^{# 61} Intelligent system for collecting and analyzing of meteorological data based on robotic platform /

Інтелектуальна система збору та аналізу метеорологічних даних на базі роботизованої платформи



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Relevance

- Importance of accurate weather forecasts in many areas of human life
- Uneven coverage by measuring stations
- Discreteness of observations in time
- The importance of weather forecasting for the military



Disadvantages of existing means of collecting meteorological data

Meteorological stations



Meteorological probes



Meteorological planes



Meteorological satellites



Disadvantages of existing systems

- The OpenWeather service is the most popular service which displaying current weather indicators in a certain area with historical data
- The service has a number of major drawbacks, among which the main ones are the discreteness of observations in time, as well as being tied to areas, since all data is taken from static weather stations

Main idea

The proposed system involves the creation and using of the following components:

- A complex of sensors for data collection
- A drone with the possibility of direct control
- Automatic data collection system based on given coordinates
- ► GSM communication system
- The system for transferring the collected data to the server

Main idea

- Proposed to develop a system that will allow collecting, processing and storing weather indicators of a limited area of the territory in real time from universal drones.
- The system will rely on data collected from drones and have the possibility of configuration and scalability depending on the needs of the user.



Main idea

- A relational database is using to store the collected data, however, a Realtime Database is using to correctly display the collected data in real time
- Integration with the OpenWeather service allows to compare collected data for areas where it possible
- Other configurations available on the web application



Structural diagram of the designed system





Hardware components



Basic technologies



The main advantages of the designed system

- The main advantage of this system is its low cost compared to analogues.
- Big potential for modernization.
- Support for all IEEE 802.11 security features, flash drive encryption and cryptographic hardware acceleration.
- The ability to set route points and specify the date and time when you need to collect data through the web application without the need to be near the drone.

The main advantages of the designed system

- Modularity the whole system consists of several modules, which can be parts of other modules. Thus, the system can be fast modified
- Scalability the system is designed for several users to be able to accumulate their number without significant costs in speed

The main advantages of the designed system

Universatility - the system is not tied to the model and configuration of the drone. For this operation, it is enough that the latter corresponds to a limited set of parameters that will be transmitted. In addition, the system is able to identify a user who can or cannot provide data from a particular drone.



Possibilities of improving the system

- Connecting the video module.
- Using lidars.
- Using a more powerful GSM module.
- Using Thread technology.
- Expanding the number of simultaneous users.
- Dropping attachment to template data.
- Improvement of administration.
- Deepening the integration with the OpenWeather service

Work stand





Intermediate work result



Vladyslav.shevchuk.ki.2017@lpnu.com Hello: vladyslav.shevchuk.ki.2017@lpnu.com User ID: 9HFBnczwBLSucdEhEu01GvfXtVG3 Email: vladyslav.shevchuk.ki.2017@lpnu.com Navigate to data dashboard

Page with information about the authorized user

Intermediate work result



The web part which hosted by the microcontroller

The web part which hosted by server

STATION

HUMIDITY

62.60254 %

😑 AIR QUALITY

32.947 smth

Choose File N...

PRESSURE

993.53998 hPa

↑ HEIGHT

237.7 m

KHMELNYTSKYI Facts about city

Has the Cheapest Real Estate

Until 1954 Proskuriv, or Proskurov

The first bazaar is by royal privilege

Intermediate work result



Window with data from RTDB

Demo of intermediate work result

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