Development of Mobile Online Solar Powered Smart Weather and Air Quality Station

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Abstract

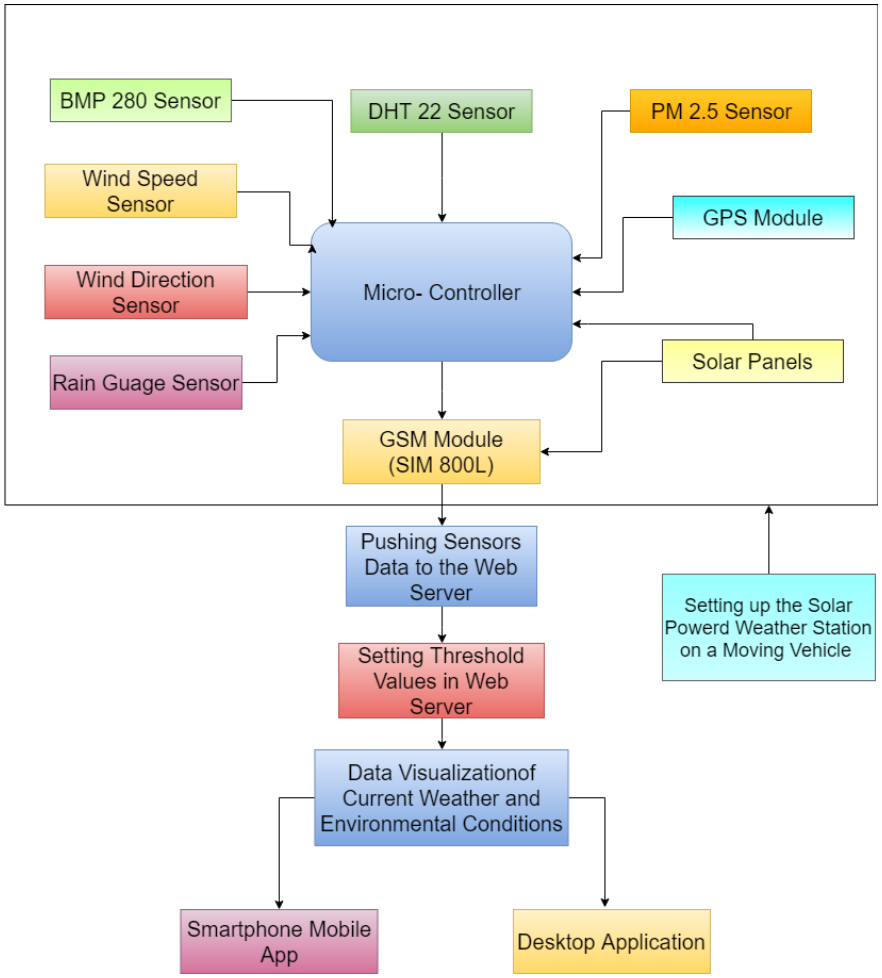
In recent years, the climate is becoming a major interest in the problems of climate change. Today, the need for climate monitoring tools for real-time monitoring, alerts, and reporting of variable environmental conditions has become very essential. In this study, smart sensors for the control of meteorological parameters were selected and integrated. The alert system must be developed via a smartphone application that sends warning messages based on the weather conditions at that location. The weather station will include several sensors, namely temperature, pressure, humidity, wind direction and speed, rain gauge, PM2.5, Heat Index. These sensors will be powered by the solar battery which in turn will be charged by the solar panels connected to the weather station. Solar panels will receive energy using solar energy, in addition, climate change is observed in a web platform. An alert system will be developed to indicate sudden changes in climate parameters. The real-time graphics are displayed in the smartphone application. Graphs of sensors parameters for an hour, daily, weekly and monthly will be shown in the graphs. Real-time alerts will be displayed on the smartphone screen. Evaluation tests include; check if the prototype was built correctly or not. In addition, test the prototype in real-life scenarios and verify the performance of the system developed both quantitatively and qualitatively compared to other existing meteorological systems.

Weather monitoring is a basic need in daily life every human being wants to know about the weather changes and to know how the weather is currently. Mainly in urban and rural areas, in this research, the Weather air quality station (W&AQ) is used in coastal and agricultural areas. By this W&AQ station farmers they can know rainfall, temperature, heat index and wind speed & direction that they can protect their farms in that way this W&AQ can help them not only in the agricultural but also in the cities it measures air pollution and dust particles by using pm2.5 by knowing about the air pollution that they can divert the traffic to another route when air pollution exceeds on that area. The W&AQ built with microcontroller and sensors, and data is pushed into the web server by using the GSM module. Users can check the weather data in a web browser and in the developed mobile application. Alert notification system also developed when the threshold values are greater than or lesser than they can get the alert notification in the smartphone. In this research study by using W&AQ in Bangkok, Thailand air pollution as compared to daily data, weekly data, weekdays and weekends data. By using

a solar panel, the battery is charged through that W&AQ is powered up. The battery can stand still 18hours with a full charge.

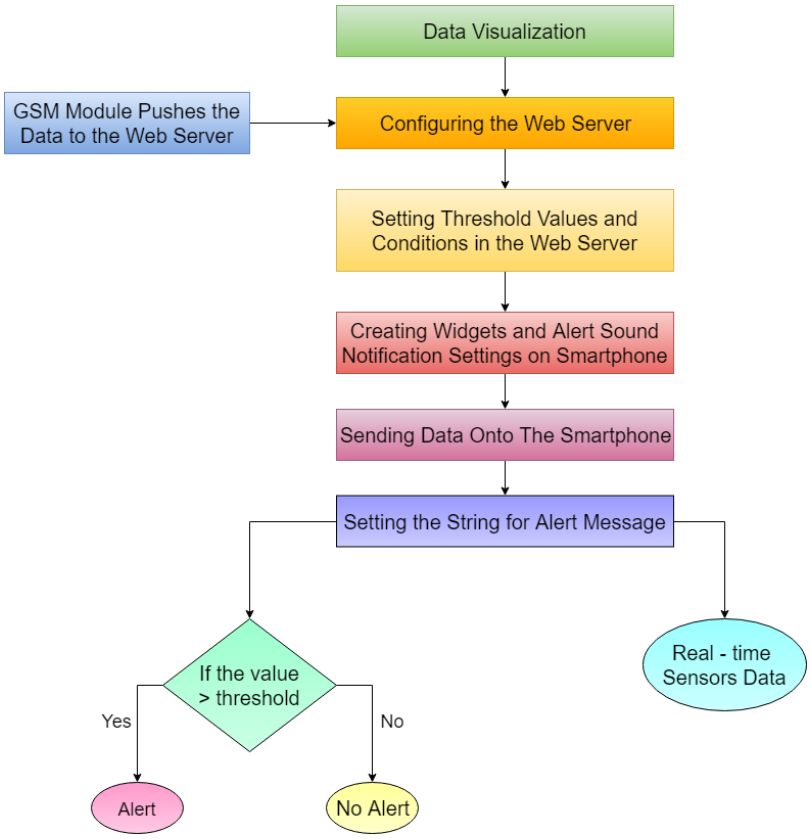
The below figures show the overall methodology in this research. The overall methodology is divided into 4 parts

- Interfacing sensors to the microcontroller
- Developing web server
- Pushing sensors data to the server
- Developing a Smartphone application



The below figures show the overall methodology in this research. The overall methodology is divided into 2 parts

- Developing Widgets in the smartphone
- Developing Alert notifications



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Masters student in the field remote sensing and Geographic Information Systems (GIS) in Asian Institute of Technology Thailand. Done my thesis on the development of mobile online solar powered smart weather station and air quality station. I have done my Bachelor of Engineering in computer science engineering. I want to continue my research and gain knowledge in Remote sensing and geographical information systems for that I applied Ph.D. admission in AIT. I got more interest in RS&GIS after my masters and I changed my dream to become a professor in a teaching line and then I want to build a company on my specialization. I want to serve my country form my side and my want make my parents proud. I have interest in robotics and weather technologies and health. My main goal is to help people and my country with my knowledge. Specialization in GIS, Computers technologies, electronics and embedded systems.

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