshness and extend shelf life during the distribution process (Yam et al, 2005). Packaging design that combines elements and design guidelines are oriented to the environment, also play an important role in informing and directing consumers to keep buying.

The increasing packaging types and options nowadays also necessitates more systematic and precise way to select the best packaging option for a certain type of product. Decision-making processes are often faced with a wide range of unique conditions, uncertain, dynamic, time-consuming and complex nature (Turban et al, 2007; arimin & Maghfiroh, 2010; Wu, 2010).

This paper discusses the development and implementation of a decision support system (DSS) to ease and enhance the decision making process for selecting the best packaging option for products. The application mainly face to two types of users, couriers and customers. When they log in the system through the password and username, they can use different functions. The mobile terminal mainly use the electronic map with GPS location information through ios API, to obtain the real-time location of courier and package, and then make the automatic route planning for the courier. At the same time, the courier can update the logistics status immediately to the server through communication network, which can share the logistics information timely for each customer.

II. REQUIREMENTS

8 bit ATMega microcontroller with reduction instruction set (RISC) based hardware architecture.
Programming language used on the Micro-controller is Embedded C.
MPU-6050 Six-Axis (Gyro + Accelerometer) MEMS Motion Tracking combine a 3-axis gyroscope and a 3-axis accelerometer on the same silicon die, together with an onboard Digital Motion Processor™ (DMP™), which processes complex 6-axis Motion Fusion algorithms..
Light Detecting Resistor (LDR) sensor/module is used to detect the presence of light.
The embedded Digital Motion Processor (DMP) is used to compute motion processing algorithms.
A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are commonly used in security alarms and automatic lighting applications.
Neo 6M Global Positioning System (GPS) sensor Used to give information about the location.
SIM800H Global System for Mobile (GSM) module can transmit Voice, SMS, and data information with low power consumption.
Infrared (IR) Sensor module will help determine if someone puts their hand in the package during transit.
Temperature sensor module (DHT11) is a basic, ultra-low-cost digital temperature and humidity sensor.
Arduino IDE is a cross-platform application that is written in functions from C and C++.

III. METHODOLOGY

The IPS development kit will be made into a compact space and placed inside the package that is to be secured. The package will have enough space for the kit to work properly. The sensors that are used in the IPS development kit will be turned on and will start working. The kit will travel within the box till the destination where it will be removed after verification of the data.

1) *Step 1:* The IPS development kit is first placed in the package that is to be tracked. This is placed inside the package along with the contents of the package. This is considered very easy as it is as simple as just placing the IPS development kit along with the package to be secured. For the kit to work properly and without any interruptions it must be placed as close to the package contents as possible. In the case of any food products or any hazardous chemicals that are being transported, the food products may be enclosed in another layer of packaging to protect its integrity. If the package is transporting any electronic cargo, there will be no problem in the placement of the package as there will be no electrical or electronic interference with the module. The sender must place the kit in such a way that the kit is not moving on its own inside the box. Once the kit is securely placed and it is tested for its sturdiness, the package that is containing the IPS development kit as well as the shipping contents can be sealed and locked. The IPS development kit is enabled.
2) *Step 2:* The IPS development kit starts running the program that is coded into it and hence starts transmitting data to the cloud. The data on the cloud is visible on the web interface that has been built for this specific purpose. The website updates in real-time to show the change in data if any to the parties concerned. This allows them to take any immediate action that may be necessary to ensure the integrity of the package.
3) *Step 3:* The data is monitored in real-time on the cloud as well as in the IPS development kit. In the event if a mishap occurs: If there are any changes in the data that suggest a break in the integrity of the package if there is any mishap with respect to the package then an alert is sent to the manufacturer of the product (the sender), the logistics partner (the person shipping the parcel) as well as the customer (the person receiving the parcel). This enables them to take any action that is necessary to either stop the package in transit or to verify its integrity. If there is no mishap during transit: If there is no mishap in the entire duration that the package is being shipped, then the package arrives safely at the destination and no alert is raised to inform all the concerned parties. The customer scans a QR code that is present on the IPS development kit and the customer receives an OTP.
4) *Step 4:* On receiving the OTP, the IPS development kit is reset and it is ready to be taken back by the shipping company and installed on another parcel and the cycle of the IPS development kit continues.

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IV. CONCLUSION

Hence this smart packaging system helps in the overall security of the package and it tracks them effectively and efficiently. In the present growing world this type of smart package is necessary because it can prevent thefts, exchange of important parts in package, handle a safe and secure delivery to the consumers. The main advantage of this packaging is, it can be reusable, the same package can be used multiple times resulting in less installation cost. Therefore smart packaging can be one of the best and sophisticated method to obtain a proper and original product.

V. EXPERIMENTAL RESULTS

When the power is switched on, the LCD displays "INTELLIGENT PACKAGING SYSTEM". We have to place the object inside. After the package is placed inside the ips kit, the "OBJECT PLACED" is displayed. The lid will be closed and "SEALED BOX" is displayed. Then all the sensor conditions are checked and the humidity and temperature inside the box is measured. Next step is to enter the OTP. The OTP generated is received through telegram and Blynk app and then it is entered. When the correct OTP is entered "OTP MATCHED UNLOCKING PACKAGE" is displayed and the lid of the IPS kit will open and the package is collected.

Fig: When power is switched on

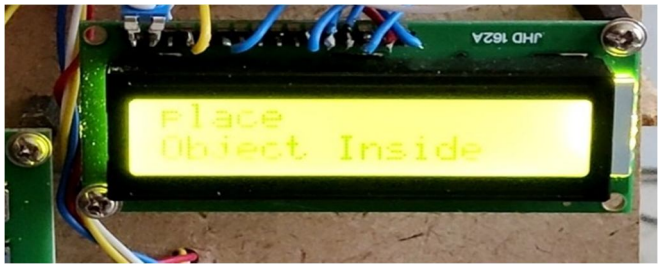


Fig: Indication to place the package

Fig: Indication that the object is placed

Fig: Indicating the user that the lid is closing

Fig: Indication that the box is sealed

Fig: Measurement of Temperature and Humidity

Fig: Indicating to enter the OTP

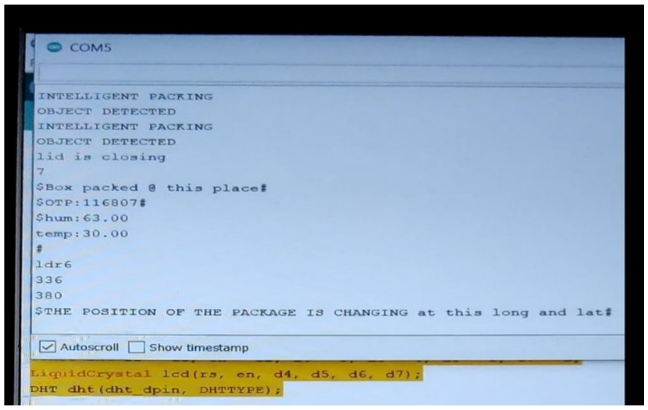


Fig: OTP generated from the server

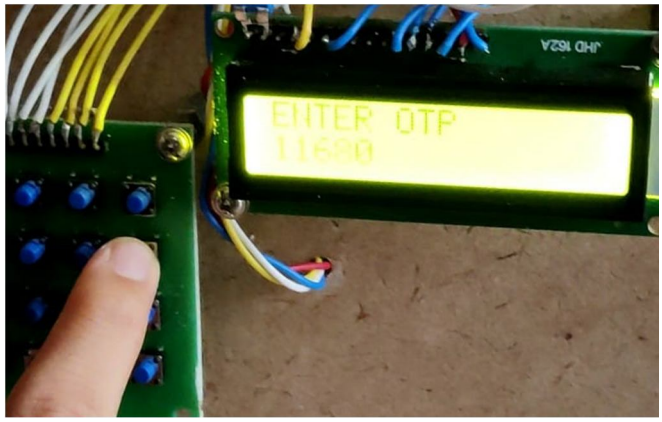
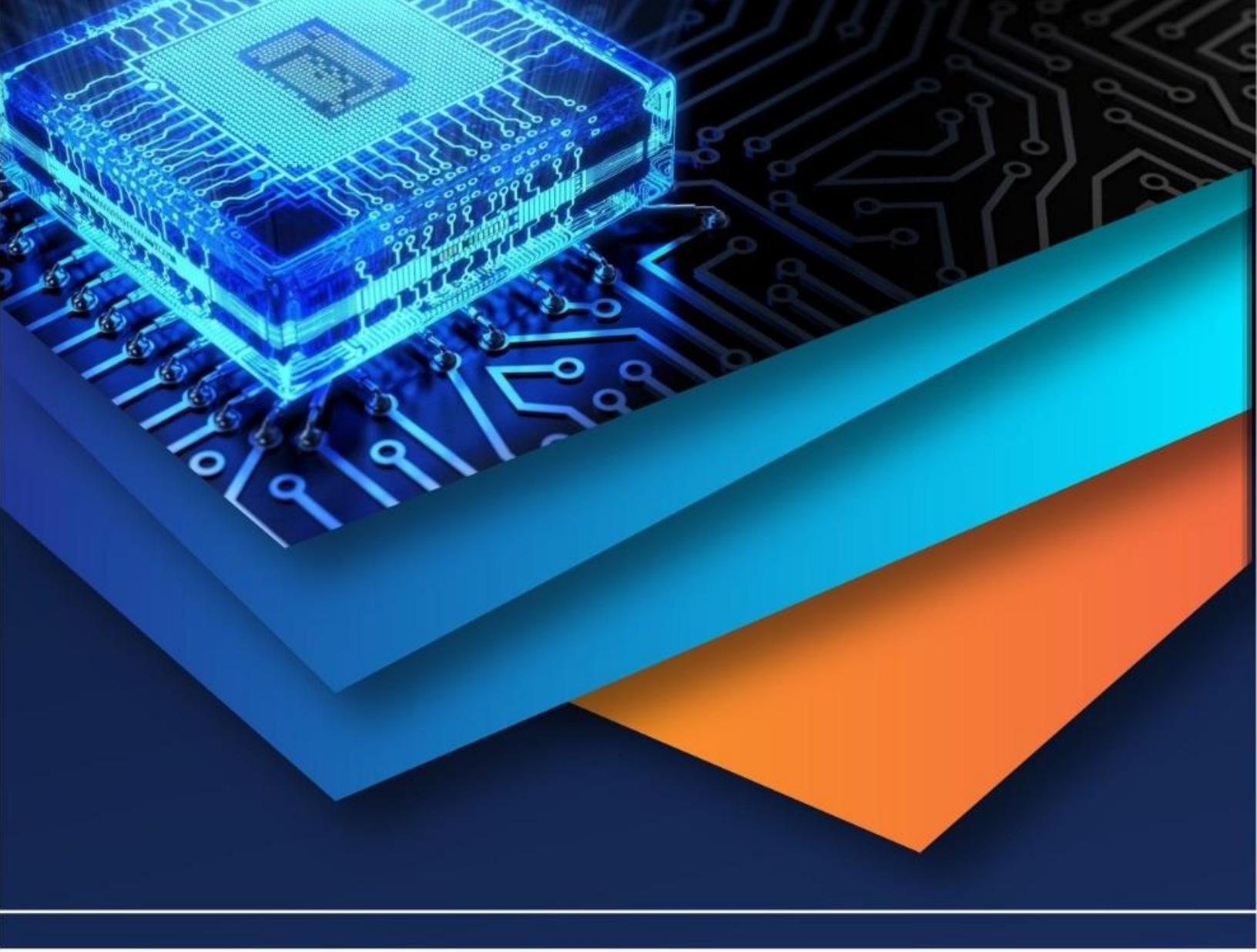


Fig: Entering the received OTP

Fig: Indicating that the OTP is matched and the package is being unlocked.

REFERENCES

[1] http://postscapes.com/internet-of-things award/connected-home-products/
[2] http://www.cisco.com/web/strategy/docs/gov/everything-for-cities.pdf
[3] http://en.wikipedia.org/wiki/Internet_of_Things
[4] http://whatis.techtarget.com/definition/Internet-of-Things
[5] http://www.wired.com/2013/05/internet-of-things-2/
[6] Internet of Things for Smart Cities Andrea Zanella, Senior Member, IEEE, Nicola Bui, Angelo Castellani, Lorenzo Vangelista, Senior Member, IEEE, and Michele Zorzi, Fellow, IEEE, IEEE Internet Of Things Journal, VOL. 1, NO. 1, FEBRUARY 2014.
[7] Zhiyong Shi, "Design and implementation of the mobile internet of things based on tdscdma network" published on 17-19th December 2010 in Information Theory and Information Security (ICITIS), 2010 IEEE International Conference.
[8] K. Nirosha, B. Durga Sri, Ch. Mamatha and B. Dhanal axmi, Automatic Street Lights On/Off Application using IO T, International Journal of Mechanical Engineering and Technology , 8(8), 2017, pp. 38–47.
[9] B. Durga Sri, K. Nirosha, P. Priyanka and B. Dhanal axmi, GSM Based Fish Monitoring System Using IOT, International Journal of Mechanical Engineering and Technology 8(7), 2017, pp. 1094–110 1.
[10] Hariharr C Punjabi, Sanket Agarwal, Vivek Khithani, Venkatesh Muddaliar and Mrugendra Vasmatkar , Smart Farming Using IoT , International Journal of Electronics and Communication Engineering and Technology , 8(1), 2017 , pp. 58–66.
[11] Design and Operation of an Urban Electric Courier Cargo Bike System, IEEE, Tanja Niels,Moritz Travis Hof, Klaus Bogenberger, in 4-7 Nov. 2018
[12] Smart DODS: A Smart Dynamic Order Dispatch System for Short-Distance Instant Logistics Service , IEEE, Yi-Ming Wei Xiu-Quan Qiao Jun-Liang Chen Yue-Zhong FengChao Wang , in11 September 2017 Department of TCE, KSIT 2020-2021 Page 55 Intelligent Packaging Solution for Safe and Secured Delivery
[13] OCD: Online Crowd sourced Delivery for On-Demand Food ,IEEE, by Wei Tu ,in 03 September 2019
[14] Automated packing systems-a systems engineering approach ,IEEE, P.F. Whelan; B.G. Batchelor, in Volume: 26, Issue: 5, Sep 1996
[15] IEEE Transactions on Components, Packaging and Manufacturing Technology, IEEE, Mario D'Auria;William J. Otter;Jonathan Hazell;Brendan T. W. Gillatt;Callum LongCollins;Nick M. Ridler;Stepan Lucyszyn (sections 8.2.1.C & 8.2.2.A) ,in 2015
[16] Advanced Electronic Packaging: 9 (IEEE Press Series on Microelectronic Systems) Hardcover – 23 May 2006 by William D. Brown ,Richard K. Ulrich
[17] B. Durga Sri, K. Nirosha, P. Priyanka and B. Dhanal axmi, GSM Based Fish Monitoring System Using IOT, International Journal of Mechanical Engineering and Technology 8(7), 2017, pp. 1094–110 1.
[18] Hariharr C Punjabi, Sanket Agarwal, Vivek Khithani, Venkatesh Muddaliar and Mrugendra Vasmatkar , Smart Farming Using IoT , International Journal of Electronics and Communication Engineering and Technology , 8(1), 2017 , pp. 58–66.
[19] Design and Operation of an Urban Electric Courier Cargo Bike System, IEEE, Tanja Niels,Moritz Travis Hof, Klaus Bogenberger, in 4-7 Nov. 2018
[20] Smart DODS: A Smart Dynamic Order Dispatch System for Short-Distance Instant



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