YASHODA SHIKSHAN PRASARAK MANDAL, SATARA

YASHODA TECHNICAL CAMPUS

DEPARTMENT OF E &TC ENGINEERING

DEC 2021

....TECHNICAL MAGAZINE

Department of Electronics & Telecommunication Engineering Technical Magazine (YASHOTECH-ELECTRONICS) 2021-22 [ODD SEM]

**TODAY'S READER
CAN BE A TOMORROW'S
LEADER !**

PRESIDENT'S DESK

I welcome you to YSPM's Yashoda Technical Campus, Satara, an Institution which inculcates true values while disseminating quality education for shaping the career of our students. All our institutes are approved by the concerned statutory bodies and fulfill all the norms and standards laid down by them. Our technical campus is located in a lush, green, pollution free, picturesque environment. Our institutes have well qualified, experienced and student caring faculty, well equipped laboratories, spacious lecture halls and tutorial rooms, well maintained rich library, e-library, Wi-Fi Campus, Computer with Internet Facility, and a play ground with sports facilities. We emphasize on overall personality development of our students. Our faculty pays attention to each students a platform to excel not only in academics but also in co-curricular and a multi disciplinary study culture. Amenities provided by our institutes include transport facility, hostel facility, reprographics facility, canteen, STD PCO, medical centre, sports centre etc.

We are committed to import value based quality education along with development of positive attitude, skills and abilities to apply knowledge in order to meet the challenges of future. I extend my best wishes for your bright and prosperous future.

Prof. Dasharath Sagare
Founder President
YSPM - YSS, Satara

WORDS FROM THE PRINCIPAL

It gives me immense pleasure and delight to know that the Dept of E&TC, YTC have mooted up a time needed, need based and innovative move, t bring out a domain specific annual magazine, in the name and style of Technical Magazine (YASHOTECH-ELECTRONICS) while involving all the faculty, staffs, students and the Electronics Engineering fraternity.

The objectives, as spelled out by the Editorial board of the newly emerging magazines are quite sublime, ennobling as well as triggering of and enlightening about the basic concepts and philosophy of knowledge Engineering among all the knowledge seekers on all the latest vital, pivotal and critical aspects of the profession in the field of E&TC and its technology.

Being the Head of the Institution, I congratulate the head of the Dept., the faculty, staffs and students of the Dept for their keen and vigorous effort in widening the knowledge base.

Department of Electronics and Telecommunication Engineering

Vision of the Department

To be an excellent technological hub in the field of Electronics and Telecommunication Engineering ensuring state of the art knowledge transfer through teaching and research activities to meet educational, societal, ethical need of the nation.

Mission of the Department

- To provide cutting edge platform to explore innovative, creative and entrepreneurial leadership qualities among the students.
- To be hungry for academic excellence through innovative procedure.
- To inculcate leadership quality and ethical values.
- To accept/ face technological challenges through the continuous efforts in collaboration with industry.

Department of Electronics and Telecommunication Engineering

PEOs

Graduates will able to–

·To equip graduates with a strong foundation in engineering sciences and Electronics & Telecommunication Engineering fundamentals to become effective collaborators, researchers and real-time problem solver with technical competencies.

·Perceive the limitation and impact of engineering solutions in social, legal, environmental, economic and multidisciplinary contexts.

·Excel in Industry/technical profession, higher studies, and entrepreneurship exhibiting global competitiveness.

PSOs

·Apply basic knowledge related to Electronic Circuits, Embedded & wireless communication Systems and Signal Processing to solve engineering/ societal problems in the field of Electronics and Telecommunication Engineering.

·Recognize and adapt to technical developments and to engage in lifelong learning and develop consciousness for professional, social, legal and ethical responsibilities.

·Excellent adaptability to the changing industrial and real world requirement.

Department of Electronics and Telecommunication Engineering

POs

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Engineering knowledge)
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Problem Analysis)
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. (Design and Development of Solutions)

4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Conduct Investigations of Complex Problems)
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. (Modern Tool Usage)
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. (The Engineer and Society)

Department of Electronics and Telecommunication Engineering

POs

7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. (Environment and Sustainability)
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. (Ethics)
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. (Individual and Team Work)

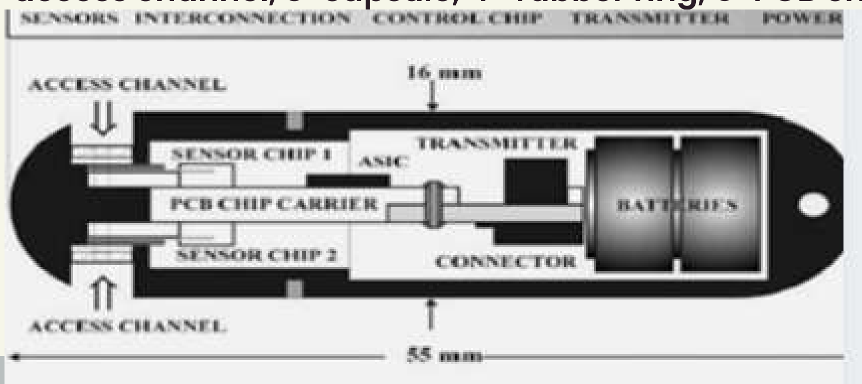
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. (Communication)
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. (Project Management and Finance)
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. (Life-long learning)

MICROELECTRONIC PILL

The invention of transistor enabled the first use of radiometry capsules, which used simple circuits for the internal study of the gastro-intestinal (GI) [1] tract. They couldn't be used as they could transmit only from a single channel and also due to the size of the components. They also suffered from poor reliability, low sensitivity and short lifetimes of the devices. This led to the application of single-channel telemetry capsules for the detection of disease and abnormalities in the GI tract where restricted area prevented the use of traditional endoscopy.They were later modified as they had the disadvantage of using laboratory type sensors such as the glass pH electrodes, resistance thermometers, etc. They were also of very large size. The later modification is similar to the above instrument but is smaller in size due to the application of existing semiconductor fabrication technologies. These technologies led to the formation of "MICROELECTRONIC PILL".Microelectronic pill is basically a multichannel sensor used for remote biomedical measurements using micro technology. This is used for the real-time measurement parameters such as temperature, pH, conductivity and dissolved oxygen. The sensors are fabricated using electron beam and photolithographic pattern integration and were controlled by an application specific integrated circuit (ASIC).

BLOCK DIAGRAM

Microelectronic pill consists of 4 sensors (2) which are mounted on two silicon chips (Chip 1 & 2), a control chip (5), a radio transmitter (STD- type 1-7, type2-crystal type-10) & silver oxide batteries (8). 1-access channel, 3-capsule, 4- rubber ring, 6-PCB chip carrier



There are basically 4 sensors mounted on two chips- Chip 1 & chip 2. On chip 1(shown in fig 2 a), c), e)), temperature sensor silicon diode (4), pH ISFET sensor (1) and dual electrode conductivity sensor (3) are fabricated. Chip 2 comprises of three electrode electrochemical cell oxygen sensor (2) and optional NiCr resistance thermometer.

Increasingly ornate designs and dozens of bright, often gaudy, colors characterized chromolithography in the second half of the nineteenth century. Overprinting and the use of silver and gold inks widened the range of color and design. Still a relatively expensive process, chromolithography was used for large-scale folio works and illuminated gift books that often attempted to reproduce the handwork of manuscripts of the Middle Ages. The steam-driven printing press and the wider availability of inexpensive paper stock lowered production costs and made chromolithography more affordable. By the 1880s, the process was widely used for magazines and advertising. At the same time, however, photographic processes were being developed that would replace lithography by the beginning of the twentieth century.

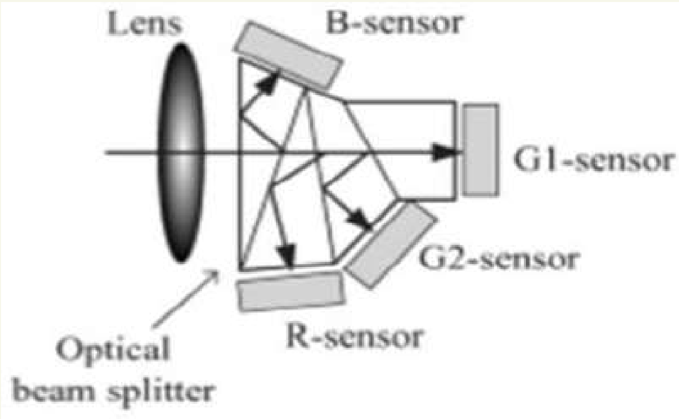
SHINDE PRIYANKA SAMIR, SY

8K HIGH RESOLUTION CAMERA SYSTEM

Digital cinema is a promising application that utilizes high-speed optical networks to transfer super high definition (SHD) images. The networks are primarily used for distributing digital cinema contents in packet data form, and are also used to support new services such as the live streaming of musicals and sport games to movie theaters.
While current transfer services offer high-definition (HD) quality video, live- streaming applications will soon shift to providing cinema quality 8K content to both business and movie theaters users.

The extra- high-quality 8K format enables a realistic telepresence, and will be combined with special tools such as video editing systems to realize effective remote collaboration for business workspaces. This paper introduces successive research on SHD image transmission and its application, especially in digital cinema and associated application fields.

Four years before the digital cinema industry standardized the DCI specification, in 2001, the worlds first video JPEG decoder system was developed that could display SHD images (38402048 pixel spatial resolution) with 24-frames/s time resolution. This decoder was designed to realize IP transmission of extra-high-quality videos, while fully utilizing the full bandwidth of emerging commercial communication networks based on 1-Gb Ethernet. In 2002, the second prototype SHD image decoder was developed that exploits a highly parallel processing unit of JPEG2000 de-compressors.



The decoder receives the IP streams of compressed video contents transmitted by a video server over a 1-GbE network, and decodes them using the standard JPEG2000 decoding algorithm in real time. The decoder was combined with a special 38402048 pixel projector using a dedicated digital video interface for the decoder. This architecture allows the decoded videos to be transferred and shown in completely digital form.

Currently, further standardization activities are in progress at the Society of Motion Picture and Television Engineer (SMPTE). To explore the application range of 8K video beyond digital cinema, we developed a JPEG2000-based 8K real time streaming codec system. This codec can compress/ decom- press 8K videos: the total bit rate exceeds 12 Gb/s (4 : 2 : 2, 60 frames/s), and the resulting 5001000-Mb/s compressed streams are transferred as IP packets.While digital cinema em- ploys the 24-frames/s movie format to replicate the cinema style, it is believed that at least 60 frames/s is needed for realistic video communication services such as teleconferencing. The following sections describe the features of the 8K imaging systems used in digital cinema and live streaming.

AAWRUTTI VIJAY GURAV, SY

5G Network

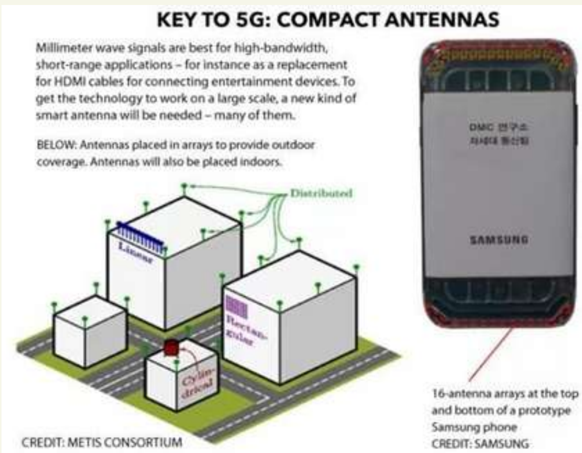
The backbone of the 5G standard is comprised of low-, mid- and high-band spectrum. 5G networks operate on different frequencies with sub-6 GHz and millimeter-wave (20-60 GHz) at the low and high ends of the spectrum.

Carriers were already using sub-6 spectrum for existing LTE networks, and now they need more of it to build out 5G. Millimeter-wave frequency was previously unused, and the advent of 5G has given carriers access to the spectrum that will enable the faster speeds we expect with the new standard.

But mm Wave has a few drawbacks: Because it's so high-frequency, the waves don't travel long distances. In fact, they can't even travel through windows or buildings. That means a device operating on an mmWave-based network, like Verizon, T-Mobile and AT&T's 5G networks, will need to be extremely close to a 5G node to catch a signal.

That's fine in a dense metropolitan area, where you can stick a 5G node every few hundred feet. But in rural areas where there are few buildings or cell towers, mmWave won't work.

That's why both sub-6 and mm Wave are necessary to make 5G widespread and high speed. Indeed, at Qualcomm's annual developer get-together this month, Qualcomm president Christian Amon said that real 5G will be a combination of the low, mid, and high-band frequencies.



Sprint is using its existing midband (2.5 GHz) spectrum to build out its 5G network. At 2.5 GHz, a signal can travel farther but not as fast as with mmWave. We've seen that play out in our testing of Sprint's network, which doesn't deliver the 1 Gbps speeds that mmWave-based networks from its rivals do, but does allow you to catch a signal more reliably.

T-Mobile launched its 5G network using mmWave in a half-dozen cities, but now features a nationwide 5G service using low-bad spectrum that can reach 5,000 cities in addition to some rural areas.

Don't confuse AT&T's 5G plans with the 5GE logo that appears on AT&T customers' phones. That logo translates to "5G Evolution," AT&T's expanded service with advanced LTE technologies, such as 4X4 MIMO, which doesn't hit the speeds we expect from 5G (or even match Verizon's current 4G service, in our testing).

AT&T is sticking by its decision: "We've been talking about 5G Evolution for a while now. We were pretty public about what we were doing and what we were deploying," Igal Elbaz, senior vice president for wireless technology at AT&T, told us at CES 2019.

MAHADIK SMITA DATTATRAY, SY

Number Puzzles

1. Find a 10-digit number where the first digit is how many zeros in the number, the second digit is how many 1s in the number etc. until the tenth digit which is how many 9s in the number.

2. Use the numerals 1, 9, 9 and 6 exactly in that order to make the following numbers: 28, 32, 35, 38, 72, 73, 76, 77, 100 and 1000. You can use the mathematical symbols +,
-, ×, /, √, ^ (exponent symbol) and brackets. Example: 1×9+9×6 = 63

3. Two Fathers and Two Sons Riddle

Two fathers and two sons sat down to eat eggs for breakfast. They ate exactly three eggs, each person had an egg. The riddle is for you to explain how.

MASUGADE MADHURI ARUN, TY

TONGUE TWISTER

1. How much wood would a woodchuck chuck if a woodchuck could chuck wood?
He would chuck, he would, as much as he could, and
chuck as much wood as a woodchuck would if a woodchuck could chuck wood.
2. Six sick hicks nick six slick bricks with picks and sticks.
3. Peter Piper picked a peck of pickled peppers; A peck of pickled peppers Peter Piper picked;
If Peter Piper picked a peck of pickled peppers,
Where's the peck of pickled peppers Peter Piper picked?
4. A skunk sat on a stump and thunk the stump stunk, but the stump thunk the skunk stunk.
5. I thought a thought. But the thought I thought
Wasn't the thought I thought I thought. If the thought I thought I thought,
Had been the thought I thought,
I wouldn't have thought I thought.

PAWAR SHRADDHA DEEPAK, TY