



BOSCH

Invented for life

Next Generation

Home Automation with XDK

Web Connected Sensors



Introduction and Challenge

An average household could save 10% of annual heating costs if the temperature was reduced by about 5 degrees C for 8 hours a day according to the US Department of Energy. The annual cost is around 1000 dollars per household, even more in Europe. It is therefore no wonder that Google purchased the smart home startup Nest at a valuation of 3.2 billion dollars. It is clear that the market is ready for Internet-connected home automation devices.

Newcomers to this market face a challenge to offer a product that provides competitive features at an attractive price. The XDK from Bosch combines off-the-shelf embedded systems to form a low-cost basis for future home automation solutions with a short time-to-market.

Approach

The Bosch Cross Domain Development Kit (XDK) was introduced by Bosch Connected Devices and Solutions (BCDS) in 2016. Inclusive of multiple microelectromechanical Systems (MEMS) sensors from Bosch Sensortec and Akustica, both fully owned subsidiaries of Robert Bosch GmbH specializing in MEMS sensors and microphone solutions bringing digital awareness to new customer products. It provides an all-in-one platform that can measure any number of conditions within a home. This small device (measuring

60x40x22 mm) includes temperature, pressure, humidity, light and other sensors. It sends data via Bluetooth LE, Wi-Fi or USB to any other device configured to receive it.

The Bosch IoT Cloud (BIC) is an Internet of Things platform developed by Bosch Software Innovations. It is an open platform that allows you to quickly prototype and develop secure IoT applications. The current project explores the ability of the XDK hardware to collect various data and uses BIC to combine, evaluate and display it.



The Role of Bosch Connected Devices and Solutions

Bosch Connected Devices and Solutions (BCDS) is an innovative company that draws on extensive experience in sensors and software solutions. We put together our expertise with partners from different business entities such as Bosch Sensortec and Akustica to provide added value through a combination of innovative proposals with low barriers to market entry.

The XDK from BCDS is an all-in-one scalable hardware platform with ready-to-use software. There is no need to select and assemble components and hardware or deploy a real-time operating system. Drivers are included for all system components.

BCDS also offers the XDK Workbench. This is a development platform that every buyer of the XDK can download free of charge. It includes typical applications and a user community.

The XDK web connected sensors also use the Bosch IoT Cloud to collect and evaluate the data. The BIC was developed by Bosch Software Innovations. It helps IoT developers to accelerate their IoT projects, improve the time-to-market for new IoT solutions, and profit from integrated security mechanisms, lower complexity and costs. Bosch know-how, solutions and cross-divisional collaboration are combined within the project to achieve a truly groundbreaking next-generation home innovation platform.

Use Case

Bosch Automotive Electronics and Bosch Connected Devices and Solutions initiated the project to use the XDK from Bosch to measure various sensor data. This data is then transferred over an IoT gateway to the backend, which is hosted on BIC. The collected data is aggregated and permanently stored on a database for future use. A dashboard shows real-time statistics for the connected sensors. It also charts the changes in readings over time. Sensors can be configured to immediately send notification of any unusual readings to specified e-mail addresses (of residents, building caretakers, etc.).

The data is collected from temperature and humidity sensors, as well as from digital light sensors, pressure sensors, and even from the built-in accelerometer, gyroscope and magnetometer.

The IoT gateway software is installed on a Raspberry Pi. It scans for nearby XDK devices and immediately starts to collect, format, and display the data for users. This data gives users a better overview of processes within the home and allows them to optimize their energy use, to give just one example.

Overall, the web connected sensors project is still in its early stages due to its massive potential. The project participants plan to continue development to improve performance and provide new features to take advantage of the potential applications.



Solutions and Benefits

The sensor package and software backend in this project provide a framework to measure any number of conditions within a home. The monitoring functions measure temperature, humidity and several other factors, and notify users immediately when the readings go outside the desired range.

Department of Energy statistics show that even minor adjustments to home energy use can result in savings of 10% or 100 dollars per year as a conservative estimate. This provides consumers with a value incentive, since they can recoup their investment in the hardware in a relatively short space of time. There is also considerable benefit to the environment, estimated at around 0.527 kilograms of CO2 saved per kilowatt hour or about 350 kilograms using the given data.

The humidity sensor also can help prevent mold damage by measuring its potential for growth. Multiple sensors installed around the home allow residents to detect areas where addition-

al insulation would improve heating bills. Residents can even use the light sensor to detect activity when they are not at home to improve home security.

Conclusion

This pilot project to monitor the home via web connected sensors shows the potential of the XDK as the cornerstone of future home automation products. Residents benefit from the solution in the form of lowered energy costs and increased safety and security. The collected data can be aggregated within the Bosch IoT Cloud for future additional innovations, not to mention improvements in ease of use over time. The open-source basis of the solution enables developers to adapt the project to any scenario at low cost.

We at BCDS, with our experience in IoT, are the right partner for sensor-based IoT projects. We increase comfort, security and productivity by enabling new business models for global markets, improving everyday life.

About Bosch Connected Devices and Solutions

Bosch Connected Devices and Solutions GmbH is based in Reutlingen, Germany and is a 100% owned subsidiary of Robert Bosch GmbH. As an innovative company, it serves the new market for the Internet of Things. We offer compact electronic devices, comprehensive software and end-to-end solutions in many fields of application. Our main businesses are in the areas of Connected Mobility and Industry 4.0 & Logistics! We improve everyday life, increase comfort, security and productivity.

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