Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
Vile Parle (W) Mumbai - 400 056.

DJCSI

PROTOCOL

VOLUME 13

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TESTIMONIALS

The CSI student chapter of our college has been working diligently to help the students gain exposure to the various technological advancements along with their regular academic curriculum. The success and the magnitude of these events highlight the tremendous growth DJ-CSI has undergone year after year. This is further highlighted by the fact that the committee was awarded the best CSI Student Chapter of India. I wish the DJ-CSI committee all the very best for their future endeavours.

- DR. HARI VASUDEVAN,
PRINCIPAL, DJSCE.

Dear students, I am delighted to present the 13th edition of Protocol. Keeping up with the tradition of Protocol, this year's issue throws light on a myriad of disciplines and technologies. Special efforts were taken to highlight the various technological advancements adopted by the various branches of our college. I would also like to take this opportunity to thank our Principal, Dr. Hari Vasudevan, Dr. A.C. Daptadar, Vice Principal (Admin), Dr. Manali Godse, Vice Principal (Academics) as well as the faculty of IT Department for their constant support and encouragement.

- DR. VINAYA SAWANT,
DJCSI STUDENT BRANCH COUNSELLOR, HOD I.T. DEPT.

TESTIMONIALS

DJCSI has always strived to reduce the gap between the academics and industry. The multitude and diversity in terms of departments makes the students understand the importance of collectively and effectively working in a team. With the latest edition of Protocol, we at CSI have attempted to throw light on various technological advancements and how it will enrich our future. I hope that this issue of Protocol is highly beneficial for each and every reader.

- PROF. MITCHELL D'SILVA
FACULTY ADVISOR, DJSCI

Today, technology is no more bound to an intangible impact but rather has the power to touch lives and truly make a difference. Being the Chairperson of DJ-CSI, I have had the privilege of working with the finest talents across the Indian technical forefront.

I would like to express my gratitude towards our HoD and Branch Counsellor, Dr. Vinaya Sawant and our faculty at the dept. of Information Technology for their continual support and the freedom they gave us to express ourselves and our ideas, while actively participating in all our ventures.

I would also like to thank the entire team of DJ-CSI 2019-20 for being such a big influence in a successful tenure and for sharing the same dynamic and vision which helped us achieve our goals.

I hope that in the years to come, DJ-CSI can continue to grow and accomplish its mission of using technology to make the world a better place.

- PUSHKAR BHUSE
CHAIRPERSON, DJCSI 2019-20.

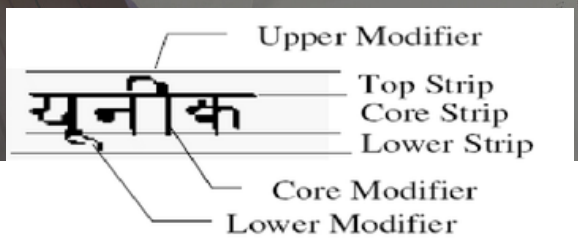
COMMITTEE 2019-20

CONTENTS

PROJECT 01

Intelligent Form Reader

Best Student Project Award by TCS for 2018-19
Winner of DIPEX 2019, Finalist at DJASCII 2019
Best Paper Award in ICACTA 2020



Organizations prefer collecting data manually through paper-forms because only 369 million people in India are online which accounts for 28% of the total population. To elude this cumbersome step in the process, devised a solution named as 'Intelligent Form Reader'.

Intelligent Form Reader is a mobile application which will automate the form reading and saving form data process which is now being done manually by the data entry operator. The system applies knowledge of deep learning and image processing into computer vision technology. The application provides a one-click solution that will allow the user to capture the form and visualize the automatically extracted data.

All other secondary objectives that the system will meet are as follows:

- Form Generator application for better compatibility with the processing algorithm.
- Provision for correcting incorrect predication if any.
- Authentication and authorization of forms and templates for providing confidentiality.
- Proper Visualization of the data extracted from the user's forms.
- Providing Mobility to the user organizations by the use of mobile application service.

One of the major focus of the System is inclusion of Devanagari based Form. This research work applies the knowledge of more than two academic disciplines namely which can be further elaborated as:

- **Image Processing**: This involves pre-processing the input image for image enhancement and correction, detecting and analyzing edges, point features and contours in the input Devanagari Character. Various Image Processing techniques are used to build an algorithm that pre-classifies the input characters so as to reduce the no. of classes and improve the classification accuracy in character recognition.
- **Deep Learning**: This provides the core character recognition module. The pre classified characters are then supplied to Convolutional Neural Network model, which is to be trained on more than 1 lakh sample images, that performs feature matching and feature detection to recognize the input Devanagari Character.

PROJECT IMPLEMENTED BY:
DR. VINAYA SAWANT
PRATHAMESH MHAPSEKAR,
MANDAR MHAPSEKAR,
ANIKET MHATRE

PROJECT 02

SYT-AJ: Virtual Reality to treat Lazy Eye

1st Runners up at DJASCII 2019
Best Paper Award in ICACTA 2020

Lazy eye is the non-scientific term for amblyopia. Amblyopia is the result of a lack of development of clear sight in one or both eyes. Because the brain doesn't develop the ability to see clearly in one or both eyes, the eyesight cannot be improved with glasses alone.

In most cases of amblyopia, one eye sees more clearly than the other. As a result, it seems like one eye does all the work, and thus the slang term "lazy" for the other eye. As many as millions of people are affected with this disease across the World. Particularly in India it is increasing at an alarming rate of 5% in children.

SYT-AJ is a Virtual Reality (VR) based project to treat Lazy Eye. It will help patients to get relief from the disease Amblyopia in a very cost-effective way. The project has used game therapy such as shooting games in order to improve the vision. This therapy is a series of exercises and activities that help a person improve their visual skills.

Vision therapy helps restore a person's binocular vision, which is the root cause of the condition.

With SYT-AJ, they aim to increase user involvement and interaction with the virtual environment so as to engage the users in the visuals they are seeing leading to faster recovery from the disease. This involves Eye-eye co-ordination, Brain-eye co-ordination & Hand-eye co-ordination treatment.

Blender and Unity are open source modelling and animation tools which are used to develop models and animations that make up the virtual game to be created. A VR headgear and controller set are used for visualizing and navigating through the virtual environment.

PROJECT IMPLEMENTED BY:
PROF. NEHA KATRE
TEJAS VED, JAY CHAUHAN, SHYAM PATIL

PROJECT 03

Identity (KYC) secure sharing

First prize for this particular Problem Statement at finals of SIH 2019.
The Team was rewarded a Trophy and Rs. 75,000.

They came up with a solution where the user will have control over his/her personal data.
The user will have to do the KYC process only once. Verification is done using Aadhar or PAN + Electricity bill using facial recognition methods, and OTP. The companies can verify that the user is authenticated or not. A new user (not authenticated) can sign-up and perform the KYC process through our Android app or web application. The user will receive a unique ID known as Uni-kyc. Similarly, the companies will also have to register themselves on our platform.While registering, the companies need to mention the basic data requirements that they want from the users. The user and company data is stored in SQL database. These companies will have to use the API key provided by our platform to get the status and access the details of the user. All the transactions of the users will be stored on a permissioned block chain (hyperledger). The users can decide whether to grant access to the details to the companies that have inquired about the same.
The users can also revoke access whenever they want. If users have any concern about their data being leaked, then they can raise an issue with their platform.

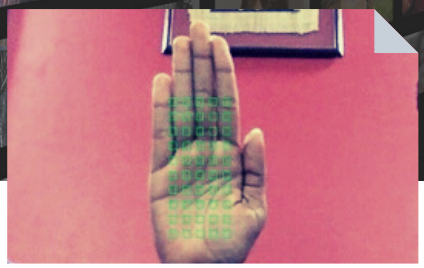
The cross-examine component (CXTeam) will analyze and track the transactions which will guarantee non-repudiation. The details of the CXTeam is maintained in Firebase.
Mobile app is built using react native. A user can register or signup using this app and complete the one-time KYC process. The app performs face recognition for authenticating the users. The users will be notified about the grant permissions of the companies. The users can grant these companies access to their data. They can also revoke access from the companies. The users can raise an issue which will be forwarded to the CXTeam. Web Application Users can also use the web application to get themselves authenticated.
Face recognition can done be similar to the mobile app. The users can view the grant requests and grant or revoke them.

PROJECT IMPLEMENTED BY:
HARSH JAIN, FARHAN KASMANI,
AJAY LAD ,
SHREEYAA AGRAWAL,
HARSHITA KHANDELWAL,
PRITALEE KADAM

PROJECT 04

Real Time Communication System for Hearing and Speech Impaired

First Prize Winner at DJ ASCII 2019



A communication barrier exists between the deaf community and the hearing majority and so there is a need for a sign language interpreter system that recognizes gestures. The systems that currently exist are not real time, do not facilitate two-way communication, require static surrounding conditions or have low recognition accuracy.

This project consists of a real-time communications system built using the advancements in machine learning and computer vision that provides real-time sign language to text and text to sign language conversion. The primary goal is to enable such communication in real time by interpreting alphabets, numbers and words in the Indian sign language. The system is able to predict 17600 test images in 14 seconds with an average prediction time of 0.000805 seconds.

They prepared their own dataset for this study. For each gesture, they have captured 1200 images. The captured images in 50X50 pixels were converted to grayscale and all the images were flipped. This led to the generation of total 96000 images. These variations enabled the system to be trained on a variety of different forms for the same sign, thus making the system more accurate.

In the process of getting the hand histogram, they extrapolate the hand to fill dark spots within and blur the image using median blur. This reduces the noise in the image up to a great extent. The contours in the image are found using the 'findContours' function of OpenCV. Then it finds the contour with the maximum area which is the hand.

Using image processing techniques and CNN model, a reliable recognition of sign language gestures can be carried out. The model proves it is robust enough in different lighting conditions and backgrounds as effective image processing techniques are applied before it is fed into the model. The multiple image processing stages ensures that the system functions well irrespective of the environmental factors. The ISL system is able to recognize all the alphabets and basic words such as – 'remember', 'like', 'best of luck' etc.

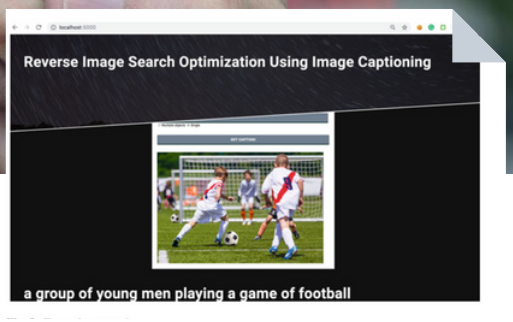
The next aim is to train the model for use case of public metro service announcement and video call.

PROJECT IMPLEMENTED BY:
PROF. PURVA RAUT
TANUJ BOHRA, SHOUNAK PATEL, KRISH PAREKH

PROJECT 05

Optimizing Reverse Image Search

Best Paper Award in ICACTA 2020



Reverse image search is a query technique that formulates a search query based on the sample image provided to it. Surveys showed that about 80% of people use it frequently, out of which about 70% of people did not receive expected results.

Captions are the detailed description of images that help to distinctly locate an image from its pool. Using it, one can find results that are more accurate and apt to the user's search. The existing systems fail to generate accurate and contextual captions for moderate-to-high complex images.

It was concluded that CNN is the most suitable method for the purpose of feature extraction; VGGNet" is used in order to upgrade the object detection improving the accuracy. In order to generate the sentences, long short-term memory (LSTM) is used. LSTM is a form of RNN that uses an internal memory to remember its inputs. They used two datasets accumulating upto 38k images for training.

Captions are preprocessed by splitting each of the five captions for an image and inserting and tags at the beginning and end of each caption. Images are also preprocessed by converting them from RGB to BGR format. After preprocessing, the objects in the image are identified by feature extraction.

First, it splits the image into segments and then extracts features/objects from each part. The convolution layer is applied which convolutes a kernel over the pixels of the image, giving a feature map. In this way, the network first learns edges and curves and then slowly understands complex and intricate shapes. The output of the convolution layer is fed into the pooling layer which reduces the spatial dimensions by averaging or taking the maximum value of the subregions in the feature maps. This improves computation performance and also reduces chances of overfitting.

The next layer is flatten layer, which converts 2D matrix into 1D vector. At the end, the output objects are extracted using an activation function. The objects that are extracted in this step are related using a sentence framework.

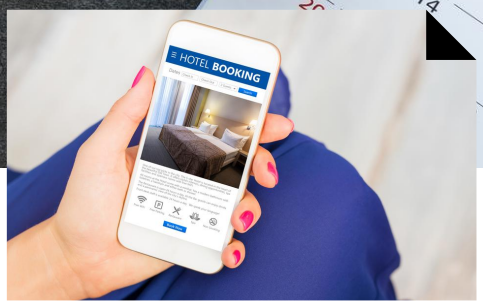
In order to determine the relationship between objects, the model is taught to learn "English" with the use of Parts of Speech(POS) tags so that it can generate sentences. Thus, the system is ready to take user input and generate appropriate captions.

PROJECT IMPLEMENTED BY:
DR.ABHIJIT JOSHI,
DHVANI KANSARA,
ADITYA SHINDE, YASHI SUBA

PROJECT 06

Voyageur

Received Research Grant of Rs. 25,000 from University of Mumbai for Research Proposal "Voyageur" in 2018-2019



People face a lot of problems while planning a trip. Some of those problems identified are:
Firstly, there is abundant of information but it is not fragmented properly. Secondly, it is difficult to organize the gathered information for making a decision. Lastly, differentiating the outcomes based on calculation whereas experience may suggest some more days including other factors such as days for rest, shopping, delays, etc.
The user requirements and the flaws were studied by reviewing the existing systems. An itinerary of the same destination was made on popular travel planning websites and its drawbacks were noted down. Also, offline customized tour planners were reviewed.
Then, a survey was conducted to identify the problems faced by people during trip planning.
'Voyageur' is a web application which can solve all these problems thus giving users a single common platform on which they will find all their requirements and make an optimized and efficient itinerary.

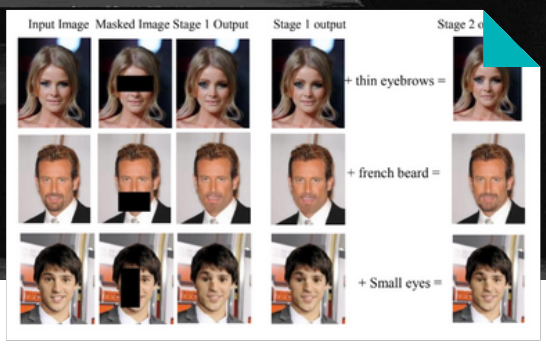
The proposed system provides features such as:
The user will be able to find all the information required at a single place. Voyageur offers automatic itinerary generation which takes into consideration various factors such as user preferences, the distance between places to visit, etc.
The generated itinerary will contain the best sightseeing to visit based on user preferences and the ratings available on the internet. It will also suggest best hotels which are nearest to all the preferred places to visit. The users can replace or swap the sightseeing in the generated itinerary as per their interest. The users can define block time and location, so that they can consider food breaks, conferences, shopping time, rest time, events, etc.

PROJECT IMPLEMENTED BY:
PROF. MITCHELL D'SILVA
AKSHEN KADAKIA
DEVANSHI DESAI
URVI MISTRY

PROJECT 07

Face Completion Using Generative Adversarial Network

Best Paper Award in ICACTA 2020



In crime investigation sector, recognition of the suspect is difficult due to lack of proper pictorial evidence. In such cases, there is absolutely no technology available to reconstruct the entire face. This drawback creates an obstruction in the investigation process.

Through this project, they have provided a solution to this extremely critical problem. Partial part of the suspect, which is available as evidence would be fed into the system and the system will generate the entire face hence helping the investigation process. In this project they have presented a novel idea of hybrid algorithm a two stage Generative Adversarial Networks (GAN) each comprising of Convolutional Neural Network (CNN) tackling the problem of face inpainting. In order to address various peculiarities of face, they've aided the user by accepting textual inputs for the same.

The description would be accepted from the user by high-level description for example 'french beard', wavy hair', etc. and after a dual combination of both the modules viz. face completion and text to feature conversion, a final output of the entire face is generated.

To achieve this, a technique called Image Inpainting is used. Image inpainting is a technique which aims to fill the missing regions of an image with plausibly synthesized contents. Inpainting is achieved by Generative Adversarial Networks (GAN).

GAN, is a combination of two neural networks, Generator and Discriminator. The generative model can be thought of as analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. This idea was prolonged by employing a generator network which takes masked image as input and inpaints the missing region. This image is then forwarded to the discriminator to distinguish it as real or fake and backpropagates the feedback to the generator. This process eventually allows generator to generate plausibly realistic images. Various systems have been designed using Generative Adversarial Networks to achieve significant results in image inpainting.

PROJECT IMPLEMENTED BY:
PROF. PURVA RAUT
MOXA DOSHI, MONIL
DHAVAN & KARAN DOSHI

PROJECT 08

Juxtaposing Deep Learning Architectures for Breast Cancer Classification

Best Paper Award in ICACTA 2020

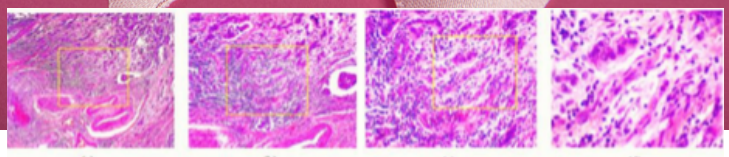


Fig. 6. Slide of breast malignant tumor (stained with HE) seen in different magnification factors: (a) 40X, (b) 100X, (c) 200X, and (d) 400X. [13]

Breast Cancer has been proven to be one of the major forms of cancer all over the world. India has also been adversely affected by this phenomenon with a high rate of incidence and a considerable rate of mortality. This study is an attempt to find out the Deep Neural architecture best suited for classifying histopathological images obtained from the BreakHis public dataset. Inception v3 and NASNet have been chosen as the subject Neural Networks.

Transfer Learning has been applied to use the weights obtained by training ImageNet on both the architectures and custom layers have been defined on top of the existing architectures. The NASNet was proven to be a better classifier in terms of accuracy and loss and the scores form the confusion matrix support it.

New state-of-the-art Deep Learning models have shown to be incredibly accurate and precise.This study was an attempt to tackle the Breast cancer classification problem by comparing two of the most famous and highly accurate Deep Learning models of recent times.

It trained the Inception v3 network and the NASNet on the BreakHis dataset using Transfer learning to add custom final layer and train just the custom layer while keeping the weights obtained from training the models on the ImageNet data.

The objective was to determine which model could best classify whether a tumour was benign or malignant from a histopathological image. With an accuracy of 86.3% and a loss of 33.8%, the NASNet model out did the Inception v3 network which posted an accuracy of 81% with a loss of 43.2%. The confusion matrix further backs the fact that the NASNet model had better scores for precision and recall than the Inception v3 model.

Overall, keeping in mind the scope of this study with respect to the dataset and the restrictions on computational capabilities, NASNet architecture has proved to be a better classifier than the Inception v3 network.

PROJECT IMPLEMENTED BY:
PROF. PURVA RAUT
AKSHEN KADAKIA,
VIRAJ MEHTA

PROJECT 09

Virtual platform for Startups to connect with Government

Top 4 finalists for the Problem Statement at SIH 2019

Many Startups have to deal with Government entities while working on their business ideas. Government offices may be able to provide required mentorship in product design, complying with regulations and guidelines, information and application process Government schemes, connecting them to relevant stakeholders, providing Government market research data opportunity to pilot etc.
The platform will enable a mentee to connect with the right Professional Mentor from Central Government Department.

Key Points:

- Prevent plagiarism of ideas - NDA signing using RSA digital signature with MD5
- Recommend mentors - Simple algorithm (as data increases Machine Learning can be used)
- Filter mentors
- Prevent spamming and reduce mentor workload - Limiting number of requests per user per day, profile matching
- One-to-one connectivity - Chat and Video Calling using Web RTC
- Non repudiation - Video recording and logs
- Flash/speed mentoring
- Maintaining trust - Endorsements and reviews
- Keep track of which startup is assigned which mentor
- One stop platform for all stakeholders - Forum (query tagging using NLP)
- Increase your network - Events (are scraped and can be posted)
- Obtain correct information from authenticated users - Resources section (schemes, grants, requirements)

PROJECT IMPLEMENTED BY:
RAJ KOTHARI
BHUMIL JAKHELIA,
YASHVI UPADHYAYA,
KRITIKA MITTAL
MAITRI THAKER,
GARGI VYAS

PROJECT 10

Translating various regional languages to India Sign Language

Selected for Final Round of SIH 2019

Their proposal is an Offline Android application which uses Natural Language Processing to translate various Indian regional languages to India Sign Language used by the Speech and hearing Impaired. The user may provide a phrase through text or speech in any Indian regional language which will then get translated to English; for example, "**हमे आमंत्रित करनेके त्रिए आपका धन्यवाद**" will first get translated to "Thank you for inviting us".

This sentence will then be broken down into meaningful fragments with the help of natural language processing toolkit. The phrase "Thank you" will be treated as one unit or word instead of two separate words. Datasets of predefined sign language are used as input so that the software can then convert & display the converted text obtained in English to appropriate sign language either in form of images or videos obtained from database.

Thus, the phrase "Thank you for inviting us" will be matched in the database with the dataset available in the database and if exact match is found, appropriate images or videos will be displayed.

If no match is found the application will display image for each and every alphabet. Besides this, there is a repository of images and video tutorials as well as images of each and every alphabet in Indian Sign Language with the help of which sign language could be learnt easily.

PROJECT IMPLEMENTED BY PROF. AMIT SAHU, SRUSHTI PATHAK, MANALI SHAH, AVDHI SHAH,TILAK SATRA , CHIRAG GOYEL, SAGAR DARJI

PROJECT 11

Driver alertness and rash driving detection

Selected for Final Round of SIH 2019

They have implemented different features to provide alertness to the driver at the time of driving.
Features:
1.Drowsiness detection: The system detects Eye Aspect Ratio (EAR) using Haar cascade classifier along with Adaboost optimizer which is the world's finest optimizer for binary classification, unlike traditional approaches.
2.Alcohol detection: The system uses MQ3 sensor and STM32 microcontroller to detect alcohol vapors in the driver's breath. An external switch is connected to control the motion of the servo motor. When alcohol amount greater than the legal limit is detected, the car won't start and the driver will receive an LED indication.
3. Emotion Analysis and detection: The model detects various emotions of the driver such as, Happy, Sad, Angry, etc. An SMS alert will be sent. The Emergency contact can start a video call with the driver using the Front cam installed inside the car or can communicate using WebRTC.
4. Lane detection: The model detects the current lane of the vehicle and alerts the driver in case of any deviations.

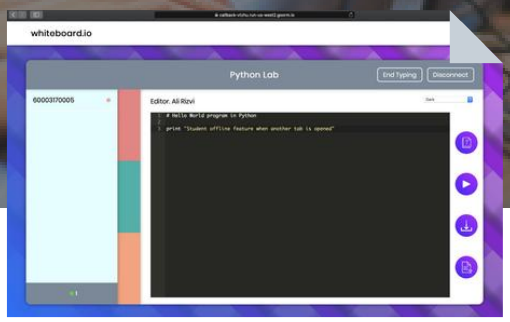
Rash driving can be detected if too many lane changes occur within a particular time period. The system uses sobel and gradient filters for detection of the lines. Sliding window is used to detect lane changes.
5. Proximity sensing and audio alert It will give different audio warnings to the driver whenever a vehicle or pedestrian is detected in close vicinity. The audio output is available in different languages.
7. Distraction by the use of mobile: EAR is used to implement this technique. if the driver is on his/her phone for a long time then the system sets off a buzzer sound which alerts the driver.
8. Reminder for maintenance: As per the scheduled date an alert is sent to the driver to remind about the maintenance.

PROJECT IMPLEMENTED BY:
PROF. TUSHAR SAWANT
PROF. PRATIK KANANI
DISHANT SHAH,POOJA JHA,
SHRUTI RAVICHANDRAN,
AASHREEN RAORANE,
SHANE FERNANDES,
HITANSHU RAMI

PROJECT 12

Whiteboard.io

Project Represented at Aavishkar 2019.



A Node.js/Express project for live teacher-student integrated session management using sockets, wherein the student can write, compile, run and post codes and the teacher can edit the codes live.
Its Technology Stack includes Frontend using vanilla HTML, CSS and JS, Backend using Node.js/Express, Data stored in MongoDB Atlas, Live code interaction using socket.io, User session management using passport.js, C and Python compiler by compilex, Java compiler provided by HackerEarth and Editor provided by Ace.
Whiteboard.io has a fine dashboard with features like display of details about both students and teachers, statistics about no of posts of the day, total posts etc

- **For teachers**

->Shows all posts by that teacher
->Query posts by respective batches

- **For students**

->Shows all posts by their respective batches
->Students can download any code they require from the dashboard. It also has a Notification feature to send notifications from student to teacher, teacher to teacher and teacher to student.
The main Room in whiteboard.io has the following distinct features:

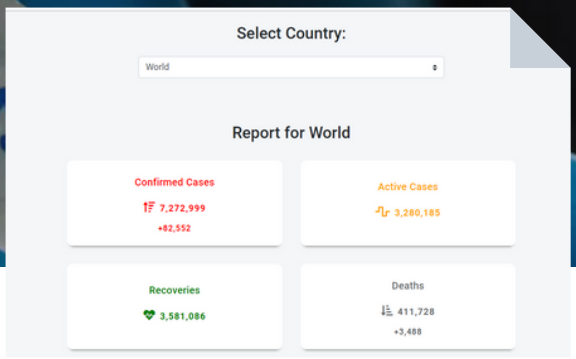
- Question can be added by the teacher which will be displayed to all the students in that room live
- Students will get an editor for the respective language of the room
- Students can write their code and can run it on the application, code will run on the server and needs no software installed on the desktop
- The teacher can view the code of any student at any time live, can also edit the code of any student live and it will stop the student from editing the code at the same time
- The student can see if the teacher is watching him/her, or if the teacher is editing his/her code
- The student can finish his/her code which will be checked by the teacher

Programming languages supported for coding - C, Java, and Python. Activity statuses of students like "Online", "Idle", "Coding" are visible to facilitate a perfectly monitored session. Features like querying teachers personally for doubt solving and notifications are also provided.

PROJECT IMPLEMENTED BY:
DR. VINAYA SAWANT,
DR. ABHIJIT JOSHI,
BHAVESH SINGH,
ARSH SHAIKH, ADNAN HAKIM,
ALI ABBAS RIZVI,
RAHIL DESAI,
HUSSAIN SADRIWALA.

PROJECT 13

All about Covid



With COVID-19 surging to its highest peak, it's crucial to keep a check on an infodemic surging in our lives too. With an opportunity to create a platform with authentic real-time information revolving around COVID-19, a couple of 2nd year students created a website “AllAboutCovid” which gives us an insight on all the factors about COVID-19 as well as the number of cases, latest news, and more. All this data has been taken from the verified sources such as - WHO, John Hopkins, Mohfw, and other local sources.

people should get to know about different zones such as red, orange, and green. This will help people understand which places are accessible. As we all know this Lockdown can be mentally brutal too, they have added some blogs about how to keep your mental health intact.

This website is developed using a popular Front-end JavaScript framework called Vue.JS along with the involvement of various supporting packages and libraries such as MatrialUI, ChartJS, Chart-kick, Leaflet, and Bootstrap. The data is fetched from RESTful APIs and other useful API sources.

It consists of a GeoGraphical map where users can surf through any country or enter the country name and get live case counts with current active cases, total confirmed cases, recoveries, and deaths along with visualizations.

Along with a global platform, they also created a separate and detailed page for INDIA where users might search for a particular state and get all the details regarding that state including Case Counts, District wise zones, Emergency helpline numbers, and Essentials & relief services available by government or private NGOs such as Covid-19 testing labs, Food relief service, quarantine facilities, delivery of home essentials, and many more.

The website is backed up with Top-Headlines about India and COVID-19 (globally) by web scraping verified sources. Other additional features include preventative measures from the virus, Myth busters, a blog on “Deal with loneliness and overthinking during lockdown”. The website has an easy simple interface, thereby making it easier for the users.

PROJECT IMPLEMENTED BY:
SOHAM DAVE

1. WEB DEVELOPMENT

Web development is the field where coders develop fully functional websites, with a well designed front-end webpages, and an efficient backend architecture in to provide data storage/access.

Frontend:

Front-end development may seem scary with so many options to choose from. But everyone has to learn the 3 core languages i.e HTML, CSS, and JS. From there on it is advised that coders work on a few practice projects of their own , that can give them some confidence. Then, they could want to delve into different front-end frameworks out there like ReactJS, AngularJS, VueJS which make the job of rendering well designed webpages a piece of cake. Being well versed in MERN stack(Mongo, Express, React, Node) or MEAN (A stands for Angular) stack is always a bonus for any web developer who has just entered the scenes.

Backend:

A backend developer needs to take care of all the work that happens behind the scenes i.e. all the server side development along with choosing an appropriate database for data storage. The best path to tread for server side is by learning Node.js with Express, as it finds maximum usage in the industry as of now. Other backend languages is the old school PHP which still enjoys decent popularity- but relatively newer languages like Ruby, Python (for Django) etc also are a safe bet to start off with backend development. Lastly, developers need to choose between whether they would like to proceed with a SQL DB, or the newer NoSQL databases(Mongo) or cloud hosting services like Firebase.

Software engineers who are interested in game development have a significant head start. Programming skills are central to game development. Significant knowledge about any OOP based language is a head start because, migrating to the core languages of C++ or C# becomes very easy from there on.

Python too employs the use of the Pygame library using which can be used to make small, yet exciting games that can be both 2D or 3D. The smaller and lighter games like Tetris, Snake, etc can be easily made using Pygame.

Unity is 'the place to start from' for newcomers to this area for two reasons: It has a LOT of resources and a great community and second it uses C#.

C# is a language that can be used to not only create games but a plethora of applications and hence it has been recommended way more than one of the older languages say C++.

Unity helps create games and multiple platforms with relative ease- moreover the quality of graphics,

effects, and high level of functionality one can equip their game with, is un-paralled when developers make use of Unity.

Data Science is all about extraction of raw and quantitative data into organized and informative information so that it can be analyzed, visualized, and maintained for records. It is a combination of some hard skills (like learning Python and SQL) and soft skills (like business skills or communication skills) etc.

1. **Statistics:**

Statistics is the process of analyzing historical data, like customer search history.

2. **Mathematics for Machine Learning:**

Machine Learning theory is a field that intersects Linear Algebra and Calculus. With the right approach through the practical implementation of maths, it can be quite fun!

3. **Programming Knowledge:**

1)Advanced Microsoft Excel:

Excel is very useful to clean data because of its vast set of features.

2)Python:

Python is an interpreter based language as it interprets the Python code line by line. Very useful in the parallel field of AI.

3)R:

R is customized to develop statistical models for analyzing a large amount of data.

4)SQL:

SQL helps to retrieve and manipulate data from the database.

CODESHASTRA 6.0

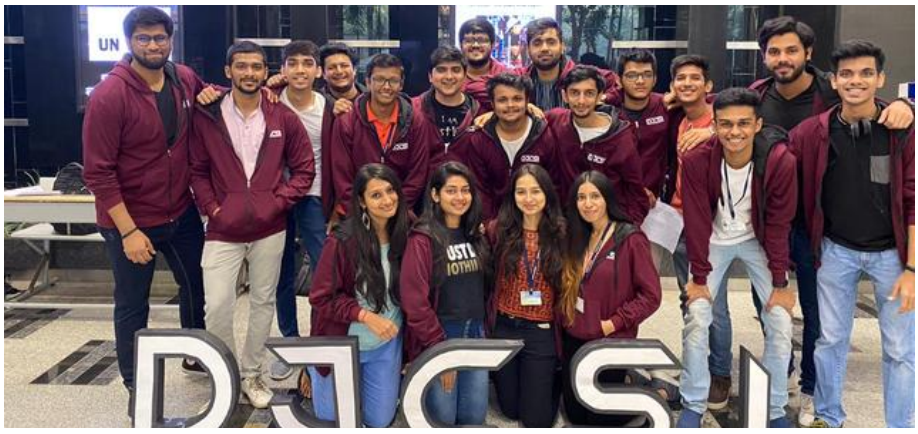
CodeShastra is an excellent platform for participants to get a gist of the latest trends in the I.T.sector. The participants are motivated to enhance their coding skills to show their technical prowess.This event organized by DJCSI is a great way to work towards the amelioration of the participants aswell as the committee.

The 6th edition of DJCSI's flagship event Codeshastra was an astounding success. Being one of the premier 24-hour hackathons of Mumbai,
The theme for this event was Social Conscience with a motive to inculcate a sense of responsibility and concern for the problems faced by the society and use technology for the betterment of the masses.
Codeshastra 6.0 lived up to all the expectations as the event was held on an even more impressive scale.

CodeShastra6.0 was held in two rounds:-
1.)Round 0(Intra-College Round).
2.)Round 1(Inter-College Round).

CODESHASTRA 6.0: ROUND 0

Round 0 of the prestigious CodeShastra 6.0 was held on 26th January 2020. It served as the preliminary elimination round for the event. Round 0 received an enormous response from the students as 59 teams (consisting of more than 200 students) from our college participated in it. Out of these, 20 teams were chosen for Round 1.



TECHTALES BY DJCSI

The aim of DJCSI is to stimulate a spark and ignite the passion we have for technology in students of our college and beyond. With the initiative of helping students understand the various technological realms and clear their ambiguities regarding it, DJCSI came up with TechTales. TechTales is a platform, where experts and students likewise from various areas of technology talk about their fields of expertise. This year, several podcasts provided students with insights to learn various topics.

A DAY OF ACCOLADES

The official Computer Society of India student chapter of the college, 'DJCSI' run by the IT department has set a unique national record by securing two awards for their outstanding contribution in the ever-growing programming community at the CSI Annual Convention held at KIIT University, Bhubaneshwar on 18th January, 2020.

The esteemed committee received national level recognition for their constant and continuous efforts to help increase the outreach of CSI (the largest professional body in India) and for succeeding in their goal of helping ignite in young engineering students a passion and hunger to learn coding and grow as budding programmers.
Dr. Vinaya Sawant, the HOD for the IT department and the student branch counsellor for DJCSI, is a proud recipient of the **'Longest Continuous Student Branch Counsellor Award.'**

The official DJCSI organising committee for the tenure of 2018-2019 emerged as one of the top student chapters over more than 500 other CSI student branches across India and is a proud recipient of the **'Best Accredited Computer Society of India Student Branch.'**

With this recognition, DJCSI hopes to continue moulding the next generation of coding geniuses by creating waves of innovation and impact through organising various technical activities across the college.

EVENTS IN 2019-20: ICACTA 2020

The 2nd edition of International Conference on Advanced Computing Technologies and Applications (ICACTA) was held on 28th & 29th February, 2020 at D.J Sanghvi. Organizing ICACTA is simply a modest endeavour by the Departments of Information Technology and Computer Engineering that encourages researchers to have a predilection towards the field and provides them a platform to interact and get inspired by like minded people.

The proceedings are published in the renowned **Springer** Publication in **"Algorithms for Intelligent Computing"**. The primary objective of ICACTA 2020 was to provide a platform for researchers, academicians and industry professionals from all over the world to present their research and development work in the area of **"Intelligent Computing".**

The conference proceedings were organized into five sessions spread across three parallel tracks. Research papers were presented on domains such as Machine Learning, Data Computing, Deep Learning, Linguistic Computing, Statistical Computing, IoT, Semantics and Ontology, Security, Natural Language Processing and Ambient Applications.

Mr. Prasad Kolte, Chief Operating Officer of the Maharashtra Information Technology Corporation was the Keynote Speaker for the event. He spoke on the evolution of e-governance, principles of e-Kranti and emphasized on how "Data is the new oil".

Mr. Devesh Rajadhyax who is the founder and CEO of Cere Labs Pvt. Ltd. having key research interests in the fields of machine learning, Deep Learning, enlightened the students about the various possibilities in these fields.

Dr. Surya S. Durbha who is a professor of The Centre of Studies in Resources Engineering at IIT BOMBAY conducted the session. His key interests are in the fields of Internet of Things, Knowledge-based Systems & Image Information Mining.

Feedback from the conference was very positive, participants greatly enjoyed the chance to meet like-minded people from different countries, the opportunity to network and the chance to explore ideas. All in all the event was a huge success.





CODESHASTRA 6.0: ROUND 1

DJCSI organized its flagship event **CodeShastra 6.0** on 7th-8th March 2020. From being the first **24-hour hackathon** to be organised in Mumbai 6 years ago, CodeShastra 6.0 was exactly what it had promised to be i.e. a huge success.

CodeShastra 6.0 witnessed **over 90 teams** from various parts of the country making it the highest participation in any at DJSCE. Codeshastra 6.0 took place for 24 hours with brilliant, ebullient, creative minds working cohesively to create an efficient solution which would be beneficial for the society. With timely meals, refreshments, merchandises and guidance by mentors for the entire duration, all participants had an amazing experience by the end of the hackathon. All the teams gave their best and cash prizes were handed out to the winners.

The winner of Codeshastra 6.0 was DJ's very own team: **Breaking Codes**- Soham Dave, Ansh Mehta, Shivam Kejriwal and Harshil Zaveri. On the occasion of **International Women's Day** There was an award given to the top female coders in the hackathon. We salute all participants for their efforts and congratulate Breaking Codes on their great victory!

The team was thankful to TCS, Quantiphi, Foxmula and DotSyndicate who provided the problem statements for which the participants came up with innovative solutions, reassuring us of the talent in today's youth. The team has a huge commendation for our mentors for mentoring all participants and the judges from CSI India, Oracle, Quantiphi, TCS and Quantiphi for taking the time review all the solutions.

Due to the immense hardwork, co-operation and support provided to Team DJCSI by their heads **Dr. Vinaya Sawant, Prof. Mitchell D'Silva** and senior faculty members ensured that the event was a great success. All in all, Codeshastra 6.0 was an unprecedented opportunity for every inquisitive programmer to learn and grow.

A GLIMPSE INTO INTERNATIONAL TECH

Computers Already Learn From Us. But Can They Teach Themselves?:

Scientists are exploring approaches that would help machines develop their own sort of common sense.

Artificial intelligence seems to be everywhere, but what we are really witnessing is a supervised-learning revolution: We teach computers to see patterns, much as we teach children to read. But the future of A.I. depends on computer systems that learn on their own, without supervision, researchers say.

When a mother points to a dog and tells her baby, "Look at the doggy," the child learns what to call the furry four-legged friends. That is supervised learning. But when that baby stands and stumbles, again and again, until she can walk, that is something else. Computers are the same.

Just as humans learn mostly through observation or trial and error, computers will have to go beyond supervised learning to reach the holy grail of human-level intelligence.

Now, scientists at the forefront of artificial intelligence research have turned their attention back to less-supervised methods. "There's self-supervised and other related ideas, like reconstructing the input after forcing the model to a compact representation, predicting the future of a video or masking part of the input and trying to reconstruct it".

There is also reinforcement learning, with very limited supervision that does not rely on training data. Reinforcement learning in computer science is modeled after reward-driven learning in the brain: Think of a rat learning to push a lever to receive a pellet of food. The strategy has been developed to teach computer systems to take actions.

How Facebook uses machine learning to detect fake accounts

In 2019, Facebook took down on average close to 2 billion fake accounts per quarter. Fraudsters use these fake accounts to spread spam, phishing links, or malware. It's a lucrative business that can be devastating for any innocent users that it snares.

Deep Entity Classification (DEC) learns to differentiate fake and real users by their connection patterns across the network. It calls these "deep features," and they include things like the average age or gender distribution of the user's friends. Facebook uses over 20,000 deep features to characterize each account, providing a snapshot of how each profile behaves to make it difficult for attackers to game the system by changing tactics.

The system starts by using a large number of low-precision machine-generated labels. These are generated through a mix of rules and other machine-learning models that estimate whether users are real or fake. Once that data is used to train a neural network, the model is then fine-tuned with a small batch of high-precision hand-labeled data, generated by people around the world who have an understanding of local cultural norms.

The final classification system can identify one of four types of fake profiles: illegitimate accounts not representative of the person, compromised accounts of real users that have been taken over by attackers, spammers who repeatedly send revenue-generating messages, and scammers who manipulate users into divulging personal information.

Since implementing DEC, Facebook says, it has kept the volume of fake accounts on the platform at around 5% of monthly active users.

How artificial intelligence outsmarted the Superbugs

The team of MIT and Harvard researchers built a neural network (an algorithm inspired by the brain's architecture) and trained it to spot molecules that inhibit the growth of the Escherichia coli bacterium using a dataset of 2,335 molecules for which the antibacterial activity was known – including a library of 300 existing approved antibiotics and 800 natural products from plant, animal and microbial sources.

They then asked the network to predict which would be effective against E coli but looked different from conventional antibiotics. This produced a hundred candidates for physical testing and led to one (which they named "halicin" after the HAL 9000 computer from 2001: A Space Odyssey) that was active against a wide spectrum of pathogens – notably including two that are totally resistant to current antibiotics and are therefore a looming nightmare for hospitals worldwide.

There are a number of other examples of machine learning for public good rather than private gain. One thinks, for example, of the collaboration between Google DeepMind and Moorfields eye hospital. But this new example is the most spectacular to date because it goes beyond augmenting human screening capabilities to aiding the process of discovery.

So while the main beneficiaries of machine learning for, say, a toxic technology like facial recognition are mostly authoritarian political regimes and a range of untrustworthy or unsavory private companies, the beneficiaries of the technology as an aid to scientific discovery could be humanity as a species.

The technology, in other words, is both good and bad. Kranzberg's first law rules.

The segment highlights in short various technological advancements adopted by the various branches of our college.
They include: Departmental Clubs, Student chapters from other branches, Social Service and Cultural Committees.

INIT.AI

Init.ai is a student chapter of Information Technology Department at DJSCOE. It was founded with a mission to educate, inspire and help the students to explore the field of Artificial Intelligence.
They make AI more accessible by holding weekly lectures, research talks and producing blog articles that covers anything from ML algorithms, computer vision, NLP and anything in between. They help equip students with the ability and skills to analyze, design and develop computer systems to use AI to change the world.
Init.ai provides people the resources to do research in various sub-fields of AI along with bringing in real-world industrial projects and internship opportunities for their team members.
One such collaboration was with TCS for a project internship during winter 2019. Nine members from the Init family got an opportunity to gain hands on experience on the industry projects provided by the company.

DJS RACING

DJS Racing is the Formula Student team of DJSCOE. They design, manufacture and test a prototype constructed on a set of rules. This year they advanced their method of propulsion from being petrol powered to electric. The whole car is designed and assembled virtually using Computer Aided Designing (CAD) on a software named Solidworks before manufacturing.
To simulate the real-world conditions, Finite Element Analysis is run which replicates these environments and justifies the design before manufacturing. Once the vehicle's critical parameters are decided, they virtually determine the lap times and performance characteristics of the car on any track.

DJS KRONOS

DJS Kronos India is the official SAE BAJA team of DJSCOE. They design, fabricate, manufacture and validate an all-terrain vehicle named Poseidon every year from scratch.
To ensure that their design is flawless, they make use of softwares like Solidworks(to make primary CAD), Ansys and Hyperworks (to stimulate the vehicle in various scenarios).
Together with this, they use a microcontroller Arduino with various sensors to acquire data and validate different parameters of our vehicle.

DJ IETE

IETE-SF is the student chapter of the EXTC department. Their main objective- to harness modern technology to convert "Project to Product". Their two flagship events – DJ Strike and DJ Spark are annual project-based competitions that encourage students to infuse modern technology into practical working models and document their work in a technical paper. Their papers are then published with a prestigious ISBN number.
DJ Strike offers a mentorship program for students of DJSCE and guides participants through multiple review stages culminating in the final presentation day while DJ Spark provides an opportunity to students from all over Maharashtra to showcase their technical skills in the form of a technical paper.

CODESTARS

CodeStars, a Programming Club of DJSCOE, is set up with the motive to create awareness about Competitive Programming amongst the students which is an important criterion in the recruitment process for all major companies.
This year, the club conducted lectures covering the inbuilt libraries, application of various number theories, graphs, Prims and Dijkstra's Algorithm, Kruskal's Algorithm and Disjoint Sets and dynamic programming to familiarize them with competitive coding.
Codestars maintains an infinite competition (i.e. no time limit) on Hackerrank where students can compete and practice their coding skills.

DJS SPEEDSTERS

DJS Speedsters design, fabricate and manufacture an E-bike from scratch and participate in various competitions across India. The team was started with the aim of gaining hands-on experience and developing industrial efficiency as a part of college education.

For the 2020-21 season, DJS Speedsters have switched from a commercial motorcycle to an Electric Superbike. It has a Finger Print unlock for maximum security. The owner of the Bike is authenticated and verified using a mobile app. The bike has a top speed of 75kmph and can run up to 70km on a single charge.

DJS IICHE

DJSCE IIChE is a student chapter which aims to bridge the gap between the industry and academics by working as an engine to provide unparalleled thrust to the aspirations of budding chemical engineers.
DJSCE IIChE used the advent of technology and especially social media to connect to the public. They educated the masses about the use of simple chemistry to make their life easier, spread environment consciousness among the common public and made technology an indispensable part of their praxis in pursuit to engender a digital and tech-savvy India.

DJS KARTING

DJS KARTING INDIA is the official Go-Kart team of DJSCOE which designs, manufactures and fabricates combustion and electrical go-karts from scratch to participate in national level competitions.
The last season saw the upcoming of an electric go kart, the team being the first ever to complete all tests in first attempt, thus continuing to build their legacy.
They use the Solidworks software for designing CAD models and Ansys for the analysis and virtual testing of the kart. This helps in measuring the appropriate factor of safety by putting maximum forces plausible to simulate real life circumstances and thus finalize design of parts accordingly.
Once all aspects are confirmed virtually, the manufacturing phase begins.

DJS ARYA

Since it's inception in the year (2018-19), DJS Arya has strived to understand and recreate the intricacies of an actual satellite model.
Tackling every challenge put forward to them from making a gyrocopter to a glider, they have designed it all. Their satellite models use technology with many real-life applications. The main objective irrespective of the design of their model is to record atmospheric data and transmit it to a ground station. Given the turbulence and other factors, they need to make a structure which survives the roughs of the atmosphere. Their models capture real-time data from wind speed and atmospheric temperature to visual data captured through an integrated camera.

DJS ROBOCON

DJS ROBOCON is the official Robotics team of our college with an aim to manufacture industry level robots. ABU Robocon's theme for 2020 was to play rugby 7's down utilizing two robots and five obstructions as five safeguarding players. Prototypes are designed by the Mechanical department which after Simulation and testing goes to the manufacturing stage. The Coding and Hardware department work in sync to create the required Control Systems to drive the robot.
It includes Embedded Systems, Power Electronics, simulating the circuits on Altium and proteus. Developing and implementing Machine Learning algorithms according to the need of problem statement has also been done under Coding department.
In MATLAB & Simulink, they import CAD models to test different ideas till the desired results are achieved after which the real-life prototype is made. This reduces the prototyping cost. The challenge here is to account for various losses to obtain a more realistic simulation.

DJ ACM

D.J. Sanghvi's Association of Computing Machinery (ACM) student chapter helps students by connecting their curriculum to the industry to facilitate a structured path from education to employment.
DJ ACM organized an Industrial Visit to the TMS (Train management System) and to Tata Telecom services to put real word applications of computing in perspective and help explain the relevance of telecommunication and automation across several domains.
ACM annually organizes the "Lines of Code (LOC) hackathon" where several teams participate to generate high-value actionable business ideas and product concepts.

DJ LIT

DJLIT - Literary Society of DJSCE, aspires to promote a creative vent amongst the youth through their events and activities.
DJLit has impeccably exploited technology to its great benefit. Apart from a social media page having weekly news, educating students with llustrative GRE words etc.
This year DJLIT revamped and DJVU- DJ's official website for news and articles by writers.
Their website incorporates a number of software advances. Ghost CMS is used which is an open source blogging platform written in NodeJS, hosted on GoDaddy's shared hosting using a few tricks.
Customizations to the leibling theme were made and used for it. They used Cloudflare to add an SSL certificate and CDN for faster delivery of pages. The statistics for the website are compiled and displayed by Google Analytics. For every post put up, comments and reactions can be given.

PACEMAKER DJSCE

Pacemaker is the student chapter of biomedical department that aims to pique interests of students in various innovations taking place in the medical field. It helps develop the skill-set of students in the latest technologies used in healthcare industry.
To execute this, several workshops and visits were conducted like the Proteus and Altium
Workshop on basics and information on Altium, followed by performing easy tasks on it.
Webinar on Project Selection on Image Processing encouraging students to participate in online competitions in the field of Biomedical Image Processing and learn the Python language and use it in Image Processing.

DJ NSS

DJNSS, the NSS unit of our college, has always strived to serve the society and reach untouched corners.
During their annual camp, DJNSS successfully installed three integrated solar street lights in its adopted village- Narpad, Dahanu.
The second technical project was “Composting-Tumbler installation” in the village of Ambewadi, Dahanu. With the aim of reducing the dependency of the farmers on chemical fertilizers, thereby improving their health and optimizing their budget.
Further, to help speed up the process of compost preparation, a setup of “Tumbler Composting” was installed by the volunteers in the nearby school premises.’

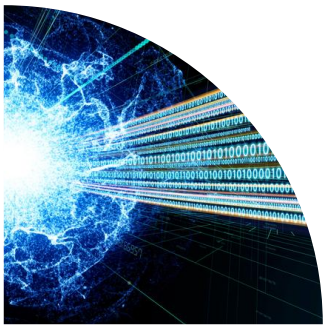
DJ UNICODE

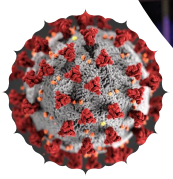
With the motto of "You and I code", DJ Unicode works relentlessly creating projects and code that matter. The hierarchical structure, at Unicode comprises of the 4th year undergrads as supervisors, 3rd year undergrads as project mentors and 2nd year undergrads as primary developers.
Some of their notable projects in 2019-20 include:
SPA- Computer Programming Exam Portal is a centralized system designed for teachers to assuage the wearisome task of evaluating C programs.
Attendance System- The Attendance system, currently being used by the Computer Engineering department, helps teachers track and manage attendance records digitally - as opposed to traditional Excel sheets and registers.

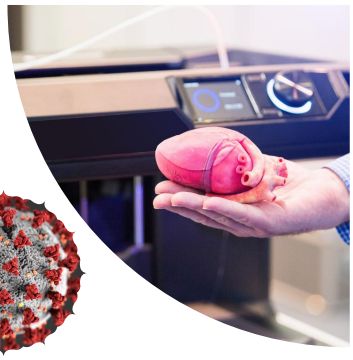
TECHNOLOGY TO LOOK FORWARD TO IN 2020

INTRODUCTION

Technology is now evolving at such a rapid pace that annual predictions of trends can seem out-of-date before they even go live as a published blog post or article. As technology evolves, it enables even faster change and progress, causing an acceleration of the rate of change, until eventually, it will become exponential.
Technology-based careers don't change at the same speed, but they do evolve, and the savvy IT professional recognizes that his or her role will not stay the same. And an IT worker of the 21st century will constantly be learning.







TOP 10 TRENDS TO LOOK FORWARD

From robotics to 5G networks, these are the trends that will be shaping tech in 2020:

- Ubiquitous high-speed internet and true 5G networks
- Open-source tools that make AI accessible
- Quantum computing making new tech possible
- TV advertising becoming fully digital
- Technology geared toward building trust into their products
- Alternative datasets for predictive analytics and pattern recognition
- AI task automation
- Continued growth of ML and AI hype
- Car as a Platform (CaaP)
- AI becoming less artificial

EFFECT OF COVID 19

The pandemic has demonstrated how reliance on human labor makes it impossible to keep the economy running during a viral outbreak. Because the best scientific predictions estimate that we may be dealing with this for another year or two, and because there's no
guarantee we won't experience another pandemic five, ten, or twenty years down the line, we're seeing an even greater degree of focus put on using AI to do jobs that are risky for humans under the circumstances.

With shortages of masks, face shields, and other vital medical equipment, **3D printing** is also emerging as the hero technology of the COVID-19 crisis.
Numerous additive manufacturing companies as well as DIY/maker communities are shifting their efforts towards printing and providing designs for essential medical equipment.

5G-WILL IT BE ACCEPTED THE WAY IT WAS PLANNED?

Despite outlandish conspiracy theories that 5G is somehow the cause of the novel coronavirus, rollouts of 5G shouldn't see a significant slowdown. Speaking at the recent ABI Tech Summit, Dimitris Mavrakis, a research director at ABI Research said the challenges facing 5G in the crisis have more to do with personnel than supply chain. "Engineers and technicians cannot visit sites because of restrictions," he said. These sorts of restrictions could show delays in installations of small cells and other new equipment needed for 5G.

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