VIDYA JYOTHI
INSTITUTE OF TECHNOLOGY
An Autonomous Institution
Accredited by NAAC

Anurag
Institutions

Cartwheel

Issue 1 2018

News
Views
and
More...

An Anurag Group In-house Magazine

MILAN' 2K18

VJIT Alumni at the Campus

Vision of the Institution

To develop into a reputed Institution at National and International level in Engineering, Technology and Management by generation and dissemination of knowledge through intellectual, cultural and ethical efforts with human values.

To foster Scientific Temper in promoting the world class professional and technical expertise.

Mission of the Institution

To create state-of-the-art infrastructural facilities for optimization of knowledge acquisition.

To nurture the students holistically and make them competent to excel in the global scenario.

To promote R&D and Consultancy through strong Industry-Institute Interaction to address the societal problems.

Chairman's Words

Dr. Palla Rajeshwar Reddy, MLC
Govt. Whip, Telangana Legislative Council

Dear Students,

The present education system occupies a significant place in the era of Educational Boom which paves way to various diverse fields.

The new Education system hopefully should impart Education for job readiness to Education for human potential. It should bring out the extraordinary human potential in a student.

There are ample opportunities for the present student community. Tap your potential and bring out the best in you. Focus on the future. Through the new education system, the student should foster personal and intellectual development over the acquisition of particular Skills and Professional training.

The focus of the student should be on the entrepreneurship angle pertaining to the career opportunities for the students with entrepreneurial ambition. The students should become the job givers than job seekers. Entrepreneurship is the need for in this era. Build up the necessary parameters required to operationalize entrepreneurship.

Strong academic background makes you grounded. Live the dream of many entrepreneurs-Learn the ropes of management.

Keep Scaling Heights .... Wish you all the Best.

(Dr. Palla Rajeshwar Reddy)

EDITORIAL

Cartwheel

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Pushyamu

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Chief Patron
Dr. P. Rajeshwar Reddy

Editors
Dr. A. Padmaja
Mr. R. V. Chalam
Dr. Elizabeth Kamala

Publisher
Mrs. S. Neelima

Basic Design
VJIT Team

Email
cartwheel@vjit.ac.in

GREETINGS & BEST WISHES !

Dear Readers,

Greetings from Cartwheel Team!

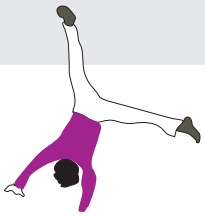
The Cartwheel - the in house magazine is an association of exhibiting student talents, faculty performance and Departments accomplishments.

The Cartwheel Team extends its heart full thanks to our Chairman, Secretary, Director and Principal.

We are thankful to all Heads of Departments, Faculty, and Staff who have contributed for this issue.

Our special thanks to all the co-ordinators who have come forward to share the achievements of the Departments.

Cartwheel



Content

1. Kaleshwaram Lift Irrigation Project
2. Low Budget Air Cooler
3. Long Term Career Planning
4. Case Based Learning
5. Ai Enabled Attendance Marking System
6. Economical Smart Bin
7. Parkfi - The Sss Parking
8. Home Security
9. How I Started Reading Novels?
10. Economic Trend - By Bill Gates
11. Skills Of The Future
12. In Demand Jobs Of The Future

KALESHWARAM LIFT IRRIGATION PROJECT
"Telanganakotiratanalaveena"

Valaboju Viranyu
B. Tech (Civil)

Kaleshwaram project is India's most ambitious lift irrigation project. It has the world's biggest pumping station each motor has a capacity of 139 mw. The 8th package 7 pumps can fill Gandipet dam in just 1 day we can just imagine their power. These pumps are 1,86,000 hp motors. Because of their capacity these motors are being called as Bahubali motors. Each motor weighs 700 tons.

units of water are tmc (thousand million cubic feet = 1000,000,000 = 109 = 1 billion)

1 TMC = 30000000000 Litres of water

1 TMC water can be filled In 5600000 Tankers which have the capacity of 5000 Litres

Around 10,000 Acres can be cultivated in 1TMC.

Previous Governments have not taken any remedial measures for the fluoride dilemma in Nalgonda People getting effected due to consumption of fluoride water. Diseases like Floursis will make bones weaker.

Water coming from Godavari river is diverted to which is approach canal Medigadda pump house by lifting into Annaram barrage and from Annaram water pumped to Sundhilla barrage by gravity canal and from their water is pumped into Yellampally barrage through gravity canal from Yellampally water is pumped into Sri Ram Sagar project and then distributed to entire state.

Benefits of Kaleshwaram

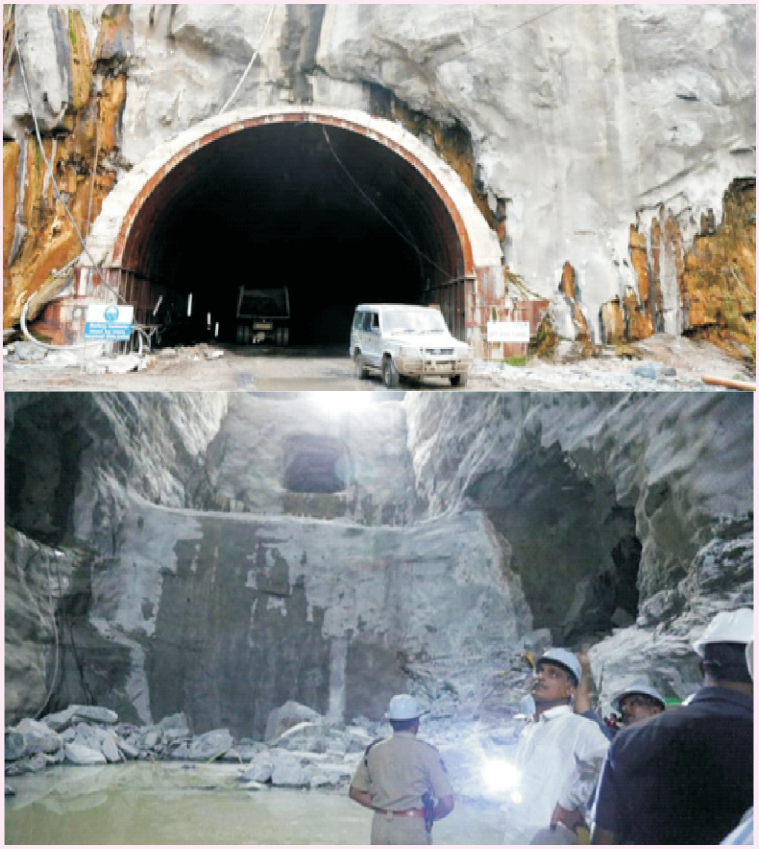
- Daily 2Tmc water can be pumped to Hyderabad and there is an option of another TMC in summer time.
- No water scarcity problem will be faced by 31 districts.
- About 21,000 Crores of revenue will be generated every year.
- The Project Will Irrigate A Land Of 24 Lakh Acres.
- The production of certain suggested crops will rapidly raise from 500% to 900%.
- The production of fruits ,millets, rice, jowar etc will increase.
- Farmers suicides will be reduced completely.
- Provides water for industries.
- Safe drinking water for the state.

These motors in package 7,8 are world's largest motors that can pump water from 100m to 620m .

Amazing Facts:

- Kaleshwaram sets an Asia record by completing 7000 Cubic Metres of concrete work in a single day.
- The 139 MW is the Highest Capacity in the country.
- Kaleshwaram Project sets a bench mark by pumping 3Tmc every day.

Recently 5th Motor in 8th Package was successfully operated for the first time .It will completed soon .



Irrigation Minister Harish Rao's Supervision over the Project

LOW BUDGET AIR COOLER

Researcher: Viranyu Valaboju.

Undergraduate Level:

Presentation Title: Low budget coolers from waste materials.

Research Focus: Bringing the technology at affordable prices.

School: VidyaJyothi Institute of Technology.

Abstract: in the 21st century day by day the temperatures are reaching the peak level because of the ozone layer depletion so to get rid of this problem there is the remedy of an air conditioner but it costs too much(30k- 60k) but this prices are not affordable to everyone and that too ac's emit a lot of CFC's which are harmful for the environment so the air coolers is the best way to get rid of this hotness the temperature is reaching upto 40 degrees so the coolers are the option even coolers upto 5000 so the poor people can't afford it so my aim is to bring the coolers at cheap prices and it costs only 800 Rupees which can be affordable to everyone it uses less power no use of stabilizer, works at both humid and dry conditions, low ,maintenance charges, can be moved any were by trolley legs, environmental friendly.

- Can be used in zoo parks for animals in summer instead of spending lot of funds for costly coolers.
- Can be used in function halls.
- Can be used in shops such as tailor shops, general stores.

Figure 1
Front view

Figure 2
Top view

Figure 3
Right side view

Figure 4
Left side view

“Long term Career Planning”

The word “Engineering” means the application of scientific, economic, social, and practical knowledge, in order to design, build, and maintain structures, machines, devices, systems, materials and processes. The field of Engineering is infinite like multitudinous galaxies on sky, sand particles in deserts etc. Engineering is all around us in fact it lies under our feet. There are different types of engineering and every branch exhibits a significant impact on surroundings. Every branch of Engineering is linked with each other. Long term Career Planning

Civil Engineering is considered as mother of all types of engineering. It has been practiced through many centuries. Civil Engineer is the one who design mega structures and carry out execution works for roads, bridges, dams, plants and buildings and similar structures by using his knowledge of physical sciences and the principles of engineering, acquired by professional education and practical experience. A professional Engineer provides his services for the public welfare or the safeguarding of life, health or property is concerned. Engineers use their knowledge of science, logic, and appropriate experience to resolve different problems. Long term Career Planning

As we all are aware of the fact that Civil Engineering is itself very diversifying field. It includes Structural Engineering, Geo-Technical Engineering, Hydraulic, Irrigation, Pavement and Foundation Engineering etc. In Bachelors we study almost 40 subjects in our course work but no one is able to grasp full command on every subject. After graduation, students find chance to work in different fields of civil engineering. Sometimes they get little confused to choose regarding a particular field of civil engineering which possesses long-run significance for their career. In some cases it also happens that if anyone is interested in structures, he might find job in geo-technical division. Long term Career Planning An Engineer should taste the flavour of every field i.e. design, execution works, planning and tendering, sub-soil investigation and lab testing etc if he would be given a chance to serve. He surely will find every field as fruitful bunch and interesting. He should be passionate about his career. It is necessary to gain knowledge with full concentration and later on by using his tacit knowledge he will find a way and surely can easily select the discipline which suits him the best. But it is pretty certain that this may take few years. The field in which he is taking more interest and satisfying with its scope of work can be selected for long-term career planning. Once the field is selected then one will enjoy the unimaginable outcomes and relevant possibilities. He can excel his skills and abilities in specific field and ultimately will find more opportunities for better career growth. Long term Career Planning

I would suggest that for making long-term career planning you must have worthy knowledge about growing market. To make remarkable achievements, An Engineer has already a strong educational background just Need to focus on your goals and get experience by enhancing your skills. It is important to know your values. You should try to explore yourself and identify your skills in particular field. Search the best possible career options all around you. You must have decision making power to move on. Long term Career Planning

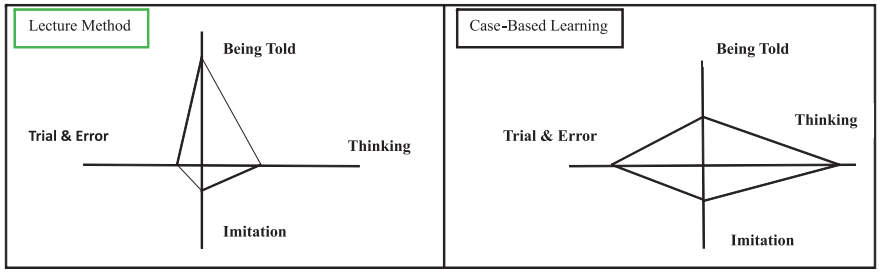
M.PRASANTH

Case based learning : An effective learning technique in Civil Engineering

Case based learning is the pedagogical approach to teach the curriculum to the student in the real time environment. It facilitates effective learning and reveals the real time problem faced at the organizational level or at work place. The process of case base learning includes applicability of the curriculum knowledge to the some case and come up with the possible solution. Resource constrains present in the applying a solution to a problem will affect largely on its efficiency. Also gives the application illustration to the students of the theoretical concepts prescribed in the respective syllabus. Although case based learning gives a problem tackling and solving ideology and provides the set of solution it depends on the expertise knowledge to select the exact one.

Dr. Pallavi Badry
Associate Professor
Department
of Civil Engineering

The case based method of teaching used in the technical education is quite different from most of the methods of teaching used at the school level. Unlike traditional lecture-based teaching where student participation and involvement from the student in the classroom is minimal, case based learning is an active learning method. This requires participation and involvement from the student in the classroom. For students who have been exposed only to the traditional teaching methods, this calls for a major change in their approach to learning. A good lecture may enhance the technical knowledge of a student but cannot hone his/her executive skills. Moreover, even if students have the knowledge, they may not be able to relate it to an actual situation. The truth is that accumulated technical wisdom cannot be effectively transferred by lectures and reading assignments alone. Each technical situation is unique and requires its own diagnosis, analysis and unique technical actions. This is where case studies come in to picture. Cases provide a student with a valuable way to test and develop their technical and executive skills while grappling with real on site problems. Figure 1 shows a comparison of the lecture method and case based learning based on how they employ the four ways of learning. In this method student take on the role of active learner and learn by doing (trial and error) and thinking. Whereas need of lecture being told by instructors is comparatively is less in this method. As we study more case-based studies. Exposure to the different practices, different organization, issues and challenges faced by a technical team can be understood. Rather than adopting a passive role in the learning process, students are forced to come up with your own recommendations and plan of action.



Simulation of case based learning scenario

Illustration of case based learning

A case based study usually describes the events and organizational circumstances surrounding a particular situation in the factual manner. It may deal with a whole industry, a single organization. It puts students on the scene of the action and familiarizes students with all the relevant circumstances. Student's role is to diagnose and evaluate the situation described in the case and then recommend the appropriate action to be taken.

An important point to be emphasized here is that a case is not a problem. A problem usually has a unique, correct solution. On the other hand, a decision-maker faced with the situation described in a case can choose between several alternative courses of actions, and each of these alternatives may plausibly be supported by logical argument. To put it simply, there is no unique, correct answer in Cased-base learning.

Objectives of case based learning

Students new to the case methods are often bewildered by the fact that case discussions do not conclude with concrete answers. While some may be just curious, others may fret and fume that after a series of good arguments for more one course of action, the class disperses without the 'right answer to the case' being reveled. This is because students have grown used to the traditional lecture method where they are told what is right and what is wrong. Technical solution may not be same as in is not an exact science with just 'one best way' of approaching an issue or of 'one best way' of doing something. There may not be any 'textbook way' of taking technical action in a particular situation. Whether it is right or not depends on its results. students are expected to learn from a case based learning program is how to enhance their skills, analysis situations, develop technical judgment, and understand what needs to be done in different circumstances. The objective of the case based learning are:

- To increase students understanding of what engineers should and should not do in certain situations.
- To build students analytical skills
- To increase students understanding of theoretical concepts and their application in real life situation
- To enable student to get valuable practice in identifying key issues that need to be addressed, evaluating alternatives, and formulating workable plans of action.
- To develop critical thinking skills and enhance students sense of judgment.
- To enable students to gain in depth knowledge about different industries and companies, thereby acquiring something close to actual business experience

Now that students knows what the objectives of case based learning are, student can focus their attention on building the right set of skills and competencies that will hold student in good stead in their technical career. Of course, this means that student may have some unlearning to do before student learn the new way. The consequences to the students from involvement in case based learning are listed below.

Some points to be noted for case formulation

- Case analysis requires students to practice important technical skills, diagnosis, making decisions, observing, listening and persuading- while preparing for case discussion.
- Cases require students to relate analysis and action, to develop realistic and concrete action despite the complexity and partial knowledge characterizing the situation being studied.
- Students must confront the intractability of reality. To complete with absence of need information, an imbalance between needs and available resources, and conflicts among competing objectives.
- Students develop a general managerial point view- where responsibility is sensitive to action in a diverse environmental context.

Tecaher and Student roles in case based learning

In this approach it is necessary to make role of student clear before starting case studies. Student must have anticipated that students will have to play a more active role compared to that of the instructor. In case-based learning tremendous rigor to deal with the almost all the industrial exposure is ensured.

As a case-based learning is student-centered learning, the onus is on student to learn. If student don't take up the full responsibility for their learning, then he/she will gain practically nothing from the approach. Case based learning works best when it involves the following three stages individual preparation, preparation in group and class participation.

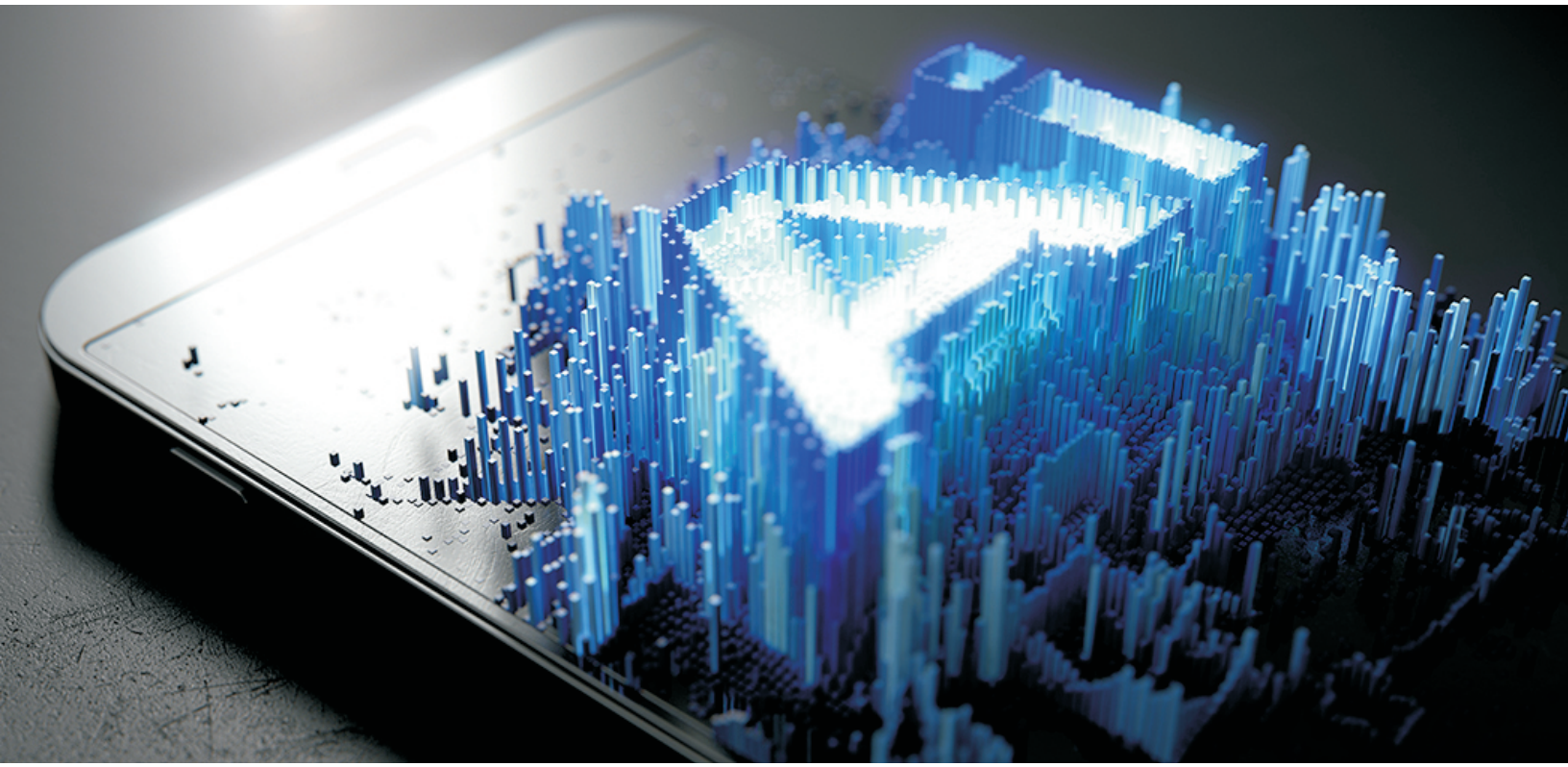
Time	Teacher	Students or participant
Before class	Assigns case and often readings	Receives case and assignment
	Prepare for class	Prepares individually
	May colleagues	Discusses case in small group
During class	Deals with readings	Raises question regarding readings
	Leads case discussion	Participates in discussion
After class	Evaluates and records student participation	Compare personal analysis with that of their peers.
	Evaluates materials and updates teaching note	Reviews class discussion for major concepts learned.

Benefits of case based learning at student concerns

Case-based learning has several advantages over traditional teaching methods. The skills that students develop by being exposed to this method are listed in Table 3.

- Qualitative and quantitative analytical skills, including problem identification skills, data handling skills, and critical thinking skills.
- Decision making skills, including generating different alternatives, selecting decision criteria, evaluating alternatives, choosing the best one, and formulating congruent action and implementation plans.
- Application skills, using various tools, techniques, and theories.
- Oral communication skills, including speaking, listening and debating skills.
- Time management skills, dealing with individual preparation, small group discussion, and class discussion.
- Interpersonal or social skills, dealing with peers, solving conflicts, and practicing the art of compromise, in small or large groups.
- Creative skills, looking for and finding solutions geared to the unique circumstances of each case.
- Written communications skills, involving regular and effective note-taking, case reports, and case exams.
- Case study allows students to step into the shoes of the decision-makers in real organizations, and deal with the technical issues involving decision-making with integration of theories and concepts learnt.
- Case study improve students ability to identify and understand the underlying problems to ask the right question in a given problem situation
- Expose student to wide range of industries, organizations, functions, and responsibility levels. This provides student with the flexibility and confidence to deal with a variety of tasks and responsibilities in his/her future career.
- Cases studies strengthen student's grasp of technical theory by providing real-life examples of the underlying theoretical concepts.
- Case studies reflect the reality of decision-making to students where decisions based on insufficient information reflect the ambiguity and complexity that accompany most technical issues.
- Case studies approach in curriculum should be assigned marks and evaluated for Case presentations written case analyses, Case writing assignments or similar projects.
- When working on a case study in group, along with involvement student must also be able to understand and deal with different viewpoints and perspectives of the other members in their team. This serves to improve your communication and interpersonal skills.
- Case-based learning exposes student to this reality of technological advances.

Automatic AI Enabled Attendance Marking System



Attendance is taken in every organization. Traditional approach for attendance is, professors call Students Roll Number or Student Name and record attendance. For each lecture this is wastage of time and sometimes there is a chance that the professor may forget to take attendance. To avoid these losses, we are about to use automatic process which is based on image processing.

In this approach, attendance of the student is recorded at the time of effectively catching picture and detecting a face in its sensor. Here we are using face detection & face recognition system. The first phase is pre-processing where the face detection is processed through the step image processing. It includes the face detection and face recognition process. Second phase is feature extraction. During face recognition process we will apply machine learning classification techniques to improve the efficiency of image retrieval. Step by step execution of these techniques (Image Processing) helps to achieve the final output. The working of this is to detect and recognize the face and mark the attendance for the corresponding face in the database. Input of this system is face detection and recognition and output is to mark the attendance. It is designed to be reliable and low power.

The Automatic face detection and recognition proposed to attendance marking in database acts as the solution for the automatic attendance marking system.

By

M.Vijayashanthi, M. Tech,(PhD)

Associate Professor

IT Department

Economical Smart Bin.

Health is a major concern in the existing times. The places need to be more hygiene and the real time applications must be more rigid so that both people and authorities are put to task.

Garbage bins play a vital role in maintaining a hygiene atmosphere there by decreasing the risk of health issues.

Economical Smart Bin has 2 IR sensors positioned diagonally to each other, when the bin is completely full the lid of the garbage bin falls automatically and the board which shows “Bin is Empty” on the front flips to “Bin is Full” and a buzzer rings at the nearest control room by displaying a message “Bin is full!” on the control panel in the control room, the continuous notification and buzzing annoys the volunteers and will put them to task at the earliest.

The Smart Bin can be emptied from a door present on the left bottom of the bin, when the bin is empty the lid raises leaving the bin open, the board flips back to “Bin is empty” and the buzzer stops at the control room.

This Smart Bin is called Economical because instead of using LCD to interface simply a servo motor and cardboard is used which is cost effective and also serves the same purpose as LCD. Garbage Bins must be efficient and the at the same time effective as well, Economical Smart Bin is one of its kind.

The Economical Smart bin has 2 IR sensors positioned diagonally to each other giving accurate results rather than the existing dumpsters which have only 1 sensor that delivers result as full even if one side of it still can accommodate garbage.

The Economical Smart bin can be used in places where hygiene is the call but spending too much resources on it feels inappropriate, places like gated communities, colleges, etc.

By

K Himaja

IT III Year I Semester

ParkFi - The SSS Parking

In the era of modernisation, places have come closer because of transportation. Many efficient vehicles are being manufactured daily. Providing security to such efficient vehicles when parked is the need of the hour. IoT- Internet of Things is an emerging technology which provides efficient solutions to real time problems.

ParkFi is a Smart, Secure and Systematic parking system.

The driver in vehicle, which is to be parked in ParkFi, must pay a standard amount for the space that he will be occupying and must take an RFID tag.

The person at toll booth will guide the driver to his allotted slot based on the number that is displayed on the tag.

The driver will have to scan the RFID tag at the entrance for the toll gate to raise. Once the toll gate raises he will be able to enter the parking lot.

Once the driver reaches his allotted slot he will have to scan the RFID tag again on the EM18 at the right side of the slot. If the unique ID of the tag matches the slot ID only then the toll gate at the slot will raise or else the driver will have to search for slot assigned to him.

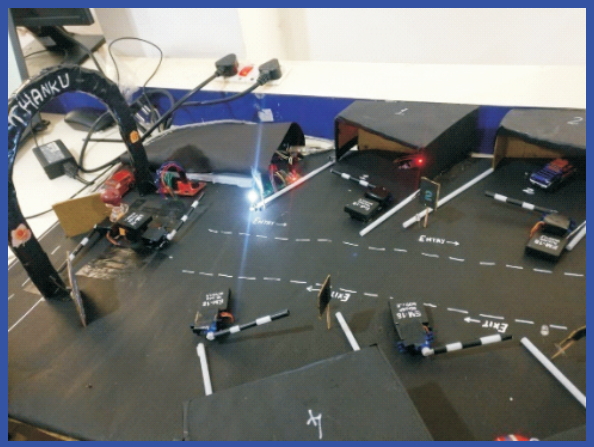
When the vehicle is in the slot, LED in front of the slot will put OFF.The LED will be ON only if the slot is empty, the LED is positioned in such a way that the light from LED will fall on the boards infront of the slot, luminating the board.

After parking the vehicle, the driver will leave from a small gate provided at the rare end of the slot.There is a shed covering two third of the slot, providing security to the parked vehicles from being lifted by cranes in open parking lots.

When the driver wishes to leave the parking lot. He has to enter the slot from the gate at the rare end and scan the RFID tag at the slot entrance, only if the slot ID matches the unique ID on tag the toll gate will raise and will allow the vehicle to leave the slot. Once the slot is empty the LED will glow again.

At the exit, the driver has to scan the RFID tag, return the card and leave the ParkFi. ParkFi can be applied in different areas where systematic parking is need of the hour like offices, airports etc. ParkFi provides a secure open area parking, it can also be applied in closed area also by making necessary changes.

By
K Himaja
B Yugandhari
N Rebecca
P Mounika



Home Security

The issue of security is becoming more prevalent. The Internet of Things (IoT)-enabled home security solutions, use sensors to collect and share data from multiple edge devices. If an attacker gains access to these smart systems through malicious means, the underlying functional logic of control systems can alert the owner.

There are many existing security alarms system in the current generation. But this Home security system differ from the alarm security system .In this security system the owner will receive the notifications when bulgur enters the house which is not available in the normal alarm security system.

Working principle is that whenever the gate opens as a result the magnet gets separated from the reel switch and the circuit inside the switch breaks, this braking of circuit triggers the NodeMCU to send a status update to Blynk Server that push a notification on our phone about the event of opening the door and we are able to get the door's open notification status on our phone in anywhere in the world via internet connectivity and led is also glown.

The developed system can also be used to in industrial and commercial applications such as offices, warehouses and other areas where some areas are reserved for authorized personnel only or other places where safety and precautions are of primary concerns such as internet server room of a big MNC from where corporate data can be stolen. The system can also be easily upgraded to add extra safety features such as cameras, motion detection sensors, etc. for increased safety.

By
M Surekha
Y Priyanka
D Aneela
P SaiJyothi

How I started reading novels?

The moment I completed my under graduation, I got placed in a company. People over there used to speak either in English or Hindi. I was literally galvanized with their slang and later I came to know that I was lagging behind them on the subject of speaking. At last I decided to do something to overcome this complication.
As a Fresher, I didn't have more work for the first two months. Since I have nothing to work on, I passed my time by gathering information about our company initially. As the days got passed, I was pissed off to pass the time as I was placed on bench. As you people know, you can't use mobiles or you can't simply pass the time by watching some videos on your PC.

At that point of time, I thought many ways to keep myself busy in my office. After many thoughts I got an idea to increase my fluency and vocabulary. I just googled the best romantic books. My PC flashed with 10 best romantic books and I selected the 1st book out of them, which was named as "Revolution 2020" written by an Indian author named ChetanBhagat, famous for his romantic novels. Now I can't directly buy the paperback book because it would be weird if I hold the book and read in front of my colleagues in workplace.

So I downloaded PDF copy of the book. And then I extracted all the content from the PDF and added into our company's word document. That's how I got attracted to read and started the book in my workplace to simply pass the time. Once I am completely done with reading, my first ever book in three weeks, I was simply delighted. I felt like I have seen a total picture in front my eyes but at the same time I felt really sad that book got finished early. While going through the book I was like I wished the book had never ending story. The moment I completed my first book, my office work increased but I never lost any interest towards reading. Later I decided to read some more books, I went to the market and bought 10 books which were written by ChetanBhagat and SudeepNagarkar and started reading those at home.

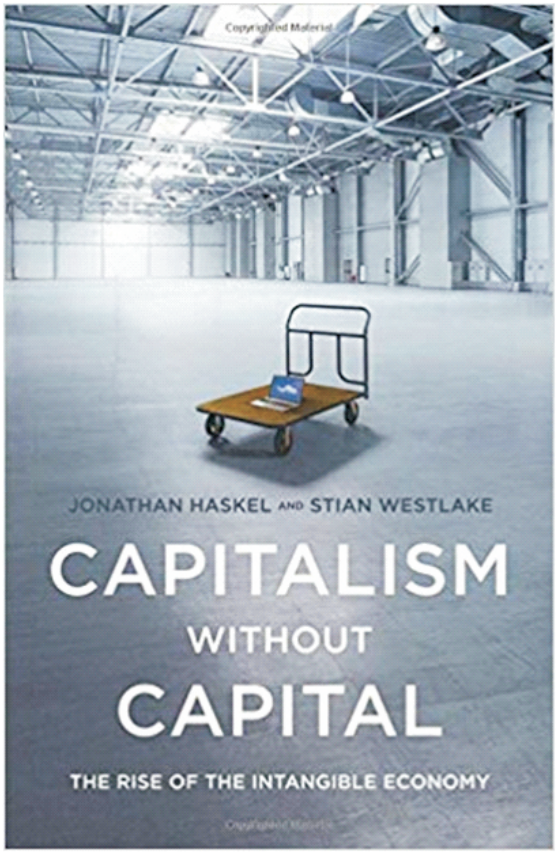
That's how I started reading and since then I never got bored while reading. I have found that reading books is the best medicine to kill boredom. Till now I read some hundreds of books. Now I started reading motivational books. I prefer Robin Sharma books for the kind of his motivation to achieve success in life.

"The joy of reading books can't be described in words". It's something that you understand only by real experience. Most of them will hesitate to read and sometimes by seeing the size of the book itself, people won't even give it a try. I repeat don't judge a book by its cover. You'll know nothing unless you gain experience. I suggest you that first of all select any kind of book according to your taste and start reading so that you can cherish the joy of reading.

All the best.
Thank you.

Not enough people are paying attention to this economic trend

By Bill Gates
| August 14, 2018



By the second semester of my freshman year at Harvard, I had started going to classes I wasn't signed up for, and had pretty much stopped going to any of the classes I was signed up for—except for an introduction to economics class called "Ec 10." I was fascinated by the subject, and the professor was excellent. One of the first things he taught us was the supply and demand diagram. At the time I was in college (which was longer ago than I like to admit), this was basically how the global economy worked:

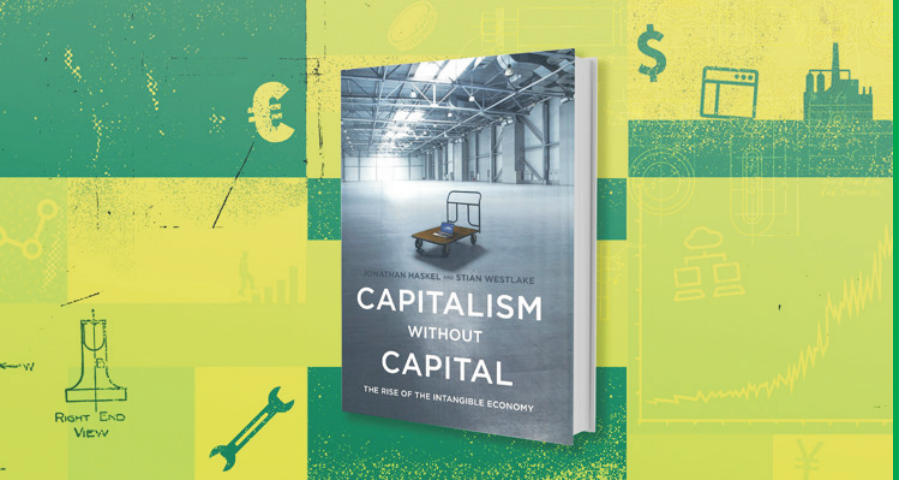
There are two assumptions you can make based on this chart. The first is still more or less true today: as demand for a product goes up, supply increases, and price goes down. If the price gets too high, demand falls. The sweet spot where the two lines intersect is called equilibrium. Equilibrium is magical, because it maximizes value to society. Goods are affordable, plentiful, and profitable. Everyone wins.

The second assumption this chart makes is that the total cost of production increases as supply increases. Imagine Ford releasing a new model of car. The first car costs a bit more to create, because you have to spend money designing and testing it. But each vehicle after that requires a certain amount of materials and labor. The tenth car you build costs the same to make as the 1000th car. The same is true for the other things that dominated the world's economy for most of the 20th century, including agricultural products and property.

Software doesn't work like this. Microsoft might spend a lot of money to develop the first unit of a new program, but every unit after that is virtually free to produce. Unlike the goods that powered our economy in the past, software is an intangible asset. And software isn't the only example: data, insurance, e-books, even movies work in similar ways.

The portion of the world's economy that doesn't fit the old model just keeps getting larger. That has major implications for everything from tax law to economic policy to which cities thrive and which cities fall behind, but in general, the rules that govern the economy haven't kept up. This is one of the biggest trends in the global economy that isn't getting enough attention.

If you want to understand why this matters, the brilliant new book Capitalism Without Capital by Jonathan Haskel and Stian Westlake is about as good an explanation as I've seen. They start by defining intangible assets as "something you can't touch." It sounds obvious, but it's an important distinction because intangible industries work differently than tangible industries. Products you can't touch have a very different set of dynamics in terms of competition and risk and how you value the companies that make them.



Haskel and Westlake outline four reasons why intangible investment behaves differently:

1. It's a sunk cost. If your investment doesn't pan out, you don't have physical assets like machinery that you can sell off to recoup some of your money.

2. It tends to create spillovers that can be taken advantage of by rival companies. Uber's biggest strength is its network of drivers, but it's not uncommon to meet an Uber driver who also picks up rides for Lyft.

3. It's more scalable than a physical asset. After the initial expense of the first unit, products can be replicated ad infinitum for next to nothing.

4. It's more likely to have valuable synergies with other intangible assets. Haskel and Westlake use the iPod as an example: it combined Apple's MP3 protocol, miniaturized hard disk design, design skills, and licensing agreements with record labels.

None of these traits are inherently good or bad. They're just different from the way manufactured goods work.

Haskel and Westlake explain all this in a straightforward way—the book is almost written like a textbook without a lot of commentary. They don't act like there's something evil about the trend or prescribe hard policy solutions. Instead they take the time to convince you why this transition is important and offer broad ideas about what countries can do to keep up in a world where the "Ec 10" supply and demand chart is increasingly irrelevant.

The book is eye opening, but it's not for everyone. Although Haskel and Westlake are good about explaining things, you need some familiarity with economics to follow what they're saying. If you've taken an economics course or regularly read the finance section of the Economist, however, you shouldn't have any trouble following their arguments.

What the book reinforced for me is that lawmakers need to adjust their economic policymaking to reflect these new realities. For example, the tools many countries use to measure intangible assets are behind the times, so they're getting an incomplete picture of the economy. The U.S. didn't include software in GDP calculations until 1999. Even today, GDP doesn't count investment in things like market research, branding, and training—intangible assets that companies are spending huge amounts of money on.

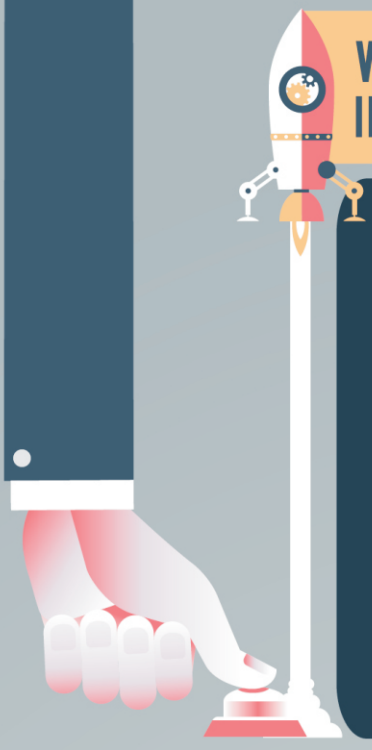
Measurement isn't the only area where we're falling behind—there are a number of big questions that lots of countries should be debating right now. Are trademark and patent laws too strict or too generous? Does competition policy need to be updated? How, if at all, should taxation policies change? What is the best way to stimulate an economy in a world where capitalism happens without the capital? We need really smart thinkers and brilliant economists digging into all of these questions. Capitalism Without Capital is the first book I've seen that tackles them in depth, and I think it should be required reading for policymakers.

It took time for the investment world to embrace companies built on intangible assets. In the early days of Microsoft, I felt like I was explaining something completely foreign to people. Our business plan involved a different way of looking at assets than investors were used to. They couldn't imagine what returns we would generate over the long term.

The idea today that anyone would need to be pitched on why software is a legitimate investment seems unimaginable, but a lot has changed since the 1980s. It's time the way we think about the economy does, too.

SKILLS OF THE FUTURE

10 SKILLS YOU'LL NEED TO THRIVE IN 2020



WHAT IS THE FOURTH INDUSTRIAL REVOLUTION?

The Fourth Industrial Revolution builds upon the innovation of the Third Industrial Revolution to revolutionize industries all over the globe such as:

- Artificial Intelligence
- Internet of Things
- Self-driving Vehicles
- Nanotechnology
- Renewable Energy
- Quantum Computing
- Biotechnology

Because of this explosion of new fields, new markets will emerge which will require a new set of skills for employment. Increasingly smart robots will take over some jobs, and jobs that didn't exist before will be in-demand.

WHAT ARE THE TOP 10 SKILLS YOU'LL NEED TO THRIVE IN 2020?

Before we go deeper into what the fourth industrial revolution means and how it will affect the future workplace, here's a quick overview into the previous industrial revolutions.

The Industrial Revolutions: A Quick Overview

ThoughtCo. describes the term "industrial revolution" as a period of massive technological and socio-cultural change, similar to the time when our ancestors switched roles from hunter-gatherers to farmers.

Humanity has had quite a few industrial revolutions over the course of history. Here's a quick overview:

The first industrial revolution happened during the 18th century in Britain with the discovery of the steam engine and the burning of fossil fuel to power factories that replaced manual labor. The textile industry was the major benefactor of this period.

The second industrial revolution in America was an expansion of the first when Henry Ford applied the manufacturing techniques of the previous revolution to pioneer mass production and the moving assembly line.

The third industrial revolution or the digital age builds on the invention of World Wide Web and seeks to connect the world through innovations in information technology.

These industrial revolutions have one thing in common: they are all disruptive—turning the tables of the prevailing industries during the periods before them. We're currently witnessing the climax of the third industrial revolution and transitioning to a revolution that is more technological than industrial.

More Technological Than Industrial

The Fourth Industrial Revolution focuses on innovations that harness the potential of emerging technologies such as artificial intelligence, the Internet of Things (IoT), self-driving vehicles, nanotechnology, renewable energy, quantum computing, and biotechnology to name a few.

Because of this explosion of new fields, new markets will emerge which will require a new set of skills for employment. Increasingly smart robots will take over some jobs, and jobs that didn't exist before will be in-demand.

A new age of work requires a new set of skills to thrive and be productive. Here's an infographic on the top 10 skills you need to thrive in 2020:

The Future is Here

And it's brought a multitude of changes with it. The Fourth Industrial Revolution ushers in a new era where new industries take the spotlight and drive economic and commercial growth while de-prioritizing other industries that can be automated, thereby causing some jobs to disappear.

Like the previous industrial revolutions, the fourth industrial revolution is expected to disrupt the current industries mainly technology, healthcare, and transportation. In 2020, about 5 million jobs will disappear due to automation, according to a 2016 report by World Economic Forum.

As a worker in the future, the only way to survive and thrive is to identify which skills will matter for the industries that will experience unprecedented growth. One example of such an industry booming to popularity is the Internet in what is known as the "dot-com bubble." This period gave birth to some of the tech giants that we know today such as Amazon and eBay.

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Essential Skills in the Future—and Why

In a future where machines seem to be taking the place of humans, 'human skills' become increasingly important. These are the skills that would take years to be replicated by machines if it becomes possible down the road.

Creative problem solving tops the list of most essential skills in 2020. The ability to look at problems from different perspectives and come up with effective solutions is a valuable skill to have, given the increasing number of technological innovations that could crop up in the next few decades.

Making sense of huge amounts of data will also be a huge factor of candidates who are looking to enter the IT sector, as more decisions will be based on data gathered from our mobile devices based on our usage of technology. Aspiring software developers and programmers need to cultivate a deep sense of critical thinking and creativity to gain an edge in the future.

While half of the skills needed to thrive in the future are related to cognitive functioning, the other half are more connected to making human connections at work. Collaborating with others on huge projects is a must, as more and more companies will be utilizing agile strategies with their teams to accomplish their goals.

Self-awareness or knowing what you feel and managing your emotions is also a top requirement in the future, especially for leadership and managerial positions. Companies will try to keep up with the pace of technology, and they'll need more competent and flexible leaders that can take on many hats to rally their team and steer the company in the right direction.

Out with The Old

Just as industries will emerge, various jobs will also appear, while others will get replaced by machines or disappear.

In a blog post by World Economic Forum, the top 5 job families that will take a hit in the in the next five years are installation / maintenance, construction, creatives / media, manufacturing / production, and office / administrative jobs.

There is no certainty which exact jobs will see a decline in the next few years, but based on trends, the most affected jobs are those that are now being done by machines.

As work takes on a more abstract instead of physical nature, it's important to learn the skills necessary to switch careers in the future.

Does this mean that machines will eventually replace humans?
This is a common theory that is popularized by Hollywood movies and sci-fi stories: machines will rise in rebellion against humans. While this would make for a dramatic storyline, it's unlikely to happen. What's interesting is the collaboration of human and machine to achieve tasks creatively at a faster rate.

For instance, Toyota has been going the other direction and replacing its robots with humans. Why? Robots may be faster, but humans are capable of innovation and coming up with ideas that ultimately results in improvement.

Creativity is one skill that even AI is struggling to replicate, which is why it will be one of the skills a future worker needs to succeed in the future.

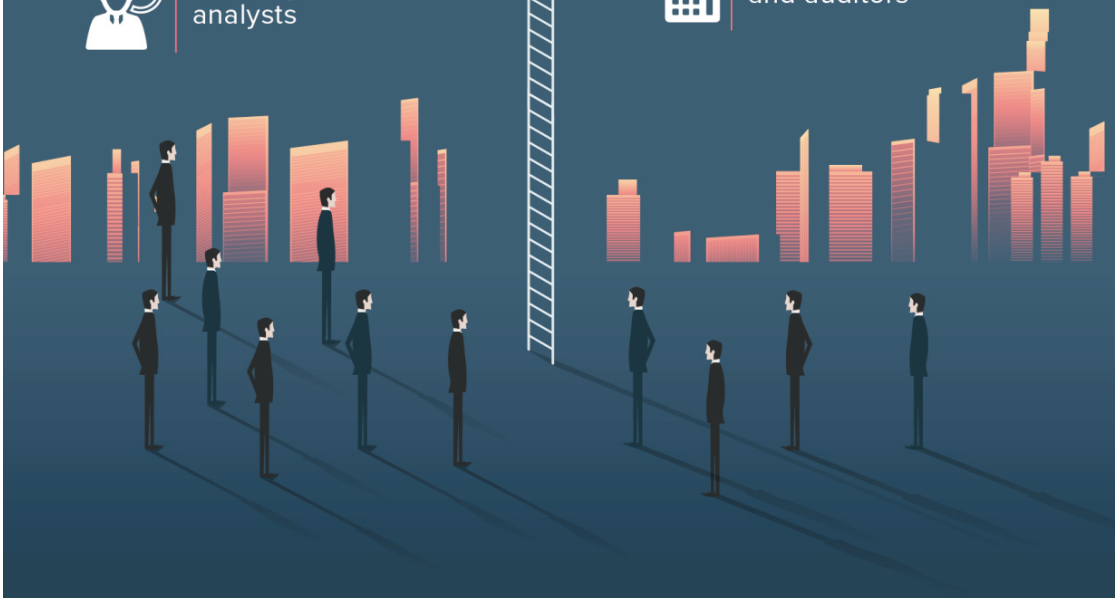
Conclusion
As writer and futurist, Alvin Toffler, once said, "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

The coming of the fourth industrial revolution will disrupt many industries and kill many jobs, but it doesn't necessarily spell doom. Investing in skills that will still be relevant even after 5 or 10 years from now is a good move in securing your spot in the workforce of tomorrow.

These are all important things to consider when hiring someone to be a part of your company. Remember, hard skills can be learned, but soft skills like attitude, mindset, and people management skills, are the things that set us apart from a machine of codes and algorithms, are the ones that will matter the most in the future workplace.

WHAT WILL BE THE 10 MOST IN-DEMAND JOBS IN 2020?

1. Data analysts
2. Medical technicians, physical therapists, and workplace ergonomics experts
3. Sales and Marketing Specialists
4. Customer service representatives
5. Management analysts
6. Software developers and computer programmers
7. Veterinarians
8. Product designers and creatives
9. Teachers and trainers
10. Accountants and auditors



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