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COMPUTER DEPARTMENT

Presents

TECHNICAL MAGAZINE

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Computer Department

Vision

To be the center for excellence for training the world-class engineers to work with multi-disciplinary domain based on the state-of-the-art of technology enabled academic system blended with industrial and business practices.

Mission

To educate and train undergraduate students in Computer Engineering by instilling excellence to fulfill professional and social requirements in business and industry on the platform of scientifically designed academic processes.

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Role of Technology in the COVID-19 Pandemic

During the current COVID-19 pandemic many technologies are playing a great role in our day to day life. We are seeing this play out in the field of artificial intelligence , machine learning and virtual reality. These areas were already in growth mode prior to 2020. With the enforcement of social distancing, the use of advanced technologies is experiencing demand from all ends of the economy.

Artificial Intelligence

As a scientific data mining tool in medical field:
AI refers to any human – like intelligence exhibited by computer , robot, or other machine.

As the pandemic has spread globally, there has been an influx of medical research published about Covid-19. While such a large volume of research is a potential boon to our understanding of how to control and treat the virus, it also presents Big Data challenges. So much research is difficult to distill and, therefore, can be difficult to draw conclusions from. Researchers are turning to AI to help them better mine data for insights.

This same technique has been used previously to identify a possible use case for magnesium in the treatment of migraines. "The hope is that AI will accelerate insights into the novel coronavirus by finding more subtle connections across more data."

Machine Learning:

Benefits in eLearning

Machine learning is a field of computer science that gives computers the capacity to learn without being directly explicitly programmed.

Machine Learning is actively being used today, perhaps many more places one would expect. There is a range of benefits that Machine Learning can offer to online learners, as well as organizations that invest in LMS platforms. First of all, Machine Learning has the ability to offer more custom eLearning solutions based on the learner's past performance and learning goals. Secondly, it enables efficient resource allocation since online learners receive the exact eLearning resources they require in order to fill knowledge gaps and accomplish their learning goals.

Virtual Reality

1. Reduce the direct spread of Virus:

VR technology develops a platform to reduce the face to face interaction of doctors with the infected COVID-19 patients.

Through live video streaming, it helps to improve surveillance systems on the ongoing situation. Virtual reality modelling language , as an international standard of virtual reality, has been developing rapidly. VRML was first proposed by Rava Raggett of HP European Research Laboratory at the first World Wide Web VRML is a language technology to create virtual reality environment on the Web.

2. In Education and Business:

For experiential business, like tours or events, the use of cutting-edge technology in the form of virtual reality (VR) provides the most valuable experience because of its visualization and storytelling capabilities. Because it can require an investment in hardware, however, this technology has had the slowest adoption rate. Verticals are finding ways around that barrier, specifically education. Whether it's low-touch – like video conference calls – or life-like experiences that require a VR headset, virtual tours and classrooms are quickly becoming the norm for students, from kindergarten to college.As it really gives a 3-dimensional real views due which to learning the things becomes interesting and easy for students.

Conclusion:

Never has the potential of AI , ML and VR been more clear than in this particular moment of crisis. During a pandemic,
when time is of the essence, AI can help stem the tide of the virus by predicting outbreaks, serving as a triage tool, and helping researchers mine insights from huge swaths of data. Similarly machine learning plays a great role in the eLearning
system. Whereas Virtual Reality (VR) has offered an imperative role for fighting this pandemic, through audiovisual-based
virtual communication.

-Divya Patil
SE Comp.

Data Mining

Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD).

The key properties of data mining are:

- Automatic discovery of patterns.
- Prediction of likely outcomes.
- Creation of actionable information.
- Focus on large data sets and databases.

Automatic Discovery:

Data mining is accomplished by building models. A model uses an algorithm to act on a set of data.

The notion of automatic discovery refers to the execution of data mining models.

Data mining models can be used to mine the data on which they are built, but most types of models are generalizable to new data. The process of applying a model to new data is known as scoring

Prediction

Many forms of data mining are predictive. For example, a model might predict income based on education and other demographic factors. Predictions have an associated probability (How likely is this prediction to be true?). Prediction probabilities are also known as confidence, (How confident can I be of this prediction?).

Some forms of predictive data mining generate rules, which are conditions that imply a given outcome. For example, a rule might specify that a person who has a bachelor's degree and lives in a certain neighborhood is likely to have an income greater than the regional average. Rules have an associated support (What percentage of the population satisfies the rule?).

Grouping

Other forms of data mining identify natural groupings in the data. For example, a model might identify the segment of the population that has an income within a specified range,

that has a good driving record, and that leases a new car on a yearly basis.

Actionable Information:

Data mining can derive actionable information from large volumes of data. For example, a town planner might use a model that predicts income based on demographics to develop a plan for low-income housing. A car leasing agency might a use model that identifies customer segments to design a promotion targeting high-value customers.

Data Mining and Statistics:

There is a great deal of overlap between data mining and statistics. In fact most of the techniques used in data mining can be placed in a statistical framework. However, data mining techniques are not the same as traditional statistical techniques. Traditional statistical methods, in general, require a great deal of user interaction in order to validate the correctness of a model. As a result, statistical methods can be difficult to automate. Moreover, statistical methods typically do not scale well to very large data sets. Statistical methods rely on testing hypotheses or finding correlations based on smaller, representative samples of a larger population.

Data mining methods are suitable for large data sets and can be more readily automated. In fact, data mining algorithms often require large data sets for the creation of quality models.

Applications of Data Mining in different fields:

Telecom, Media & Technology:

In an overloaded market where competition is very high, the answers are often within your consumer data. Telecom, media and technology companies can use analytic models to make sense of mountains of customers data, helping them predict customer behaviour towards product and offer highly targeted and relevant campaigns.

Education:

With unified, data-driven views of student progress, educators can predict student performance before they set foot in the classroom – and develop intervention strategies to keep them on course. Data mining helps educators access student data, predict achievement levels and pinpoint students or groups of students in need of extra attention.

Banking:

Automated algorithms help banks understand their customer base as well as the billions of transactions at the heart of the financial system. Data mining helps

financial services companies get a better view of market risks, detect fraud faster, manage regulatory compliance obligations and get optimal returns on their marketing investments.

-Kiran Bendkoli

SE Comp.

How computer science can help fight COVID-19:

The COVID-19 pandemic has mobilized the world's scientific community like no other recent crisis, including many researchers using the most modern data science and artificial intelligence approaches. AI tools can help in many different ways. They are being used to predict the spread of the coronavirus, map its genetic evolution as it transmits from human to human, speed up diagnosis, and in the development of potential treatments, while also helping policymakers cope with related issues, such as the impact on transport, food supplies and travel . But in all these cases, AI is only effective if it has sufficient examples to learn from. As COVID-19 has taken the world into unchartered territory, the "deep learning" systems, which computers use to acquire new capabilities, don't necessarily have the data they need to produce useful outputs. The early toll of the COVID-19 pandemic revealed severe health inequities in who catches the disease and who suffers death and morbidity.

In the early stages of a disease outbreak, detecting cases is critical to prevent population spread, but also very difficult—a proverbial "needle in the haystack" data problem. But computer scientists have already developed artificial intelligence systems for such challenges in other contexts, such as detecting mechanical faults in jet engines or anomalous and potentially fraudulent financial transactions. Models built for these applications must be able to accurately and reliably find rare occurrences in a flood of data—nobody wants to discover airplane engine failure too late.

COVID and other diseases can be detected using medical and public health surveillance data. It will adapt solutions for common challenges such as training models on sparse data, combining data from different sources and collection techniques, and minimizing false negatives that could have dire consequences if infected patients are missed.

Such projects focus on primary research interest that is interactive machine learning. As opposed to the passive, "black box" of most AI models, these systems actively work with human experts, suggesting new data sources that should be gathered to improve

predictions, or asking for help when a particular diagnosis is unclear. If the model is not very confident about the predictive results for a certain medical diagnosis on available data , it will flag these data and ask experts to verify or correct the predictive results . Interpretable recommendations and training the AI system to effectively communicate with the human users (medical professionals) to collaboratively make detection and diagnosis decisions is crucial. By running simulation tests to screen various chemical compounds for potential drug development, AI is being used to accelerate drug treatments and even vaccine discovery, expediting the usual trial process for this kind of testing. In addition, AI is helping to identify new drug targets for therapeutics with the aim to improve treatment efficacy.

Medical use of AI is nothing new . It has been used to accelerate genome sequencing, drive faster diagnosis, and carry out radiological imaging analysis, among other applications. Although it doesn't eliminate the need for human expertise, AI has also facilitated greater access to scientific research and publications worldwide, helping to optimize individual patient care.

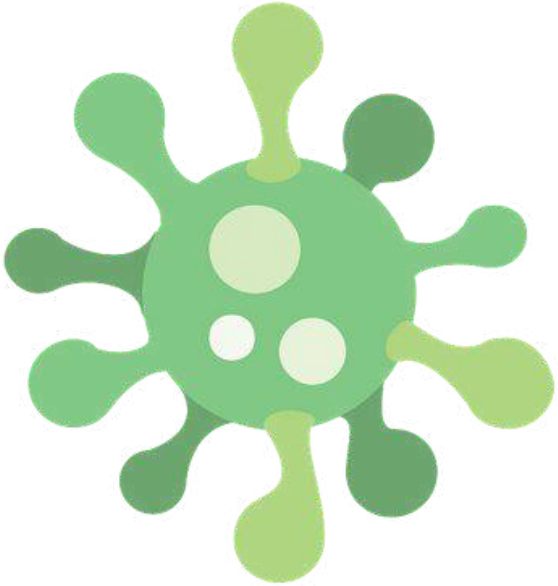
Such international collaboration and data sharing have been encouraging throughout the COVID-19 pandemic.

– Isha Suhas Kulkarni
TE Computer

How technology is changing the world during COVID-19

Image source: Pexels.com

The way we live has changed immeasurably since the beginning of March when COVID-19 began spreading rapidly throughout the whole world. In the midst of April, most of us were at home, using tools like Zoom, Meet, Teams, and Slack to stay in touch with colleagues. Other than groceries and prescription we're buying almost everything online and having it shipped to our door. Everyone was forced into using these technologies directly or indirectly.



How education is completely Transformed :

In the wake of COVID-19 crisis, India is witnessing an eLearning boom. All around the world, schools, colleges, educational institutions, are leveraging online learning platforms, thereby continuing the teaching-learning process.

This move has changed the concept of education overnight, and digital learning has emerged as an absolutely necessary resource for education.

The great thing is that India is well prepared with the extensive and robust 4G Network and affordable data, in virtually every part of the country.

How E-commerce is impacted by Covid-19:

Consumers have switched from shops, supermarkets, and shopping malls to online portals for the purchase of products, ranging from basic commodities to branded goods.

Since the norm of social distancing has been initiated for almost the entirety of 2020, the scope of online purchases and online businesses is expected to surge. Many people are embracing the concept of online retail and the surge in FTUs (First Time Users) on e-commerce sites is visible.

Demand for Artificial Intelligence changing the world:

The role of AI Applications in enterprises is rapidly evolving. It is transforming how your customers buy, your suppliers deliver, and your competitors compete. AI applications continue to be at the forefront of digital transformation (DX) initiatives, driving both innovation and improvement to business operations. AI is slowly taking over the human life and is transforming the lives of people unknowingly.

Digital transformation of Life:

COVID-19 could mark a turning point in how people work. The pandemic is transforming peoples' approach towards work, mobility. Increasingly, a large part of the economic value created is coming from digital innovation,

ecosystem propositions and new technologies. This transformation has led to the interaction of humans more with devices than other people. People can buy, sell, order anything from the comfort of their homes. This has led to the change in the lifestyle of many people.

-Tejas Milind Nagmoti.

T.E Computer.

Five Ways Tech is Being Used to Fight COVID-19

While the fight against COVID-19 continues, people and businesses are finding ways to help fight the virus. Supercomputing resources available to researchers worldwide, businesses and individuals are also coming up with ways to use technology to fight COVID-19.

1. Amazon Web Service (AWS) launched a new, global initiative:

AWS just launched the AWS Diagnostic Development Initiative, committing $20 million for Amazon customers working on diagnostics solutions for COVID-19.

Funding will be provided as AWS in-kind credits and technical support to help research teams use cloud technology to tackle this monumental challenge. Amazon customers who are new to AWS cloud services will be pleasantly surprised at how much easier their workflow will be in the cloud.

The best part is that cloud technology is efficient and easily secured to meet all data privacy compliance standards.

2. Google is using DeepMind to help fight COVID-19:

Google is using technology to fight COVID-19 in two major ways. First, the company is working with US government to develop an educational website to host resources on COVID-19. As part of Google's fight against COVID-19, company has contributed its DeepMind program to its AlphaFold system. Both systems are part of Google's artificial intelligence, but adding DeepMind aims to predict the protein structures

related to SARS-CoV-2 virus that causes COVID-19 in order to create effective treatments.

3. Manufacturing companies are stepping up to produce supplies:

Most people know that large corporations like 3M, Ford and GE are working hard to build respirators, ventilators and other PPE for doctors and nurses. There are many smaller companies producing medical PPE right now, including two Italian companies – Salewa and La Sportiva.

Other companies making surgical masks, gowns and even n95 respirators include Seattle's Outdoor Research, Wild Rye and DaleBoot. All these companies deserve some serious credit for their tireless efforts during this tough time.

4. People are using 3D printers to make needed products:

Ever since 3D printers became mainstream for hobbyists, people have been making all kinds of useful items. In the wake of COVID-19 pandemic, 3D printers are proving exceptionally useful. 3D printing companies are also stepping in to make PPE for doctors and nurses on the front lines. So far, 3D printer manufacturers carbon, prusa research and formlabs 3D systems are producing face shields at a rapid pace. 3D printed face shields are technically not FDA-approved, they're not advising against using these homemade face shields and masks. They are, informing people that 3D printed face shields don't provide the same level of fluid barrier or air filtration protection that FDA-approved PPE provides.

5. HPE Aruba created a medical ferry:

Aruba, an HPE company, installed a network on a ferry that turned it into a medical ship to help people affected by COVID-19. Aruba is continuing to provide pop-up COVID-19

clinics and temporary hospitals across the United States, United Kingdom and the European Union.

It's great to see technology being used to help fight this pandemic. The fight against COVID-19 really is a group effort and every contribution helps.

-Neeraj Nawale

TE Computer

INTERNET FOR STUDENTS AND CHILDREN

In this modern century , Internet has proved to be one of the biggest blessings to the human kind itself. The most benefited from this can be our youth generation itself. Under Proper guidance our students and children can learn and understand various incredible things by connecting to the entire world .With the help of internet students can have access to the outer world at their fingertips

This topic can lead to a hot debate regarding its pro's and con's .Further we will get a look on some of the important points.

SHOULD CHILDREN BE ALLOWED TO USE INTERNET?

This Question is often placed from most of the parents worldwide regarding the future of their young ones. As a coin as 2 sides so do this Question. All that we can say is that Internet is a tool which can be a reason one's success as well as one's destruction. Everything depends on its use.

" The web is simply a world passing notes around a classroom and making it fun."

- Jon Stewart

These days most of the urban schools and colleges give their students access to internet. With the help of internet they can simply enhance the knowledge sharing and place their theoretical knowledge in front of students with more clarity.

There has been a lot of researches that states that visual learning as much more impact than any other teaching method as our eyes can register at least 36,000 visual messages per hour. There are various benefits that can be seen in below diagram.

Besides , internet can also stray them away from their benefits and be a reason to keep them indulged in unwanted things which are not beneficial.

They are several demerits such as :

- Harassment/Bullying.
- Fraud.
- Identity theft.
- Distraction.

Hence , the students should not be deprived from internet access but, the access should be in a controlled environment. The elders should always keep track of their browsing and searches and guide them to properly use internet to their need.

WHAT ARE THE PRO'S AND CON'S OF SWITCHING TO ONLINE LEARNING DURING THIS PANDEMIC?

Regarding this pandemic situation ,it is quite obvious on how internet is widely coming into use for young generation regarding their curricular aspect. Every teaching is being carried on online platform as physical contact is avoided. In this pandemic ,truly speaking internet has proved to be a boon and a viable solution for the continuity of teaching.

Pros:

- Social and physical distancing can be achieved, minimizing the spread of COVID-19.
- Continuity in teaching can be achieved even school and colleges are closed.
- You can join the class from anywhere in the world as long as you have access to internet.
- Low cost of setup.
- Instructors can share assignments and assess the results online.

However, there are some falls too.

Cons:

- Distraction can be a hindrance.
- Self-discipline is compromised.
- Physical environment may be unsuitable.

Conclusion:

Therefore , we can say that everything depends on how internet is used .if students and children use it in the appropriate manner it can prove to be their climbing stairs for success. With internet they can bring the world to in front of their eyes and on the other side can crumble their bright future leading them to distractions.

-**Lijju**

TE computer

Space Robotics

WHAT IS SPACE ROBOTICS?

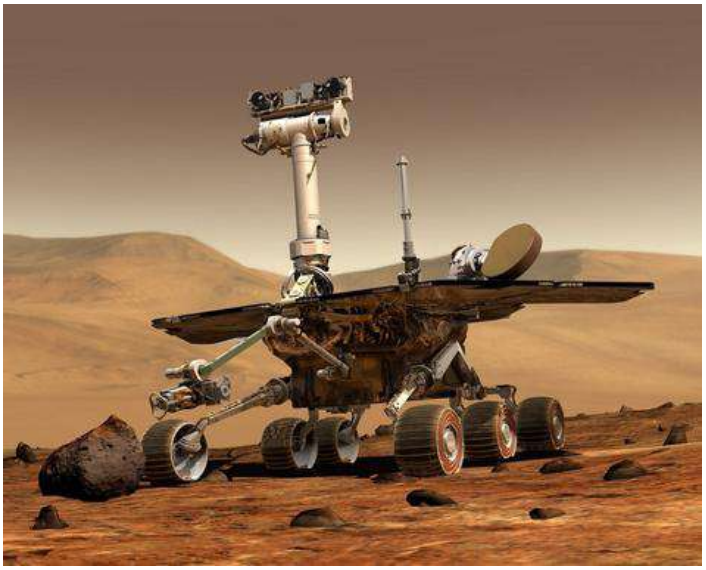
Space robotics is the development of general purpose machines that are capable of surviving in the space environment, performing exploration , construction, maintenance, servicing or other tasks. Humans control space robots from either a “local” control console or “remotely” controlled from human operators on Earth. Space robots are generally designed to do multiple tasks.

Space Research:

“SPACE”, the word itself signifies something infinite. Space travel has always been dangerous and any unexpected event can cause death. It is here that the robots play a huge role and help mankind in his research process.

How Robots Work in Space?

Working principle of Space robots are based on the SPA algorithm. SPA stands for sense, plan and action. It is used in built world modules to match and worked accordingly.



Flowchart:

Fig: Working of Space Robots

Technologies Used: Mapping and navigation One of the basic functions of a space robot is to navigate its way cleverly through all obstacles that come in its way. Mapping and navigation comprise of three more technologies.

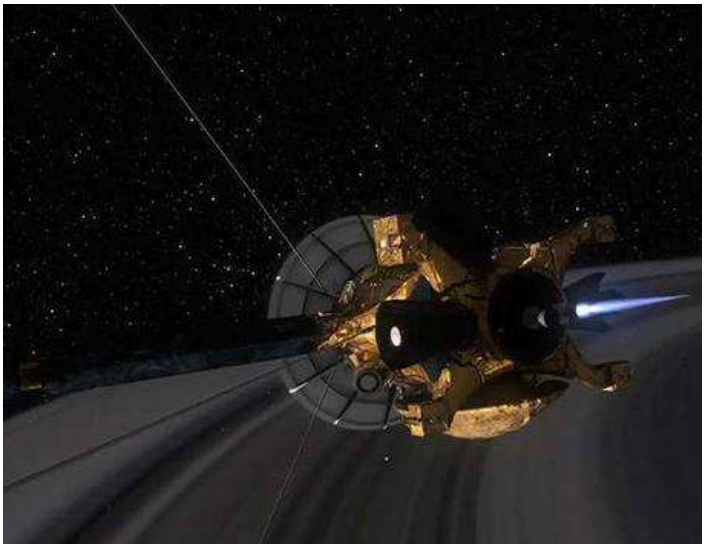
1.Obstacle avoidance
2.Mapping
3.Path planning
4.Planning: It is a feature by which a robot understands the situation and
5.decides a strategy to tackle it.
6.Sequencing: Selection of a particular skill set which would result in perfect execution of a plan.
7.Control: Performing the selected skill set to perfection.

Types of Space Robots:

1. Planetary Rovers:

It is the most advanced form of robotics technology used in space research.

They are the robots, which explore, navigate and research themselves with the least human intervention; they analyze the data collected and send the results back to earth.



2. IN-Orbit Operators:

They are the robots, which assist an astronaut during his space mission. For example a robot can be designed specially to refuel a shuttle thus helping the astronaut to remain in his shuttle and accomplish various tasks without any risk to their lives.

3. Probes:

A similar class of robots explores the system without actually physically landing anywhere. These typically use cameras and variety of instruments to measure other planets, moons, and the sun from distance. Most of these use solar cells to their instruments.

4.Astronaut Assistance: Besides acting as explorers, space robots can also assist astronauts in manned spaceflight. One of the most notable a device known as the Canadarm. with funding from the Canadian Space the Candarm became a permanent fixture many American space shuttles and the international space station.

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-Sayali Athare
B.E(Computer)

IT/Computer engineers during Covid 19

The year 2020 was not among the best years one could have had. One might even say that this is the worst year due to global pandemic. The lockdown restrictions halted most of the economic activities and led to job loss of hundreds of thousands of workers all over the world. There is not one sector which was not affected due to the lockdown. Entire manufacturing plants were shutdown, leading to loss of income source for multiple people from multiple sectors. Aviation industry also suffered from the lockdown, countries terminated international as well as domestic flights leading to job loss for multiple employees. Organisations from all over the world reduced the number of workers. There is not one sector, be it be technical or non-technical, everyone was affected. Even our sector which is engineering is affected. Freshers are worried and facing the problem of jobs not being available because companies are not recruiting. Even our sector which is engineering is affected. Freshers are worried and facing the problem of jobs

not being available because companies are not recruiting I have even heard from a certain person that his boss has asked him to enlist 15 employees from his team to be dropped off. But for us, students/workers related to computer science be it be IT engineer or Computer engineer, there is a silver lining in this situation. IT sector is debatably the least affected sector during this pandemic. And why is that one might ask, well.. “The entire IT sector has switched to ‘work from home’ concept.“ But is this the only thing positive? So the fact that our sector does not actually need to be present in the work place to continue working is the silver lining?? Well that is definitely one of the aspect, but this is not the entire story. Believe it or not the fact that we can no longer meet other people or we are stuck at home unable to reach to basic resources has lead to multiple opportunities.Let us take an example of our day to day activity, attending college lectures. This simple activity has lead to multiple scope for new startups or technologies that were till this point had no recognition as such. Example for this is the zoom application which did gain a large amount of recognition during lockdown. Google meets, microsoft meets are yet another examples.

Online learning platforms like coursera, edx, udemy became extremely popular during lockdown. Students took a great advantage of this facility.The entire market switched to digital transactions. E-commerce deliveries actually tried to implement drone deliveries, which under normal conditions might not have been implemented so soon. The need of automation, in other words the need of things being done automatically without human intervention caused multiple inventions, automation of work process. The software industry more specifically "application developers" had a great demand during lockdown because every business wanted to be digitalized. Now when we consider all the needs discussed above, who do you think we need?? Yes we need an IT guy, a guy who can code all the automation, one who can code all the applications, one who will manage all the websites, one who will manage all the servers, most importantly one who can work remotely.Some articles even stated that "Coronavirus lockdown is a blessing in disguise for IT industry" because it proved that the necessity for an employee to be present in work place is very low. Companies like microsoft and google even

stated that work from home concept may remain active even post lockdown. There are also some articles that stated that apart from e-retail and medical/pharma, IT/ITeS is also a candidate for the sectors that will bloom post corona.I am not saying that all the IT techies are doing great and not facing any issues, that is not true either. Organizations are not recruiting freshers as they previously used to, they are also reducing workers.But there is still some work for us, we can still in a nutshell 'develop'. So to all the students who took Computer/IT related fields, good choice!

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-Prasanna Dixit
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