

TOSHIBA REVIEW

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Special Reports

Spread of Universal Design

Toward Comfortable and Enjoyable Functions for Each Individual User

INOUE Masahiro

Toshiba Group's Approach to Universal Design

IDO Kenji / Horiguchi Maho

Within the context of declining birthrates and increasing longevity, there is growing interest in universal design (UD) in society at large, with progress being made in putting related technical standards and statutes in place.

The Toshiba Group is engaged in a diverse range of business activities, and deals with products in a variety of different fields.

In order to facilitate the development of UD products with the same conceptual orientation in each of the Toshiba Group's business fields, a group-wide UD promotion framework was recently put in place. This involves the formulation of principles, guidelines, and other such standards relating to common UD activities across the Toshiba Group. The independent divisions and companies engaged in their various lines of business have developed programs to formulate more detailed UD criteria and take other related actions in compliance with the common group standards.

We are making continuous efforts to enhance the quality of UD and to create products that can be used more conveniently by more customers.

Universal Design Realizing User-Friendly Home Appliances

TAKAMA Toshiaki

The value of home appliances, which are an indispensable part of everyday life, is determined by their user friendliness.

Furthermore, with the progressive aging of society, universal design (UD) for home appliances has become increasingly important.

With these trends as a background, Toshiba is continuing its efforts to realize high-quality UD for home appliances through verification of the usability of every product by the designers themselves in order to focus attention on product development policies. As part of these efforts, we are conducting interviews and other studies with a wide range of users including the elderly and the disabled, using both existing products and proposed prototype models.

Visibility and Legibility in LCD TVs

YAMANE Nobuhiro

The functionality and display resolution of liquid crystal display (LCD) TVs have recently become increasingly sophisticated, with enhanced functions of a data terminal including data broadcasting, electronic program guide (EPG), and other text information in addition to conventional TV functions. Moreover, high visibility and legibility are required with the aging of society and the growing complexity of operation of TV sets.

Toshiba has standardized guidelines for text size, color, and contrast settings to achieve high visibility and legibility of LCD TVs, based on the characteristics of aging people's vision. We have applied these guidelines to a graphical user interface (GUI) in the development of the REGZA™ series LCD TVs, to realize a more easily viewable display for all users.

Color Universal Design for LCD Elevator Indicators

TSUBOI Hideki / ONAI Tomoko / BUNYA Masahiro / MORI Tetsuya

Toshiba has developed a liquid crystal display (LCD) indicator for both call panels in elevator halls and car operating panels of standard elevators in the Japanese market. The LCD indicator makes it possible to offer various types of elevator information, including normal operation displays using animation and two languages as well as control operation displays at the time of an earthquake or other emergency.

Furthermore, we have been focusing on the development of color universal design (color UD) of display screens for people with color weakness. A Toshiba display of this type was certified as a color UD-compliant product by the Color Universal Design Organization (CUDO), an incorporated nonprofit organization, in February 2009. This is the first such certification in the elevator industry.

Universal Design of Multifunctional Peripherals Based on User Survey

HOSHINO Naoki / KOMAMIYA Yuko / WASHIZUKA Keiichi

Interest in and demand for universal design (UD) have been increasing in recent years. In promoting UD, there is an ongoing need for the development of user-friendly digital multifunctional peripherals (MFPs) for people with disabilities as well as those without disabilities, to support the participation of people with disabilities in society.

Toshiba TEC Corporation has conducted a survey of MFP users including those with disabilities, asking who uses the MFP, how it is used, and what types of problems are encountered. To overcome the problems identified in the survey, we studied possible solutions and confirmed their viability by means of verification experiments. As a result of these efforts, we developed a series of MFPs, the e-STUDIO 5520C/6520C/6530C models, applying high-quality UD.

Universal Design for Comfort and Usability in Mammography Equipment

IDO Kenji / BABA Noriaki / MIYAGI Rina

With lower rates of breast cancer screening in Japan in comparison with Europe and North America, rising breast cancer morbidity as well as increasing mortality have recently been recognized as a social problem in Japan. X-ray mammography screening is the most effective examination for early detection of breast cancer. However, it is sometimes associated with pain.

As a manufacturer of mammography equipment, Toshiba has been implementing a project to increase the prevalence of such examinations by creating equipment that enables more women to receive screening with a greater sense of comfort and security. Based on the conceptual approach of universal design, the members of the project team, consisting of people with a wide range of perspectives, have conducted repeated studies, surveys, prototype fabrication, and verification. As a result, an optimal mammography design has been achieved that incorporates measures to reduce pain experienced by patients during screening and improve usability for operators.

Universal Design for Monitoring and Control Systems

NISHIZAWA Yosoko / SUGINO Toshiharu

The concept of universal design (UD) is applied to home appliances, audiovisual equipment, and similar products with the aim of enabling large numbers of people to easily use such products. However, UD has not been considered to be so relevant to social infrastructure systems such as monitoring and control systems. As a result, the aspects of such systems to which UD is applicable have been limited to usability by people with color weakness and so on.

Toshiba is making efforts to expand the application of UD to monitoring and control systems. Applying the concept of UD makes it possible to meet requirements for diversification, with the age range of users becoming wider in the aging society and users in various positions possessing different skills handling multidimensional information.

Approach to Development of Workplace Support Equipment for Hearing-Impaired Individuals

HIROOKA Nao / HATAKEYAMA Hatsumi / KATO Nobuko

Utilization of people with disabilities has become an important issue for companies, which are required to have diverse human resources. Almost half of the employees with disabilities in Toshiba are hearing-impaired. With the aim of developing communication support equipment for hearing-impaired employees to improve their working conditions, we implemented research on communication support equipment in FY2008 in cooperation with Tsukuba University of Technology.

We conducted a questionnaire survey in conjunction with interviews asking hearing-impaired employees about their circumstances and requirements with regard to support equipment. The responses showed that speech-to-text conversion (speech recognition) was the area of greatest need, particularly high-level speech recognition equipment in the working environment. In addition to the development of support equipment, consideration of the communication and information-sharing requirements associated with hearing impairments is also relevant to universal design for communication.

Feature Articles

SrGe_x Interlayer in High-k/Ge MISFET for Future Nanoelectronics

KAMATA Yoshiki / TEZUKA Tsutomu

Transistors on silicon (Si) substrates have been continuously miniaturized to achieve superior electrical characteristics for large-scale integrations (LSIs). In recent years, however, the increasing energy consumption of LSIs has become the most important technological issue. Germanium (Ge) channel transistors are highly promising for the realization of next-generation nanoscale LSIs from 2016 onward, because the low resistance of the Ge channel makes it possible to further reduce the power supply voltage, leading to lower energy consumption.

Toshiba has demonstrated a new approach in which an equivalent oxide thickness (EOT) scalable gate stack is formed with a strontium germanide (SrGe_x) interlayer, achieving both low gate leakage current and high carrier mobility.

T003 CDMA2000 1xEV-DO Cellular Phone

NAGAO Atsushi / MURAYAMA Takuya

In recent years, cellular phones have been equipped with functions such as one-segment TV broadcast reception and digital camera. At the same time, practical and convenient features in such areas as external appearance and waterproof design are also required by users.

In response to these requirements, Toshiba has released the T003 CDMA2000 1xEV-DO (code division multiple access 2000 1x evolution data only) cellular phone. The T003 features a waterproof design in a slim chassis of only 11.6 mm in thickness in addition to all essential functions. Moreover, three-dimensional keys with a textured surface are used for easy pushing and a four-layer coating is applied on the stainless steel material of the case to provide a high-grade appearance.

vRAS™ Personal Computer Virtualization Engine and SV-PC™ Application Software

NAKAJIMA Hiroshi / KAMURA Koichiro

In recent years, virtualization technologies that can simultaneously run multiple operating systems (OSs) in a computer have been employed in server products. Hardware-assisted virtualization technologies are also being embedded in many notebook PCs, giving them the capability to run multiple OSs.

To enhance manageability and security in PCs, Toshiba has developed the vRAS PC virtualization engine that can run client and server OSs simultaneously, as well as the SV-PC application software that provides new solutions enabling PC managers to maintain PCs efficiently and prevent the leakage or loss of important data from PCs using vRAS.

60 Hz Large-Capacity Indirectly Hydrogen-Cooled Turbine-Driven Generator

TOMIKI Hiroaki / UEDA Takashi / NAGAKURA Ken

Water-cooled generators are widely used for large-capacity turbine-driven generators of thermal power plants. However, a simpler stator cooling system, such as an indirectly hydrogen-cooled generator for turbine-driven generators with an intermediate capacity of up to the 400 MVA class, is required to realize easy operation and maintenance.

With the aim of expanding the capacity of turbine-driven generators, Toshiba has been developing a large-capacity indirectly hydrogen-cooled turbine-driven generator as a solution to this issue. As a result of these efforts, we have manufactured and successfully tested a 670 MVA indirectly hydrogen-cooled turbine-driven generator and installed it at Maizuru Power Station Unit No. 2 of The Kansai Electric Power Co., Inc. The generator has achieved a high efficiency of 99.1% in a shop test, thus demonstrating the higher efficiency desired for turbine generators to reduce the load on the global environment.

PE6 Series Compact, Long-Life Turbine Supervisory Instrument Monitor

KOSAKA Hidenori / YAMAGUCHI Kenji

Turbine supervisory instrument (TSI) systems monitor the operating status, including rotation speed and vibration, of turbine power generators in power, chemical, and paper manufacturing plants. Signals from various detectors installed in the turbine are amplified or converted in the TSI monitors and sent to each control unit. There is an ongoing need for TSI systems that provide higher quality and higher reliability as well as improved cost performance.

To meet these requirements, Toshiba has developed the PE6 series TSI system. The PE6 series achieves one-quarter the volume by narrowing down the functions to the minimum necessary level while offering 2.5 times the product lifetime compared with the previous PE5 series.

UIM Realizing Highly-Secure Mobile Contactless Services

ISHIBASHI Takanobu / KURIYAMA Ryouichi

The user identity module (UIM), containing personalized user data for network connection, is a compact integrated circuit (IC) card that is widely used for third-generation (3G) cellular phones in the global market. The T=0 protocol is currently used as the data transmission protocol between UIMs and cellular phones.

Toshiba has developed a new UIM for near-field wireless communication that supports the Single Wire Protocol (SWP) and Host Controller Interface (HCI) standardized by the European Telecommunications Standards Institute (ETSI), as well as the conventional T=0 protocol. Furthermore, we have developed a high-security function for the new UIM, which is applicable to mobile contactless payment using cellular phones.

Interactive Document Classification System to Accelerate Information and Knowledge Utilization

GOTO Kazuyuki / TAIRA Hiroshi / MIYABE Yasunari

Document classification technologies are expected to provide a solution to the need for effective use of large amounts of corporate information and knowledge. However, one-way automatic classification methods have been insufficient to generate classification structures suitable for the various purposes and viewpoints of users.

Toshiba Solutions Corporation has developed an interactive document classification system. This system supports the construction of classification structures by automatically generating categories based on various viewpoints and methods, and arranging them in an interactive manner. The classification results can be continuously refined to handle increasing volumes of documents, and flexibly applied to activities such as the sorting of customer claims and analysis of patent information.

Information Retrieval and Navigation System Suitable for Digital Appliances Based on Emergence

TAKEYASU Isao / FUJINO Go / KOYAMA Noriaki

With the wide dissemination of digital appliances such as TV sets and cellular phones that can handle various digital contents including movies and news distributed via the Internet, there is an increasing need for the enhancement of retrieval functions for contents that users want to see.

In response to this problem, Toshiba has developed an optimal information retrieval and navigation system for digital appliances based on the concept of emergence, which is commonly used in the contexts of ethology and complex system theory. This system allows users to easily access not only contents of interest but also contents that might expand their interests, simply by clicking on automatically provided keywords.

Frontiers of Research & Development

Representative Sentence Generation Technology for Instantly Understanding Content of Large Amount of Documents