SIES Graduate School of Technology
RISE WITH EDUCATION

TECHNIZ
2017-18

DEPARTMENT OF COMPUTER ENGINEERING

VISION

- To be a centre of Excellence in Computer Engineering to fulfill the rapidly growing needs of the Society.

MISSION

- To Impart quality education to meet the professional challenges in the area of Computer Engineering.
- To create an environment for research, innovation, professional and social development.
- To nurture lifelong learning skills for achieving professional growth.
- To strengthen the alumni and industrial interaction for overall development of students.

PEO

- Practice Computer engineering in core and multi-disciplinary domains.
- Exhibit leadership skills for professional growth.
- Pursue higher Studies for career advancement

PSO

- To apply computational and logical skills to solve computer engineering problems.
- To develop interdisciplinary skills and acquaint with cutting edge technologies in software industries

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High Definition Multimedia Interface (HDMI)

Prof. Kranti Shailesh Bade

Today, many of us are in the process of removing their CRT TVs and shopping for the new hype in the TV market –High Definition TVs. And if you happen to be one of them, you surely would have come across the term HDMI. Not only TV, HDMI port is available on home theatres, play stations, HD-DVDs and many others.The difference between a HDTVs and old TVs (Standard Definition TVs) lies in the technology. Older TVs were analog, whereas HDTVs are digital.

Older TVs used interlacing, aspect ratio of 4:3 and picture resolution of about 704 X 480 pixels. HDTVs use progressive scanning, aspect ratio of 16:9, picture resolutions up to 1920 X 1080 pixels. In other words, HDTVs use higher refresh rates, wider displays as well as enhanced picture resolution. What this implies is that HDTVs require higher amount of data to be processed and also at a faster rate compared to standard TVs. To handle larger amount of data at faster rates, a standard called HDMI – High Definition Multimedia Interface was evolved. The standard is basically a set of guidelines used for providing high bandwidth connection between the devices (digital in nature).

HDMI technology dramatically simplifies cabling and provides customers with the highest-quality HD experience. HDMI delivers all contents- digital audio, video as well as control signals via a single cable. HDMI has support for standard, enhanced or high definition video as well as multichannel video on a single cable. It transmits all HDTV standards and supports 8-channel, uncompressed digital audio and all presently-available compressed formats. In addition, it has spare bandwidth to accommodate future upgrades.

GESTURE

Prof.Varsha Patil

Gesture? As per Oxford Concise Dictionary 1995, gesture is defined as “a movement of a limb or the body as an expression of thought or feeling”. Similarly, Random House de?ned “gesture” as “the movement of the body, head, arms, hands or face that expresses an idea,opinion, emotion, etc.”

Kurtenbach and Hulteen defined it as “A gesture is a motion of the body that contains information. Waving goodbye is a gesture. Pressing a key on a keyboard is not a gesture because the motion of a finger on its way to hitting a key is neither observed nor significant. All that matters is which key was pressed”. Human gestures are undoubtedly natural. They may often prove more efficient and powerful as compared to various other modes of interaction. Tracking a head/hand or a body position or configuration may be quite valuable for controlling objects /systems or for feeding input parameters to the system. Gestures may also be used for expressing yourself. As an example, nodding may serve to communicate your consent or agreement, raising a finger may be a sign of your wish to interrupt, saying “huh” may indicate “I’m with you, continue”. Gestures and gesture recognition are terms increasingly encountered in discussions of human-computer interaction.Often, people use the term for character recognition, the recognition of proofreaders symbols, shorthand, and various other forms of interaction.In factevery physical action involves a gesture of some sort in order to be articulated.Gestures are communicative, meaningful body motions –i.e., physical movements of the fingers, hands, arms,head, face, or body with the objective to convey information or interact with the environment.

Cadoz described three functional roles of human gesture:

• Semiotic – to communicate meaningful information.
• Ergotic – to manipulate the environment.
• Epistemic – to discover the environment through tactile experience.

Gestures are used to convey information in variety of ways. An emotion of sadness can be conveyed through facial expression, a lowered head position, drooped shoulders, and lethargic movement. Similarly, a gesture to indicate “Stop!” can be communicated with the help of a raised hand with the palm facing forward, or an exaggerated waving of both hands above the head. Since there exists a many-to-one mapping from concept to gesture, gestures may often be ambiguous; at the same time, there also exists many-to-one mapping from gesture to concept and hence gestures are not completely specified. As speech and handwriting vary from one individual to another, gestures are also subjective. They vary among individuals and they vary from instance to instance for a particular individual Though gestural communication is rich, it is equally complex.

Researchers have differentiated them in different ways.Kendon described a “gesture continuum,” defining five different kinds of gestures:

- Gesticulation: Spontaneous movements of the hands and arms that are accompanied by speech.
- Language-like gestures: Gesticulation integrated into a speech, replacing a particular spoken word or phrase.
- Pantomimes: Gestures that depict objects or actions, with or without accompanying speech.
- Emblems: Gestures like “V for victory”, “thumbs up” and assorted rude gestures
- Sign languages: Well defined Linguistic systems such as American Sign Language. Explained below are alphabets “A”, “C” and “F”.

Spontaneous gestures (gesticulation in Kendon’s Continuum) make up some 90% of human gestures. People make use of gestures even while talking on telephone, blind people commonly gestures while talking. Across cultures, speech-associated gesture is natural and common. Despite this, emblematic gestures and sign languages, although perhaps less spontaneous and natural, carry more clear semantic meaning and may be more appropriate for the kinds of command-and-control interaction.

ROHS & WEEE

Restriction of Hazardous Substances & Waste from Electrical and Electronic Equipment.

Prof.Namrata Patel

RoHS is an abbreviation of Restriction of Hazardous Substances. Often incorrectly referred by the term “Leadfree”, RoHS directive is a European Union Directive 2002/95/EC. The primary objective of this directive is to put a constraint on the use of hazardous substances in electric and/or electronic equipments so as to promote better, environment friendly methods for recovery and dumping of wastes from electrical and electronic equipments. This directive puts a restriction on the utilization of 6 hazardous substances used in electrical and electronic products. RoHS directive mandates RoHS compliance of all electrical and electronic products which are meant to be sold in the EU market later than July 1, 2006, i.e., they must not contain six hazardous substances beyond the limits detailed by the directive. RoHS directive is not applicable for the spare parts for the repair or reuse of electrical and electronic equipments sold in the markets prior to 1 st Jul 2006. RoHS directive is applicable in all countries of European Union.

Impetus behind RoHS is the another European Directive, WEEE. WEEE is an abbreviation for Waste from Electrical and Electronic Equipment. WEEE is governed by European union Directive 2002/96/EC which makes the treatment , recovery and recycling of EEE necessary. The prime purpose of this directive is to prevent the waste from electrical and electronic equipments and also to reduce the disposal of such wastes by re-use, recycling and other forms of recovery of electrical and electronic wastes. This directive mandates producers to assume responsibility for the recovery and recycling of their EEE products. WEEE has been enforced according to the article 175. Each country must develop a mechanism to collect the wastes from electrical and electronic equipments as defined by the WEEE directive. All electrical and electronic products launched in the EU market later than August 13, 2006 must pass WEEE compliance and must carry the “Wheelie Bin” sticker. However, WEEE does not apply to those electrical and electronic equipments which are part of the equipments that do not fall within the scope of the directive. RoHS and WEEE are inter-related because both the directives apply to the same type of equipments – electrical and electronics. RoHS directive restricts the use of certain hazardous substances upfront, right from the design stage while WEEE focuses on the collection, treatment, recovery and recycling of the wastes from electrical and electronic equipments.

Zettabyte File System

Prof. Anindita A. Khade

ZFS (Zettabyte File System) is a file system designed by Sun Microsystems for the Solaris Operating System. ZFS is a 128-bit file system, so it can address 18 billion billion times more data than the 64-bit systems ZFS is implemented as open-source filesystem, licensed under the Common Development and Distribution License (CDDL). The features of ZFS include support for high storage capacities, integration of the concepts of file system and volume management, snapshots and copy-on-write clones, continuous integrity checking and automatic repair, RAID-Z etc. Additionally, Solaris ZFS implements intelligent prefetch, performing read ahead for sequential data streaming, and can adapt its read behavior on the fly for more complex access patterns. To eliminate bottlenecks and increase the speed of both reads and writes, ZFS stripes data across all available storage devices, balancing I/O and maximizing throughput. And, as disks are added to the storage pool, Solaris ZFS immediately begins to allocate blocks from those devices, increasing effective bandwidth as each device is added. This means system administrators no longer need to monitor storage devices to see if they are causing I/O bottlenecks.

Introduction of Zettabyte File System

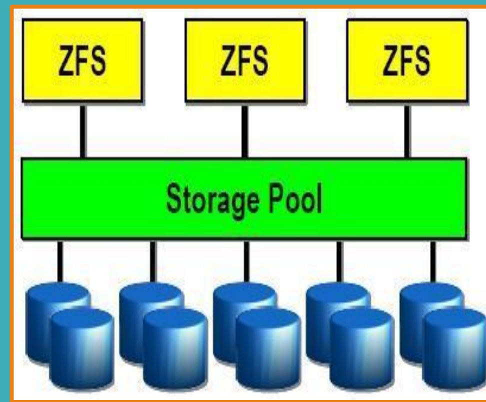
Anyone who has ever lost important files, run out of space on a partition, spent weekends adding new storage to servers, tried to grow or shrink a file system, or experienced data corruption knows that there is room for improvement in file systems and volume managers. Solaris ZFS is designed from the ground up to meet the emerging needs of a general purpose local file system that spans the desktop to the data center. Solaris ZFS offers a dramatic advance in data management with an innovative approach to data integrity, near zero administration, and a welcome integration of file system and volume management capabilities.

The centerpiece of this new architecture is the concept of a virtual storage pool which decouples the file system from physical storage in the same way that virtual memory abstracts the address space from physical memory, allowing for much more efficient use of storage devices. In Solaris ZFS, space is shared dynamically between multiple file systems from a single storage pool, and is parceled out of the pool as file systems request it. Physical storage can be added to or removed from storage pools dynamically, without interrupting services, providing new levels of flexibility, availability, and performance. And in terms of scalability, Solaris ZFS is a 128-bit file system. Its theoretical limits are truly mind-boggling — 2128 bytes of storage, and 264 for everything else such as file systems, snapshots, directory entries, devices, and more. And ZFS implements an improvement on RAID-5, RAID-Z, which uses parity, striping, and atomic operations to ensure reconstruction of corrupted data. It is ideally suited for managing industry standard storage servers like the Sun Fire 4500.

ZFS is more than just a file system. In addition to the traditional role of data storage, ZFS also includes advanced volume management that provides pooled storage through a collection of one or more devices. These pooled storage areas may be used for ZFS file systems or exported through a ZFS Emulated Volume (ZVOL) device to support traditional file systems such as UFS. ZFS uses the pooled storage concept which completely eliminates the antique notion of volumes. According to SUN, this feature does for storage what the VM did for the memory subsystem. In ZFS everything is transactional, i.e., this keeps the data always consistent on disk, removes almost all constraints on I/O order, and allows for huge performance gains.

Storage Pools

Unlike traditional file systems, which reside on single devices and thus require a volume manager to use more than one device, ZFS file systems are built on top of virtual storage pools called zpools. A zpool is constructed of virtual devices (vdevs), which are themselves constructed of block devices: files, hard drive partitions, or entire drives, with the last being the recommended usage. Block devices within a vdev may be configured in different ways, depending on needs and space available: non-redundantly (similar to RAID 0), as a mirror (RAID 1) of two or more devices, as a RAID-Z group of three or more devices, or as a RAID-Z2 group of four or more devices. Besides standard storage, devices can be designated as volatile read cache (ARC), nonvolatile write cache, or as a spare disk for use only in the case of a failure. Finally, when mirroring, block devices can be grouped according to physical chassis, so that the file system can continue in the face of the failure of an entire chassis.



Storage pool composition is not limited to similar devices but can consist of ad-hoc, heterogeneous collections of devices, which ZFS seamlessly pools together, subsequently doling out space to diverse file systems as needed. Arbitrary storage device types can be added to existing pools to expand their size at any time. If high-speed solid-state drives (SSDs) are included in a pool, ZFS will transparently utilize the SSDs as cache within the pool, directing frequently used data to the fast SSDs and less-frequently used data to slower, less expensive mechanical disks. The storage capacity of all vdevs is available to all of the file system instances in the zpool. A quota can be set to limit the amount of space a file system instance can occupy, and a reservation can be set to guarantee that space will be available to a file system instance.

This arrangement of pool will eliminate bottlenecks and increase the speed of reads and writes, Solaris ZFS stripes data across all available storage devices, balancing I/O and maximizing throughput. And, as disks are added to the storage pool, Solaris ZFS immediately begins to allocate blocks from those devices, increasing effective bandwidth as each device is added. This means system administrators no longer need to monitor storage devices to see if they are causing I/O bottlenecks.

An advantage of copy-on-write is that when ZFS writes new data, the blocks containing the old data can be retained, allowing a snapshot version of the file system to be maintained. ZFS snapshots are created very quickly, since all the data composing the snapshot is already stored; they are also space efficient, since any unchanged data is shared among the file system and its snapshots.

Writeable snapshots ("clones") can also be created, resulting in two independent file systems that share a set of blocks. As changes are made to any of the clone file systems, new data blocks are created to reflect those changes, but any unchanged blocks continue to be shared, no matter how many clones exist.

-Assistant Professor, CE DEPT

STUDENT ARTICLE

Smart India Hackathon 2018

Our Hon'ble Prime Minister, Shri Narendra Modi, envisages a Digital India to bridge the digital divide in our country and further promote digital literacy in order to make development a comprehensive mass movement and put governance within everyone's reach in India. In order to work towards our PM's vision, Smart India Hackathon was initiated in 2017. To reiterate the efforts towards our PM's vision, MHRD, AICTE, i4C and Persistent Systems has reconducted the 2nd edition of this initiative - Smart India Hackathon 2018.

SIES GST participated for the first time in Smart India Hackathon. Team Code6 was the only team selected for the Grand Finale for Software Edition from SIES GST held at one of the 28 nodal centers, NDIM New Delhi. Our students Vrushali Alugade, Arpita Rane, Rakshita Bakalkar, Akanksha Pradhan, Rutuja Patil and Tanaya Badve were accompanied by Prof.

Varsha Patil as faculty mentor and Mr. Abhilash Agarwal as Industrial mentor to New Delhi. The registration process was completed by 29th March. The hackathon was inaugurated by Hon'ble minister of HRD Ministry, Shri Prakash Javadekar and it commenced on 30th March at 8:00 am and continued for the next 36 hours.

In the 36 hour period there were 3 rounds of mentoring and evaluation . The judging was conducted on the basis of technical and business aspects. After which top 8 teams out of 28 teams were selected for the power judging round. Code6 was fortunate to be one among the top 8 teams to present their product before the panel of 14 judges.

The Nodal Centre NDIM had invited HR Recruits who gave their Industrial point of view by visiting the teams at their cubicles and boosting their confidence. Students from all over India participated in this event and attained industrial level exposure. Students were working with innovative ideas to address the problems faced by different Ministries. As said by our students, the interaction with various dignitaries enlightened their knowledge and gave them an industrial perspective as well. Overall it was a great experience for the students as well as the mentors.

-- Team SIH

STUDENT ACHIEVEMENTS

Sr. No	Name of the Student	Class	Name of Activity	Place	Level (National/ International/ Zonal/District)	Award
1	Vrushali Tanaya Rutuja P Rakshita Akansha Arpita R	TE CE	Smart India Hackathon(Software)	NDIM New Delhi	National	8th Position
2	Kamleshwar Ragava Vipul Singh Aarati B Bharat K	TE CE	Smart India Hackathon (Hardware)	BITS Pillani, Rajasthan	National	Participated
3	Vipul Singh Vedadnya Jadhav	TE CE	Zee 24Taas Young Innovator Awards 2017-18	SIES GST	Zonal	Participated
4	Subhed Chavan Saahil Shetty	SE CE	Rajasthan Hackathon	Rajasthan Digifest Jaipur	National	Participated

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At the end, we would like to extend our sincere gratitude to our management for their constant support. Also, we would like to thank our Principal for the constant encouragement. We would also like to thank our HOD Dr. Rizwana Shaikh for her support and motivations to make this magazine a successful one. Also would like to thank our Faculty Incharge, Prof. Kranti Bade for shaping Techniz. Lastly we would like to thank all the faculty members, students, alumni and all stakeholders for their valuable inputs.

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