ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH **CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM**

**TRƯỜNG ĐẠI HỌC Độc Lập - Tự Do - Hạnh Phúc**

**CÔNG NGHỆ THÔNG TIN**

*Tp. Hồ Chí Minh, ngày 14 tháng 09 năm 2018*

**ĐỀ CƯƠNG CHI TIẾT**

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| **TÊN ĐỀ TÀI:** THIẾT BỊ QUAN TRẮC, DỰ BÁO THỜI TIẾT PHẠM VI NHỎ SỬ DỤNG CÔNG NGHỆ MÁY HỌC VÀ GIAO TIẾP TRUYỀN THÔNG LORA  LOCAL WEATHER MONITORING, FORECASTING SYSTEM USING NEURAL NETWORK AND LORA COMMUNICATION TECHNOLOGY |
| **Cán bộ hướng dẫn: TS. Trịnh Lê Huy** |
| **Thời gian thực hiện:** Từ ngày 03/09/2018 đến ngày 15/12/2018 |
| **Sinh viên thực hiện:**  **Nguyễn Mạnh Thảo – 14520853**  **Quách Thế Hào – 14521124** |
| **Nội dung đề tài:**  **+ Thesis Overview:** Research and upgrade the local weather monitoring and forecasting system from the previous thesis named "THIẾT BỊ QUAN TRẮC, DỰ BÁO THỜI TIẾT PHẠM VI NHỎ SỬ DỤNG CÔNG NGHỆ LORA"   * Using Artificial Neural Network to forecast rainfall to increase the accuracy of forecasting results along with system using time * Develop an anti-collision on LoRa bandwidth * Develop weather data monitoring website   ***+*****Targets:**   * The system collects weather data independently and be able to work in windy weather environment * The local weather forecasting application using Back-propagation Neural Network model * Increase forecasting accuracy to 63% comparing to 60% of the local weather forecasting application using Fuzzy Logic * Minimize the number of error packet by data collision on LoRa bandwidth   + **Objects and Scope of the Thesis:** The thesis focuses on optimizing the accuracy and the reliability of the system. The thesis uses Machine Learning, specifically the Back-propagation Neural Network model to solve the problem of small-scale rain forecasting. Utilizing the advantages of the Back-propagation Neural Network model is to improve predictive accuracy over time. Applying data transfer technology - Lora in transmit and receive operations can increase the device installation distance. Besides, Lora technology can save more power than other transmit technologies. Also, thanks to solar cells, the battery life of the monitoring devices is extended, so that the system can be installed in many different areas without other power supplies.  + **Research method:**   * Research forecasting techniques and factors that affect the amount of rainfall, especially for Vietnam * Develop a backpropagation neural network model for forecasting the amount of rainfall in a small-scale area * Research and develop a system that collect environmental values as inputs of the neural network model using LoRa communication technology   + **Expected results:**   * The hardware system collects weather data independently and be able to work in windy weather environment. * The local weather forecasting application using Back-propagation Neural Network model. Increase rainfall forecasting accuracy to 60% comparing to the local weather forecasting application using Fuzzy Logic. * Solving the data collision problem with timeslot protocol |

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| **Thesis plan:**  + **Stage 1 (9 - 10/2018):**   * Develop weather monitoring node hardware and firmware * Develop database handler and connection between node and server   + **Stage 2 (10 – 11/2018)**:   * Train ANN model with collected data * Solving collision problem on LoRa bandwidth * Develop website showing collected data and forecast result   + **Stage 3 (11 – 12/2018)**:   * Optimize the system * Checking and fixing bugs | |
| **Xác nhận của CBHD**  (Ký tên và ghi rõ họ tên)              TS. Trịnh Lê Huy | **TP. HCM, ngày 14 tháng 09 năm 2018 Sinh viên**  (Ký tên và ghi rõ họ tên)              Nguyễn Mạnh Thảo                Quách Thế Hào |