

Smart Building Block Toys using Internet of Things Technology

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Abstract

Internet was once used to link ideas, then people and now it is starting to connect all things. IoT constitutes a good paradigm to enable people to design and modify things, and then share their designs and modifications. Through the internet, things nowadays are able to exchange raw data and information, thus enabling the development of a new class of interconnected smart objects. Smart building block toy systems are a newly proposed concept that combines internet technology into educational blocks. It is composed of the IoT environment that has attracted attention recently. In this paper, we design a system using starUML, one of the program development tools in the system design process. Educational content can be shared to learners via the proposed service of the IoT, while also being interesting for young child learners.

Keywords: *IoT, Internet of Things, Smart Building Block, UML*

1. Introduction

Recently, Internet of Things (IoT) technology has increased rapidly. In future, Internet of things will be fueled the constant change to configure smart products, virtual reality and the world of fusion. In this paper, a combination of Internet technology of these things in education block of children such as color changes to stimulate the interest of children. Chinese characters on a block-by-block basis, mathematical symbols, English words, four characters such phrase is displayed configured correctly block. It is proposed to add the ability to run a specific action, to display the correct answer. The IoT is a built-in communication function with a computer chip in a variety of things. It means the technology to connect to the Internet. It is widely used and becomes a variety of embedded systems such as household appliances, mobile phone equipment and wearable computers. Internet of things can be connected to unique ID distinguished itself, it must have a communication capability over the Internet. It must have the ability to process data. In addition, it is possible to built a sensor for data acquisition from the external environment.

According to the research and consulting firm Gartner, it is expected that this number is up to 900 million in

2020. And it is reached 26 billion pieces connection of things. In this way a number of things are connected, becomes so large data is collected over the Internet, thus gathered data will become large enough to be difficult to analyze by the existing technology. Accordingly, a need in the art to develop efficient algorithms for analyzing big data is the advent of the Internet things are together. In addition, according to a survey of Cisco Systems, 10 years from 2013 to 2022, it is expected that the Internet of things is to create economic value of 14 trillion \$ 4,000. The major-related technology to achieve the IOT, there is such as Cyber Physical System, ubiquitous sensor network, machine to machine, web of things, web of object, cloud Funding computing, ubiquitous computing, semantic technology and big data technology. The above techniques are enabling technology that supports processing and things operation of intelligent information of the connected things. It is basically to support a stable connection between the things.

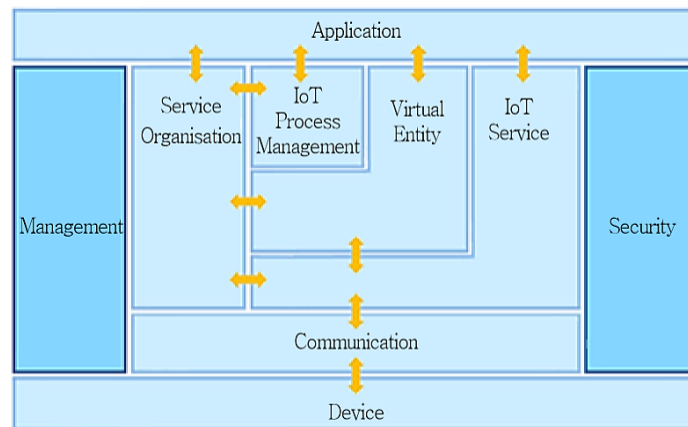


Figure 1. IOT structure in the functional point of view

IoT applications are to connect hardware to communicate within a network, often with constrained resources. Therefore, even simple use cases quickly become very complex. In addition, IoT applications often combine several technologies, and only few programmers have the skill set to cover them all. Model-driven development and model checking provide solutions to these problems. However, these solutions are barely used by programmers. Reasons for this are that model checking requires deep knowledge in formal methods to produce an appropriate input model that can be analysed. In addition, model-driven approaches often fail to cover details in code in a suitable way.

2. Unified Modeling Language

Unified Modeling Language, artifacts when developing object-oriented software intensive systems, visualization, is used when the document. UML is, data modeling (objects - relationship diagram) and Business Modeling (work flow), combines object modeling, the best technology of parts modeling. UML, as well as the software development process, can be used for all other implementations art processes. Also, be integrated into a single common modeling language that can be used object modeling techniques of Booch methodology (OMT) and object-oriented software engineering the (OOSE) extensively. The purpose of UML is a standard language for modeling the simultaneous distribution system. UML is, as a substantial standard of industry, have been improved by the Object Management Group (OMG). In order to create a modeling language of early OMG is severe software, requested the object-oriented methodological notification, many industry pioneer

answered seriously in order to support the standard to make UML. UML model, using the same transformation, such as language QVT the Object Management Group supports, other representations (eg, Java) are automatically converted to. It is possible to extend the UML, provides a mechanism for customizing the profile (UML), stereotypes (UML). Software development methodology UML itself is, but there is no development method, the object-oriented software development methodology was led at the time (for example Booch methodology, modeling of objects, Objectory) it has been designed to look good and. Several other methodologies to obtain a UML advantages as UML development (eg, modeling of the object) has been improved. In addition, new methodology that is based on the UML has or made IBM Rational Unified Process (RUP) is the most famous. In addition to this abstract way (Abstraction Method), there is a lot of UML-based methodology that has been designed to achieve a more specialized solutions and other purposes such as dynamic systems development methodology.

Model, in terms of the most general sense as a concept to be very usefully used in the fields of science and engineering, is assumed to help to understand that it is not known well be referred to as "make the model" is a means of using several things. In some areas, there may be defined as a set of set of expressions (equations) of the model, in other areas, may be a computer simulation model. Various graphic elements of the UML is one of the big picture, that is, used to draw the figure. UML is because a language, it is necessary to match these graphic elements. The purpose of illustration, it is intended to provide a view (View) can see the system from different perspectives, are a set of these views called model (Model). UML model of the system, it can be said to be similar to as scale models architects to build a building. UML model is a language for describing the "desired behavior" of the system itself. UML model is not a "means for explaining how to implement" of the system. Most of the things of the class diagram has a certain action means the only attributes yourself. It is possible to consider such behavior as a set of operations (Operation). UML, the class name consisting of a plurality of words, it is possible to eliminate the space between words, to all the first letter of each word capitalized (eg, Wikipedia). Although the name of the attributes and behavior is the same, the most before the first letter of the word to lowercase.

3. Systems Analysis and Design

As a baby education block toys, numbers and English words can be displayed in the block. English words are assembled on the block. If assembled block is correct, the sound and LED sensors are operated. the meaning of the English word meaning and idioms, it becomes possible to issue a visual effect indicating the correct answer is taught. First, the user can read the letters that appear in the block, assemble the block in the proper order that I think. And to determine the sensor which is built in the block is properly connected to the case of incorrect, give a sound and visual effects that the user induced to reassemble the blocks. In the case of the correct answer, you can show me a variety of colors to young children, you can export the meaning and pronunciation of the case of English words as sound effects, read together the pool Read idioms case of idioms I put out a give me sound effects. To balance the benefits of generating code with that of manual programming, Reactive Blocks uses a combination of Unified Modelling Language (UML) with Java. UML describes the concurrent behavior of building blocks with activity diagrams or state machines. State machines are also used to describe the contract of a block. The UML models only coordinate concurrent behavior, and refer to Java methods for detailed operations on application programming interfaces (APIs) or other data. The Java methods are edited in the Java tools within Eclipse. Existing code can also be integrated, by encapsulating it into operations and building blocks. The code related to concurrency, i.e., code that decides when the operations are called, is generated from UML. This is usually the kind of code that is cumbersome and error-prone to write manually.

4. Conclusions

The combination of the Internet and emerging technologies such as near communications, real-time localization, and embedded sensors lets us transform everyday objects into smart objects that can understand and react to their environment. Such objects are building blocks for the Internet of Things and enable novel computing applications. As a step toward design and architectural principles for smart objects, the authors introduce a hierarchy of architectures with increasing levels of real-world awareness and interactivity. In particular, they describe activity-, policy-, and process-aware smart objects and demonstrate how the respective architectural abstractions support increasingly complex application. Although presented in this paper the IT existing block toy which has been used as a play toy Internet-based smart block to gain, fused technology, educational content. In play through a combination of an array of blocks, learns the operation English, using the IoT technology, it is possible to provide a variety of learning management services to the parent. Smart blocks, by analyzing the children learning data generated through a simple learning and block via a block toy is an analog products in educational platforms of the field big data business first early childhood worldwide and Valuation expansion and business areas in global early childhood education platform is a capable business model.

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