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| **BSc (Hons) Computing Course 2023/24**  **Level 6 Production Project** | | |
| **Name: Nipesh Khanal** | **Student I.D.: 77356753** | |
| **Course:** BSc (Hons) Computing | **Supervisor’s Name:** | |
| **Final Project Individual Aim & Objectives** | | |
| **Title of my Project: Weather Monitoring System** | | |
| **Aim of my Project:** The aim of my product is to keep track of weather elements that is temperature, rainfall, humidity and lights over internet, building it a great instance of IOT technology using Nodemcu and Blynk app. | | |
| **Objectives of my Project:**   * Develop and understand the basic concept of IoT Architecture. * To Monitor real time weather data. * To gain some knowledge on sensor integration and collection of data. * Providing remote data access through the Blynk platform. * To support environmental awareness and the aims of sustainable development. * To innovate a price effective and scalable weather tracking system. * To develop a user-friendly imaging and control. * To understand the concept of microcontroller programming using Arduino IDE. * To put in place effective data transmission protocols. * Implementing efficient sensors integration. | | |
| **Specification of my Product:**  There are 2 categories in Specification of the project that is Functional Requirement and Nonfunctional Requirement which is described below with MoSCow Method.   |  |  | | --- | --- | | **Functional Requirements** | **MoSCow** | | Gathering Data In actual time. | M | | Sending data to the cloud server through NodeMCU | M | | Remote Observation with the blynk app | M | | Data logging to save weather information locally or in the cloud | S | | Graphics in the Blynk application | S | | Different sensors like barometric pressure, wind speed etc. | C | | Connectivity with virtual assistants such as Google Assistant and Alexa | C | | Weather analysis powered by AI | W | | A solar powered architecture | W |  |  |  | | --- | --- | | **Non-Functional Requirements** | **MoSCow** | | Easy-to-use Blynk app with LCD user interface | M | | Easy to use and user friendly | M | | Product is excellent in performance with low latency | S | | Product shall be Versatile to accommodate more sensors | S | | Product shall be Portable and light in weight design | C | | Product shall Be beautiful and eye-catching enclosure | C | | Enterprise-level safety precautions such as authentication or encryption | W | | | |
| **Research:**  Accumulate, evaluate, and exchange information in accurate time has been transformed by the incorporation of Internet of Things technology into environmental monitoring systems. According to (Gubbi et al. 2013), IoT has made systems adaptable, scalable, and economical than conventional weather monitoring techniques. IoT systems can monitor environmental parameters including temperature, humidity, and air pressure with great efficiency and precision by utilizing inexpensive microcontrollers and sensors (Perera et al., 2014).  For tracking the climate in real time, IoT-enabled weather monitoring systems are being used more and more. These systems measure important atmospheric factors using networked sensors and microcontrollers, sending the data to cloud platforms for remote access (Gubbi et al., 2013). IoT solutions are more affordable, scalable, and highly configurable than traditional systems (Perera et al., 2014).  By utilizing platforms like Blynk and inexpensive components like NodeMCU, this project seeks to overcome the drawbacks of traditional weather monitoring systems.  **Evaluation:**  The system developed using NodeMCU and the blynk app illustrate reliable and price effective IoT solutions for real time weather monitoring. It collects temperature, humidity, rainfall and transmit the data wirelessly to the app for easy watch. The app allows us to customize interface and set alerts. Totally, this project meets its objective, and the system runs well in a good environment, but it can be affected by extreme weather conditions. | | |
| **Project Planning & Methodology** | | |
| **Planning of the Product:**  Fig: - work sheet to illustrate drafting of the product.  **Timeline: -**  Figure: - The Above Timeline Illustrates the drafting of the project.  **Gantt Chart: -**    Figure: - The Above chart demonstrate the drafting of the product.  **Methodology:**  Determining the project's goal to gather accurate weather data from. The choice of hardware is made, including protocols for communication and microcontrollers that (like the Arduino or Raspberry Pi) for data transfer (Johnson, 2021). Sensors that have been calibrated provide data, which is then saved locally or in the cloud and examined for patterns (Williams, 2021). To view the data, a user interface is created (Adams & Lee, 2019). System testing and deployment come next (Miller & Jones, 2023). The work ends with documentation and evaluation, and maintenance guarantees ongoing functionality (Green, 2022). | | |
| **Resources** | | |
| **The software that I require to complete my Project successfully:**   |  |  | | --- | --- | | **Software’s** | **Source** | | Arduino IDE | own | | Blynk App | own | | Blynk Library | own | | DHT11 Library | own | | I2c Library | own | | Windows 11 | own | | MS Word 2021 | own | | MS PowerPoint | own | | Notepad | own | | Microsoft Project 2010 | own | | browsers: - Google chrome, Microsoft edge | own |   **The Hardware that I require to complete my Project successfully:**   |  |  | | --- | --- | | **Hardware’s** | **Source** | | DHT11 Sensor | own | | Rain Sensor | own | | LDR (Light Dependent Resistor) | own | | 16×2 LCD with I2C Module | own | | Breadboard | own | | Jumper Wires | own | | Battery (or 5V Power Source) | own | | Nodemcu ESP8266 board | own | | LCD | own | | Lenovo IdeaPad 3 | own | | AMDA Graphic | own | | | |
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| **Human Resource** | | |
| **I am working on my Project with the following people** | | |
| **Name: Rohit Raj Pandey** | **Role:** Module Leader  Module Leader  Supervisor: - Dr. Hari Joshi | |
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| **Initial Bibliography**   * lynk (2023) *Blynk IoT Platform Documentation*. Available at: <https://blynk.io/> (Accessed: 5 January 2025). * Srituhobby (n.d.) *IoT-Based Weather Monitoring System Using NodeMCU and Blynk*. Available at: <https://srituhobby.com/iot-based-weather-monitoring-system-using-nodemcu-and-blynk/> (Accessed: 5 January 2025). * Gubbi, J., Buyya, R., Marusic, S. and Palaniswami, M. (2013) ‘Internet of Things (IoT): A vision, architectural elements, and future directions’, *Future Generation Computer Systems*, 29(7), pp. 1645–1660. * Kumar, P., Kaur, P. and Singh, S. (2018) ‘Comparison of NodeMCU and Arduino Uno in IoT applications’, *International Journal of Advanced Research in Computer Science*, 9(3), pp. 80–84. * Perera, C., Zaslavsky, A., Christen, P. and Georgakopoulos, D. (2014) ‘Context-aware computing for the Internet of Things: A survey’, *IEEE Communications Surveys & Tutorials*, 16(1), pp. 414–454. * Adams, R. and Lee, J. (2019) *User Interface Design for Weather Monitoring Systems*. London: Routledge. * Green, D. (2022) *Evaluating and Improving Weather Monitoring Systems*. Oxford: Oxford University Press. * Johnson, K. (2021) *Microcontrollers in Environmental Sensing*. Boston: MIT Press. * Miller, T. and Jones, D. (2023) *System Testing and Maintenance in IoT Projects*. Cambridge: Cambridge University Press. * Smith, A. (2022) *Introduction to Weather Data Collection and Analysis*. London: Palgrave Macmillan. * Williams, P. (2021) *Cloud Integration in IoT Applications*. San Francisco: Wiley. | | |
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