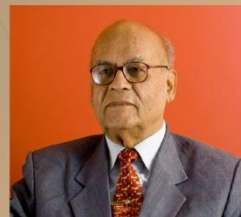


Electrikus...

Issue 3

SEPTEMBER 2014

As the chiefs say



From an initiative 3 years back to a tradition now, The e-newsletter has explored all limits of knowledge. I extend my heartfelt greetings to all participants, authors, faculty staff and students associated in this endeavor.

Er. DC Jain
Chairman
(Gyan Ganga Group)



It is a matter of great happiness to me to know that the students have continued the e-newsletter for such a long time with great efficiency. Each edition comes out better than the previous and I have similar hopes from this one.

Mr. Rajneet Jain
Secretary
(Gyan Ganga Group)



I am very pleased to know that our college team is coming out with another issue of the e-newsletter. I heartily congratulate the editorial team. We expect to put a lot of technical knowledge to the readers from this e-newsletter.

Mr. Pankaj Goyal
Executive Director
(Gyan Ganga Group)



This effort of the students will be surely appreciated by one and all. Along with academics, the different activities in college are the keys that will unlock the hidden talents and thoughts in students.

Mr. Apurva Singhai
Executive Director
(Gyan Ganga Group)



It is joyous to know that the students are continuing the legacy of the e-newsletter as it shall help in spreading the activities being conducted by the institute to the public. I wish the team good luck.

Dr. Maneesh Choubey
Group Director
(Gyan Ganga Group)



It gives me immense pleasure to know that another edition of Electrikus is coming out. I wish all the success to the team of the EC branch involved and hope that this edition will also benefit the students in a great manner.

Dr. RK Ranjan
Principal
GGITS, Jabalpur



I am confident that this e-newsletter will provide relevant data about technology and latest happenings around the globe to all the budding engineers of our college. My best wishes to the team for future prospects.

Prof. P.K. Jain
Head (Examination Cell)
GGITS, Jabalpur



This new edition of Electrikus has loads of exciting updates. Technology and time never stop and the updates here keep account of the latest developments. My warm wishes to the Gyan Ganga Group for the publication of this e-newsletter.

Prof. Vinod Kapse
Head (EC Department)
GGITS, Jabalpur



With already the so many incredible issues previously, I congratulate the editors on handling the pressure well and coming out with yet another brilliant edition of Electrikus. We truly are "Committed for Excellence".

Prof. Pankaj Sahu
Faculty Co-ordinator

From the editors



Mitul Chakraborty - 5th semester

Contributing to the department newsletter Electrikus has always been special.



Abhishree Chowdhary - 3rd Semester

The experience of publishing the newsletter has been enriching to the core. Hope you all like it.

IN THIS EDITION:

SKINPUT: SKIN INTRODUCING THE FUTURE

The Department

Vision

To be centre of excellence in teaching-learning and employability in various fields of Electronics and Communication Engineering to produce globally competent, innovative and socially responsible citizen.

Mission

1. To offer high quality graduate and post graduate programs in Electronics and Communication with strong fundamental knowledge and to prepare students for professional career or higher studies
2. To discover and disseminate knowledge through learning, teaching, sharing, training, research, engagement and creative expression.
3. To foster spirit of innovation and creativity among students, faculty and staff, promote environment of growth, participation in conferences, technical and community services and lifelong learning for all.

Skinput: Skintroducing the Future

Skinput, a technology that appropriates the human body for acoustic transmission, allowing the skin to be used as an input surface. In particular, we resolve the location of finger taps on the arm and hand by analyzing mechanical vibrations that propagate through the body. We collect these signals using a novel array of sensors worn as an armband. This approach provides an always available, naturally portable, and on-body finger input system. Finding the keypad on your cellphone or music player a bit cramped? Maybe your forearm could be more accommodating. It could become part of a skin-based interface that effectively turns your body into a touchscreen. This system is a marriage of two technologies: the ability to detect the ultralow-frequency sound produced by tapping the skin with a finger, and the microchip-sized ["pico" projectors](#) now found in some cellphones.

The system beams a keyboard or menu onto the user's forearm and hand from a projector housed in an armband. An acoustic detector, also in the armband, then calculates which part of the display you want to activate. They have identified various locations on the forearm and hand that produce characteristic acoustic patterns when tapped. The acoustic detector in the armband contains five piezoelectric cantilevers, each weighted to respond to certain bands of sound frequencies. Different combinations of the sensors are activated to differing degrees depending on where the arm is tapped.

How is this a harbinger of a fundamental change, and what makes its appeal more than...skin deep? One powerful contribution of the graphical interface is input on output: direct manipulation. In the coming years, pervasive direct manipulation—where Skinput is an early foray—will likely mature and become a major force. Every surface is a potential site for both projection and input, breaking the picture frame of the desktop interface. Phenomenologically, the change induced by ubiquitous projection is that the computer disappears by seamlessly weaving computing into the physical world. Skinput showcases three key tools for building disappearing computers: rich sensing, machine learning, and flexible projection. Systems like Skinput that flexibly sense body pose, movements, and gestures illustrate how interaction design benefits from innovating both software *and* hardware.

Does Skinput spell doom for touchscreens? Maybe not. The discourse around interactive systems often frames technical evolution in terms of "generations" of interfaces. That there were punch cards. Then the terminal. Then the mouse

and graphical interface. Each supplanting the previous one. On this view, the logical question to ask is: "What's next?" With input, this is often phrased as: "What will replace the keyboard and mouse?" Of course, different paradigms are good for different tasks. While new tools reshape the landscape and supplant some old tools, people benefit from a diverse interface ecosystem. Today, one's computing likely spans direct manipulation, gestures, keyboard commands, and search. The screwdriver does not obviate the value of a hammer. In some cases, ubiquitous projection and sensing will enable fluid interactive experiences. In other cases, like text messaging, technologies can become powerful and pervasive even though the *interface itself* is quite primitive.

Limitations:

With the forearm as the input surface, Skinput is very literally embodied interaction. Embodied interactions can offer incredible power by leveraging the amazing implicit intelligence of the human perceptuo-motor system. At the same time, bodies have clear physical limitations; you get tired holding your arm still. Unless the goal is to get into better shape, such mundane factors impose real constraints on what interfaces you're likely to actually adopt.

Tapping on skin yields both transverse waves (ripples) and longitudinal waves (bone vibration). These subtle waves generally elude people's notice, but high-frequency sensors can track them reliably. (So can high-speed cameras—another reason to watch the video.) The authors use piezoelectric sensors to measure the deformation. Today, such sensors are commonly used as guitar pick-ups. Increasingly diverse—and cheap—sensing technologies make this a really exciting time for inventing new interactive systems.

Research probes like Skinput currently require building bespoke systems. The next step is to flesh out the design space of alternatives, understand their trade-offs, and build theories. This exploration will require tools (and curricula) for rapidly and flexibly creating interfaces with rich sensing and machine learning. The DIY and research communities have made great strides here, and much exciting work remains.