

W I R E B Y T E S 4 . 0





ANNUAL NEWSLETTER 2020-2021

ABOUT US

A society, a club, a family. Zairza is the premiere technical club of the college, pushing the boundaries of innovation in the field of Robotics, Software and Design. We firmly believe in our motto “Wonder, Think, Create” and strive forward to make it a reality. The club was started in 2005 and was formally inducted as a central club of the college in 2007. Since its inception, the club members have worked tirelessly and also achieved numerous laurels in a variety of fields.

W O N D E R • T H I N K • C R E A T E



Principal's Desk

It is a matter of great admiration to observe that the young minds are constantly moving ahead to be a part of technical endeavours taking place across the globe. I find Zairza providing the students a platform to learn, collaborate and implement innovations that could make a difference to this world.

I would extend my heartfelt wishes to the students to continue their exploration in the field of computer science and robotics and bring laurels for the institution. They must value the opportunities that Zairza provides and work hard to make the technical club and the college proud.

Prof.(Dr.) Prashanta Kumar Patra
Principal CET BBSR



Professor In Charge's Desk

It gives me immense pleasure to introduce the 2020-21 edition of the Zairza Technical Society Newsletter. I would like to take this opportunity to thank the editorial team for their efforts in putting together a wonderful and informative newsletter. Notable achievements by our students, alumni have been highlighted along with the activities here at Zairza.

We welcome your inputs for future newsletter and urge to stay connected with us through email and social networking sites and visit us whenever possible.

Prof.(Dr.) Rati Ranjan Dash
Professor in Charge, Zairza Technical Society



Advisor's Desk

It gives me immense pleasure and joy to extend my best wishes and encouragement to the enthusiastic young minds of CET, Bhubaneswar who are a part of the Zairza Technical Society. They organize training programs on various fundamental subjects in their field of excellence to the freshers of all departments. I wish success and encouragement to all the members of the society and wish that Zairza Technical Society will continue with the same vigour and spirit in future.

Prof.(Dr.) Chandrabhanu Mishra
Advisor, Zairza Technical Society



Coordinator's Desk

Gunjan Giri, 4th yr

On this day of jocund merrymaking as we celebrate Children's Day and the birth anniversary of Mr. Jawahar Lal Nehru it fills my heart with exhilaration to announce the release of WireBytes' 4th edition. I won't shy away from referring Zairza, as an ever-expanding tech-universe. And WireBytes exists as a chronicle which documents all the achievements and feats achieved by the club and its members. And with each latest edition we get an opportunity to exhibit a year's journey of Zairza reaching new heights.

What sets us apart from any usual technical club/society, lies in the very roots of our foundation and objectives. Essentially, we strive to create a space which shall cease each techy's entail for a congenial company of techies having interest in similar tech-domains and tech stacks.

Zairza and I go back a long way. Ever since my freshman year, I started exploring various domains of tech. And it was all the more fascinating to witness my seniors engaged in developing projects from scratch, contributing to open source and conducting research on such fields. I specifically enjoyed learning about robotics and started investing a major chunk of my time in understanding ROS (Robot Operating System). At this point in time, I am leading the Robotics wing of Zairza and this feat has been achieved with the aid of many seniors, Abhishek and Jiban Jyoti Panda are to name a few of them. Now that I am in my final year unwilling to end my grad journey, recalling how Zairza has succeeded in strengthening its legacy, I hope our juniors put their best foot forward in upholding it.



Convenor's Desk

Prateek Mohanty, 4th yr

I am bewitched to be a harbinger of the WireBytes 4.0's release. Zairza has been releasing its annual newsletter every year to commemorate the technical advancements and breakthroughs made by its members. The club has always been a fostering ground for young minds which embody innovative ideas and solutions to numerous real-world problems. We have been collectively marching forward to not only make the members eligible of making it big in the technical industry but also make efforts to bridge some of the gaps between various technical aspects of life and society in current scenarios and their refined futuristic counterparts.

By organizing numerous hackathons, webinars and other technical events we ensure and all-round development of the newly inducted members and help them prep up for taking the club's legacy forwards and bump it up a notch.

To give a brief hindsight of my connection with Zairza. I wasn't quite active during my freshman year until I was given the responsibility to develop Zairza's website. I have delved into many tech stacks and contributed to projects using them in collaboration with my seniors, Nitish Choudhary and Pruthviraj Nayak. But at the end of the day, the connect I felt with Android development was unusual. I did continue my journey trying to get deeper insights of Backend development and android and that landed me into my first internship. I cherish the past 18 months spent with my fellow club mates organizing Zairza's first ever own tech fest, Zairzest and trying to make Zairza an inclusive space. I hope that our juniors surpass us by all means in reforming Zairza. May the force be with them!!



From the Editor

Parul Sahoo, 3rd yr

While quietly sailing forth on my own voyage, I happened to come across a jovial island, Zairza. Keeping my poetic spree aside, I shall always adjudge my induction into Zairza as a life-changing incident. The club has reformed me and my life in countless ways. For instance, it transformed me from an introvert to an opinionated, highly expressive individual. On frequently visiting the club my inclination towards IT industry and software development in general was amplified by multiple folds. Even frolicking around and prattling with seniors inside the club, always ended up filling my brain with innovative ideas and brimming ardor to realize them. Zairza did act as a magnifying glass that helped me get a sight of the meticulously hardworking self of mine which had been long concealed within me. From handling different departments during our first ever virtual fest, Zairzest to staying up late at nights, developing website and drafting WireBytes, all of them added up in enhancing my managerial skills and I had mastered the art of being an adept conversationalist. This proved to be a major advantage later when I started contributing to Kubernetes upstream.

WireBytes has been a modus operandi of celebrating the partaking endeavors achieved by an erudite bunch of highly motivated folks, quite aptly referred to as the "Zairza fam". It's most certainly an honor to serve in the position of WireBytes 4.0's editor. Scrolling through the articles submitted by various members, I was bemused by their zeal to acquire knowledge galore for practical applications and turning ingenious ideas into reality. Fine tuning these articles and presenting them in front of the readers is as rousing as interpreting a sci-fi novel. I hope this customary of publishing the annual newsletter continues for many years to come.



From the Designer

Debanshu Samal, 4th yr

From making legion visually appealing designs to providing a wide range of perspective options for the audience to choose from, at Zairza, we present you minimal yet a full of energy pack to boost our domains and gain more experience in them. Our seniors have always made us believe that, there exist innumerable many opportunities in the world and we should learn the knack of making the best use of them. I have always tried a different approach when creating illustrations, to make it more enchanting, as our aim persists. The previous editions of WireBytes have successfully stained a major impact on our audience in the past years and have gathered abundant attention towards the annual newsletter. To maintain the level of prowess in the current edition, we made a collaborative effort to bring about pronounced results. I would like to express my gratitude towards all the seniors, juniors and my fellow batchmates for their contributions in drafting and publishing WireBytes 4.0.

Whenever I sit down to retrospect the initial phase of my journey with Zairza, it always brings up a smile on my face. My journey at zairza was set in motion when our seniors had given me a task to design a poster for a specific event. I gave my best shot at designing the particular poster, but my work didn't end there. I had to seek approval from a senior member of design wing, Pratik Panda. Thereafter, he has been inspiring me and all other members of the design wing to deviate from the crowd and build up discrete identities for ourselves. In every single decision we made during the sketching and design procedure, we were taught to try different software, different textured paper for designs and so forth to set our designs apart from the usual standards. I have believed that art exists for artists like us, and the idea of considering myself as an artist has become firmer with my induction into Zairza. Starting from making innovative projects to redesigning logos, website and exploring a different form of design has been a routine chore for me and my learning from this routine shall always be treasured by me. Wishing all the members of Zairza good luck for their future endeavours.



From the Designer

Stephen Rejinold, 4th yr

Hello readers!! Hope you find my experience beneficial, in terms of the learnings and tips shared to grow in your respective careers. It's been an honour to be a part of the publishing team of WireBytes 4.0. From being an average guy to a full-time filmmaker and from an average designer to the designing lead, Zairza surely has showered innumerable opportunities and responsibilities on me. It has always pushed me to walk that extra mile, even when it seemed impossible. Little did I know that the second year of my graduation will be an essential part of my beautiful journey. I was always interested in content creating and video editing and the moment I got to know that Zairza was offering designing guidance, I just knew that I had to join. Eventually, I explored all the technicalities of designing and started looking for projects and gigs. Soon, I got my first ever paid gig during my sophomore year itself, it changed the whole concept of what I considered as a hobby until then. Designing then had become my passion. Zairza really helped me build connections and taught me the value of networking. Shortly afterwards, I got full-time job offer at Detour Odisha, which is generally creates all the media content for the state government. This sure was a huge opportunity and Zairza has always been there for me through thick and thin.

We are trying to bring in every form of digital content design including VFX and 3D Design among others, for advanced learning in the wing. We successfully hosted our first-ever virtual fest, Zairzest where we tried our best to give the participants a spectacular experience in terms of design and visuals. I would like to thank my seniors Abhishek Mishra, Om Prakash Jena and Pratik Panda for always trusting on me and encouraging me. Zairza is to be credited for everything that I have achieved until now and I shall always remain grateful for the same.

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**WHEN SOMETHING IS
IMPORTANT ENOUGH,
YOU DO IT EVEN IF THE**

ODDS

ARE NOT IN YOUR FAVOR

SOFTWARE



BLOCKCHAIN AND METAMASK

Why Blockchain?

Well under the table thousands of transactions take place, but there must be something to keep a record of each and every transaction made. But why don't we consider that to be reliable? The first reason is being, the database that conventionally document these transactions are not accessible to us following a centralization of power, the second reason being, the admin of that database holds the authority to make any changes to that database at any given point in time. So we need to develop a system that follows decentralization of power, a way where it is impossible to change the database, here comes into picture the idea of blockchain. Satoshi Nakamoto developed bitcoin using blockchain technology. Bitcoin is the first real-time implementation of blockchain technology that is connected by a collective network of decentralized nodes. From that moment onwards cryptocurrency is resounding across the world.

What is Blockchain?

Blockchain is nothing but a database that stores a record of every transaction that has ever taken place. A company mandatorily growing would keep a record of every employee and their salary, in a file, so is the case for blockchain, the file where the information is stored is nothing but the blockchain only. To rephrase it, we can say that, blockchain is nothing but a chain of blocks that contain relevant information regarding transactions.

What does this block store?

Every block contains relevant information, it will store information for every transaction being made, and a hash of the previous block. We can say that any block on the blockchain contains its hash and the hash of the previous block, forming a chain. The very first block in a blockchain does not contain any previous hash and is called the 'genesis block'.

What if someone tries to influence the data?

Anyone attempting to change the data needs to change the record or data stored within the block, changing the data in any one block eventuating in change of the previous block as every block has its own hash and the hash of the previous block!!! Well, it is quite impossible to change the data within a blockchain as any change onto any hash will lead to the change of every hash up to the last block. Yes, it is quite obvious for an unaware person to say, "Yes!!!". They will fail to gauge the time and effort that would require.

Layers of security in Blockchain system

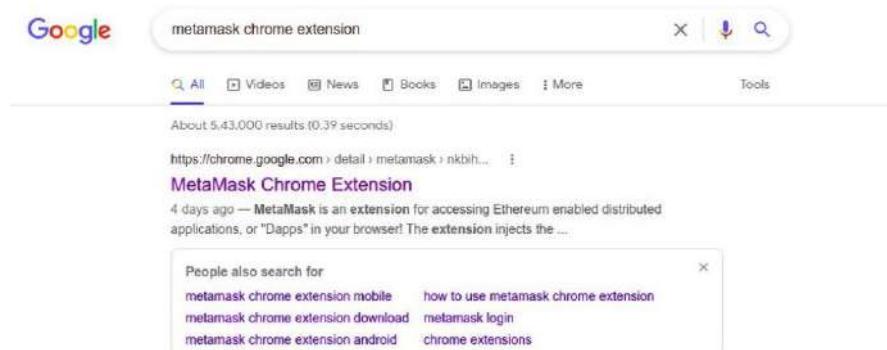
It is a network where thousands of nodes are connected onto a certain platform, what if some block needs to get added, will the miner add the blocks manually into the network? Miners compete against each other to solve a computational puzzle, and the procedure involves solving thousands of algorithmic problems but it's easy to verify the solution, and whosoever gets to solve that puzzle would be hence verified by the other miners in the network. All these processes are cumulatively called the proof of work. Hence any random miner would not be able to add that block since it needs to get verified as well, hence data stored here is protected.

How we can connect with the network?

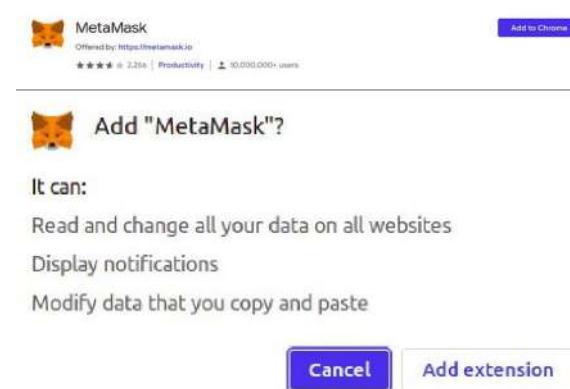
There are two different types of technologies to connect with the network. First, the way which developers like you and me, prefer to connect with the network using web3.js library, through which we can send money, store data, deploy contracts, and yes apart from developers there are still people who know little or have negligible knowledge regarding this. So they do have Metamask which is a chrome extension that allows common people to interact with the blockchain.

How to install and configure the Metamask extension?

Open your preferred browser, for me it is google chrome and search 'Metamask google extension' and click the first link.

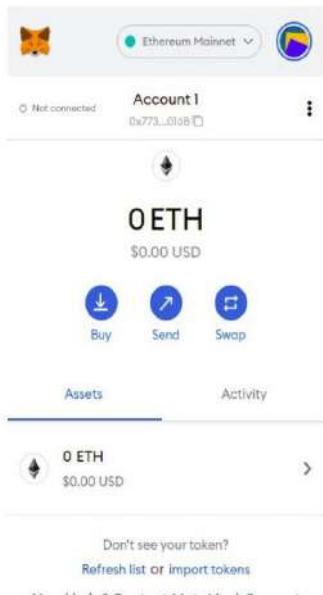


Then click on add to chrome and add the extension to the window that pops up.



Click on the metamask in your extension list, accept the privacy policies, terms and conditions and then enter the password to create a Metamask account and click on the create button. Then a screen opens with a 12 words of mnemonic which you have to store for recovery of your account and HURRAY!! your account is created.

Go and search on the drop-down box to let yourself know of some other ethereum networks. The list consists of real networks and test networks which are used freely to test code and get free ethers to test our contract with.



Every account on the ethereum network consists of an account address, a public key and a private key. These accounts are more or less similar to the email address and can be shared with anyone(except the private key).

The transactions are made through ethereum coins which are being mined with a certain price limit and are being used to avail with our smart contracts.

You can send and buy ethereum coins or swap accounts to use at your own will.

Hope you enjoy a lot while working on the Blockchain and make yourself acquainted with the system of Blockchain.

Project By:



**Pritipadma
Mishra**
2nd Year, EE



SMART CONTRACTS

Learning about smart contracts needs us to learn about the functionality of the blockchain. So what is a blockchain? The answer lies in the word itself 'block' describes the handler or the parent node and this node helps to connect to all the sub-ordinate nodes and forms a 'chain'. The most important thing which we need to understand is anything changed in the daughter nodes needs to get updated in the respective parent node, this process helps to maintain a structural placement of the system without being adulterated by the intruders who try to blend into the system and leech the data from the main network.

Then let us come to our topic i.e, a smart contract. A smart contract involves a set of functions that are defined by the developer to run a certain level of agreement with the nodes and when these test cases are passed the main network accept these changes and per each change, there is a check of data through a particular token which verifies and records the transaction.

In a general online IDE while learning a development language or a programming language we try to build a basic program like a "Hello World!" program, in the same way, we are going to build a smart contract that greets a user.

SETUP

To start building, let us make a directory named welcome_user.

```
debiddatta@debitdatta-HP: ~$ mkdir welcome_user  
debiddatta@debitdatta-HP: ~$ cd welcome_user
```

Step-1: Using mkdir we make a directory and using the cd command we go into the directory.

Next, we go install Truffle which is a testing framework and asset pipeline for blockchains using EVM(Ethereum Virtual Machine).

First, we run the command . Then we initialise Truffle after successful installation of Truffle. This creates a organization of folders and files.

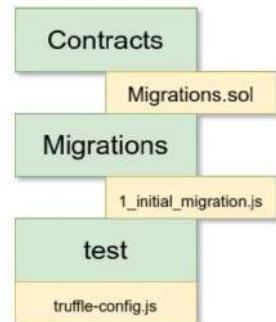
```
debiddatta@debitdatta-HP:~/welcome_user$ sudo npm install -g truffle
```

Then we initialise Truffle after successful installation of Truffle.

```
debiddatta@debitdatta-HP:~/welcome_user$ truffle init  
Starting init...  
=====  
> Copying project files to /home/debidatta/welcome_user  
Init successful, sweet!  
Try our scaffold commands to get started:  
$ truffle create contract YourContractName # scaffold a contract  
$ truffle create test YourTestName           # scaffold a test  
http://trufflesuite.com/docs
```

This creates a organization of folders and files.

This defines the folder structure where



Step-2: Now we go into the test configuration folder and add a 'welcome_test.js' file and write down the contract as below which defines greetings as a constant and in order to greet the user it uses the package module 'Greeter' and defines a contract using the package name and assert anasync function to define when the contract is deployed to the test network.

```
const GreeterContract = artifacts.require("Greeter");
contract("Greeter", () => {
  it("has been deployed successfully", async () => {
    const greeter = await GreeterContract.deployed();
    assert(greeter, "contract has been deployed");
  });
});
```

Step-3: Now run the test file using the command truffle test

```
debidatta@debidatta-HP:~/welcome_user$ truffle test
Compiling your contracts...
===== 
> Compiling ./contracts/Greeter.sol
> Compiling ./contracts/Migrations.sol
> Compilation warnings encountered:
  Warning: SPDX license identifier not provided in source file. Before publishing, consider adding a comment containing "<SPDX-License-Identifier: <SPDX-License>>" to each source file. Use "<SPDX-License-Identifier: UNLICENSED>" for non-open-source code. Please see https://spdx.org for more information.
-> project:/contracts/Greeter.sol

> Artifacts written to /tmp/test--38727-DMPnrexRkEzsY
> Compiled successfully using:
  - solc: 0.8.9+commit.e5eed63a.Emscripten clang

Contract: Greeter
  ✓ has been deployed successfully

1 passing (59ms)
```

Step-4: Add this code to the Greeter.sol file. Now run the test again.

```
pragma solidity >=0.4.0 < 0.7.0;
contract Greeter { }
```

```
debidatta@debidatta-HP:~/welcome_user$ truffle test
Compiling your contracts...
===== 
> Compiling ./contracts/Greeter.sol
> Compiling ./contracts/Migrations.sol
> Compilation warnings encountered:
  Warning: SPDX license identifier not provided in source file. Before publishing, consider adding a comment containing "<SPDX-License-Identifier: <SPDX-License>>" to each source file. Use "<SPDX-License-Identifier: UNLICENSED>" for non-open-source code. Please see https://spdx.org for more information.
-> project:/contracts/Greeter.sol

> Artifacts written to /tmp/test--58139-WdWg380vZc0R
> Compiled successfully using:
  - solc: 0.8.9+commit.e5eed63a.Emscripten clang

Contract: Greeter
  ✘ has been deployed successfully
    > No events were emitted

0 passing (78ms)
1 failing
```

Step-5:

```
const GreeterContract = artifacts.require("Greeter");
module.exports = function(deployer) {
  deployer.deploy(GreeterContract);
}

debidatta@debidatta-HP:~/welcome_user$ truffle test
Compiling your contracts...
===== 
> Compiling ./contracts/Greeter.sol
> Compiling ./contracts/Migrations.sol
> Compilation warnings encountered:
  Warning: SPDX license identifier not provided in source file. Before publishing, consider adding a comment containing "<SPDX-License-Identifier: <SPDX-License>>" to each source file. Use "<SPDX-License-Identifier: UNLICENSED>" for non-open-source code. Please see https://spdx.org for more information.
-> project:/contracts/Greeter.sol

> Artifacts written to /tmp/test--38727-DMPnrexRkEzsY
> Compiled successfully using:
  - solc: 0.8.9+commit.e5eed63a.Emscripten clang

Contract: Greeter
  ✓ has been deployed successfully

1 passing (59ms)
```

This tells us that there is an error because YES! you got it right, we don't have the Greeter artifact being defined anywhere so we create a 'Greeter.sol' file inside the contracts folder.

We pass one of the tests but the other one gets failed oops!. So yes we got the error, the migration folder only has the initial contract but does not have the Greeter contract so let us create a migrations contract i.e, 2_deploy_greeter.js file in the migrations folder add the below code and again run the tests.

Hurray! We created our first ever smart contract using Solidity, Truffle and most importantly don't forget your IDE, for me it was VSCode.

Project By:



**Debidatta
Suryaprakash**
2nd Year, EE



SPARK HEALTHLINES

The project being discussed here, has secured a world rank of 7th in Datastax's BuildAModernDataApp Hackathon 2021. Spark Healthlines is a mobile ready application with modern-day design, enhanced user experience and multi-functionality, developed to give in-person patients the freedom to wait for their turn privately in their car—or wherever they choose—rather than confining them to a stuffy, crowded waiting room alongside new germs and potential infections and facilitating a smooth check-in process for healthcare visits.

The problem we tried to solve: Traditional waiting rooms in hospitals that require patients to touch shared surfaces and breathe shared air are beyond uncomfortable—they can be unsafe. It is not only inconvenient for the patients to stand in long queues but also the crowd proves to be a breeding ground for germs and potential infections. Especially during the times of COVID, enabling social distancing is the need of the hour. A virtual waiting room helps you prevent your healthcare organization from being associated with pesky sounds, smells, people and boredom that can easily be avoided. Our project enables patients to book their appointments in the comfort of their homes without manually standing in a queue, check the availability of the doctor without physically visiting the hospital and track their position in the queue in real-time. Also users can cancel their appointments anytime. Patients don't have to wait or rush around the hospital; instead they would be able to know when their turn would arrive by tracking through the app in real-time. In the application, we have designed a queue structure that would show the exact position of the user in the queue and the estimated time of his appointment. From the doctor's end, the doctor can also see the queue and keep track of the patients. When the appointment of one user is over the doctor needs to click on the next button and the queue increments. It also keeps a full record of appointments and health history of patients. Along with that doctors also have their dashboards to keep a track of their appointments and schedule.

We came up with this application using the technology stack of NodeJS, Express, React, Redux, Tailwind, Cassandra and we have used AstraDB as the database. There is authentication for both patients and doctors to ensure authenticity and avoid nuisances. No other user can view the details of any other user, that maintains privacy. Patients can directly access, book, check availability of slots without involvement of any third party or charge of extra fees. Spark Healthlines application can be used in all hospitals, clinics and in a larger perspective it can be also applied at every place where crowd and queue of people needs to be avoided, as social distancing is the need of the hour.

Project By:



**Rupayan
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3rd Year, CSE



**Shree
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3rd Year, CSE



**Piyush
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3rd Year, CSE



**Adyasha
Mohanty**
3rd Year, IT



HEART-TO-HEART

This project was selected as winner in the #BuiltWithSymbi track in the Hack This fall 2.0 hackathon. Since the past year, we have all been going through tough times and unprecedented situations. All these events take a toll on our mental health and now, when a majority of the population is not comfortable talking about mental illness, it is more important than ever to give people a safe space to talk about their emotions and get help. Many people find it difficult to reach others out for help for any mental issues, they have a fear in their minds to be judged, they don't get a proper solution to recover.

In our project, we have focussed on creating a platform where a person can vent out his/her thoughts, emotions or feelings. S/he can know their analysis of their emotions and how they feel at the moment. After the analysis of the sentiments it will provide a report which can be downloaded and sent anonymously to a therapist who will then provide necessary help to the user. Apart from that we have developed certain features in our app which would help a person to recover and improve his/her mental health such as a 21 Days Challenge feature where we have curated a list of challenges which the user needs to complete that would in-turn help the user to achieve better mental health, pen-down-your-thoughts feature where the user can write down his/her thoughts and post them or even can maintain a diary, a chatbot named Alex which enables the user to talk one-to-one and share their feelings and receive ways that would make them feel nice, a music player to play soothing music when desired, a community feature where users can find like-minded people and a motivational resources feature where they can get benefits from all best resources.

This project is built on the technology stack of NodeJS, Express, Web Sockets, React, Redux, Tailwind and MongoDB as a database. We have used Symbi.AI for analyzing sentiments and assign the polarity score based on the conversational transcript. Heart-To-Heart is a full-fledged web application for people having mental health issues, dealing with depression and find difficult to share their feelings with anyone else to improve their mental health condition, try to make them feel better and seek help from mental wellness resources and support accessible to the larger audience - all just a click away.

Project By:



**Rupayan
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3rd Year, CSE



**Shree
Mishra**
3rd Year, CSE



**Abhipsa
Guru**
3rd Year, CSE



INTO THE WORLD OF PWAs

Ever got a prompt to install a youtube music app while playing songs in its web app in a browser?? If you click “yes” then you use something called a PWA. According to Henrik Joreteg, “PWA is the single biggest thing to happen on the mobile web since Steve introduced the iPhone!”

PWA (Progressive Web Apps) is one of the most talked-about technology shifts in the web and has gained unparalleled momentum among practitioners in the IT world. If you are building for the web, I’m sure that PWA is the latest ‘buzzword’ that has been added to your work vocabulary. It’s not surprising because PWA has made the far-fetched dream of installing web apps on phones for real.

“Progressive Web App (PWA) is a term used to denote a new software development methodology. Unlike traditional applications, progressive web apps are a hybrid of regular web pages (or websites) and a mobile application. This new application model attempts to combine features offered by most modern browsers with the benefits of mobile experience.”

In layman's language, PWA could be a child that the best of web and the best of native apps could have. This is basically a web app only which behaves more like an app. The credit for the entire thing goes to Service Worker, a script that runs in the background that connects the web app with the local cache of the devices.

But one thing that might be stuck in our head is “Can it provide the performance that a native app provides?” Drum rolls please! Definitely yes! We can use Accelerated Mobile Pages (AMP). These load much faster and consume less data and hence can give equivalent performance.

So the combination of AMP and Service Worker will provide the reliable speed of native apps. Once the page is loaded, the site sets up the Service Worker and caches the assets. This again frees users from the hassle of regularly updating their apps.

A PWA seems feasible when you are starting up something. Rather than spending a lot of resources and time on an app development team, it's better to have a PWA in the initial stage. After looking at the customers' acceptance we can slowly move towards native apps.

For example, Flipkart uses a progressive web app for its popular e-commerce platform, Flipkart Lite, and SBB uses a progressive web app for its online check-in process, allowing users to access their tickets without an Internet connection. Again, Google prioritizes web apps that load quickly on mobile devices. This is why you should consider implementing PWA or AMP, which are unique technologies that reduce web page load time.

Project By:



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BENCH ROUTES: SYSTEMS MONITORING MADE EASY

Monitoring is tough and with the increase in sophistication of modern platforms, the performance of a system tends to get affected significantly. Cloud platforms provide several deployment regions as an option to the DevOps team. Each deployment region is implemented through a different network route with respect to the target users. Analysis of these networks in terms of their accessibilities and stabilities is important for any organization. Monitoring of deployed server endpoints is crucial, since it alerts the development team about the possible crash in near future, before being experienced by end-users. The applications that run on these systems have the probability of a complete request-response cycle without any throws nowhere close to 1. The existing monitoring tools are tough to capture these events, even in their full potential, which is obvious due to the learning curve, lack of a normal end-user-based simplicity and unavailability of some useful parameters.

Bench-routes is a monitoring tool that monitors from system/kernel level information to the application level logs and performance of routes in Unix-based systems. The design of the project enables it to monitor anything that can be converted to a time-series format that is ingestible by our querier. This increases the flexibility and widens the scope of monitoring to infinity. To give further insights of the project, Bench-routes is a GUI-powered highly scalable monitoring tool that monitors system services, kernel information, application behaviour and performance of web applications and its routes (API). It also performs a series of networking algorithms and calculations to find the realtime state of routes in an application. As an additional feature alerting is provided to the users, based on application states, critical warnings and errors. Custom alerts occur when the delta in instantaneous responses fall beyond a threshold range.

How the tool benefits developers? Well, the answer to this question is a quite a simple one. With the specifically structured tests, the performance of a web application and virtual machine in terms of accessibility, availability and load-handling could be visualized over a time range with the help of metrics conveyed through interactive graphs. Visualization of various tests can be considered to conclude an efficient and effective deployment region for a web application in a simple or clustered environment.

To mention a few laurels bagged by the project and its developers, it has been selected as a participating organization in GSSoC'20 (GirlScript Summer of Code), RGSoC'20 (Rails Girls Summer of Code) and GSoC'21 (Google Summer of Code).

Project By:



**Aquib
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Alumni



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HARDWARE



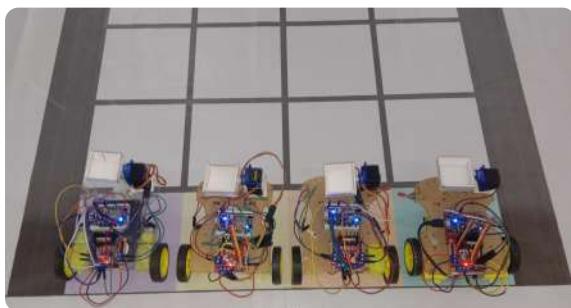
AUTOMATED SORTATION SYSTEM IN WAREHOUSES

A smooth system of Automation can help us to perform a complicated job, or a simple yet repetitive task in a much more efficient and less-daunting manner; thus reducing the physical labour and required manpower manifold.

Sorting packages in a warehouse in accordance with their final delivery location in the E-commerce industry is one such task where Artificial Intelligence and Automation play it really cool. Instead of having to sort the packages manually, which is physically demanding and prone to errors, we have employed the usage of multiple AI driven bots governed by a central monitoring system involving cameras to carry out the same task, in a very structured approach.

The Camera detects the bots and keeps track of their location in the arena at every instant, as the bots go around loading and unloading the packages to their respective destinations.

The detection and tracking is carried out by using OpenCV libraries after processing the arena's image and converting it into a grid system, so as to help us access the coordinates of multiple bots at all instants.



The lifting and dropping mechanism for the packages is carried out by using a servo motor that is capable of performing angular rotations. The instant at which bots reach the end of their mapped path, carrying the package, their location is then compared with that of the destination coordinates, following which the servo is instructed to drop the package in the final location.

Project By:



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PID CONTROL USE IN ROBOTS & REAL-LIFE

PID Control with its use in Robots and Real-life with Code and Verification PID controllers are the workforce of the controls world. PID controllers have the goal of taking some error in your system and reducing it to 0. While there are many other control strategies out there PID is probably the most common (unless you count human control) outside of just setting a setpoint. There are many advanced control strategies out there but in most cases, they will do similar or worse than a PID and be much more complex. When the other methods do better it will often only be by a small amount. One exception is if you have a model of the device and its operating conditions you can create a feed-forward controller (good for Robotics students) that performs better. However, in many cases using reactive control with a PID is the easiest and fastest approach to implement. When we talk about PID control you should remember that each of the letters represents a different mode of the controller. The P is for the proportional element, the I is for the integral element, and the D is for the derivative element. Each element has a "term", that gets multiplied with those elements. We use K to be a generic constant value, so the constant terms (or gains) are KP, KI, and KD respectively. Depending on your application you may or may not have all three of the terms. In many applications, you will have just PD or PI terms.

PID Controller

Command to Device	Proportional	Integral	Derivative	Bias (to prevent output being 0)
$output(t)$	$= (K_P * e(t)) +$	$(K_I * \int_0^t e(t)dt)$	$+ (K_D * \frac{d}{dt}e(t))$	$+ bias$
$output$	$= (K_P * e) + (K_I * (K_I.prior + e * iteration_time)) + (K_D * \frac{e - e.prior}{iteration_time}) +$			$- bias$

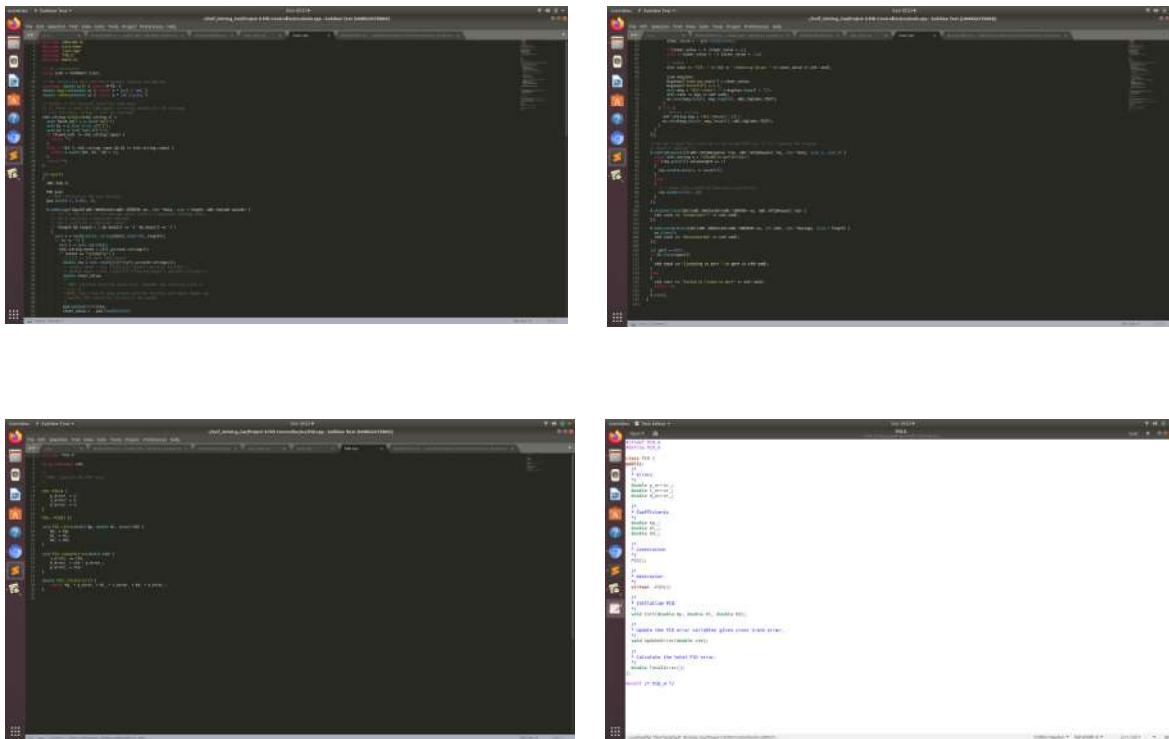
There are many forms of the PID controller. But here are the two that most people will care about:
Note: e and e(t) are the error terms, this is defined as: $e = desired_value - actual_value$. Often the actual_value is coming from some sensor that you have to detect the current value. The first is in continuous time:

$$output(t) = (K_P * e(t)) + (K_I * \int_0^t e(t)dt) + (K_D * \frac{d}{dt}e(t)) + bias$$

The second is in discrete time, which is what is more commonly used in computercontrolled applications:

$$output = (K_P * e) + (K_I * (K_I.prior + e * iteration_time)) + (K_D * \frac{e - e.prior}{iteration_time}) + bias$$

And here is some code for the PID controller:

The image consists of four separate screenshots of a terminal window, likely from a Linux system, arranged in a 2x2 grid. Each screenshot shows a different part of a PID controller's source code. The code is written in C or C++ and includes comments explaining the purpose of each section. The terminal window has a dark background with light-colored text and includes standard Linux navigation keys at the bottom.

While the discrete approach is more useful from an implementation perspective. When it comes to understanding and tuning your controller the continuous approach is important for you to understand. Also, while you usually do not see the bias term added to the filter, I like to put it in just in case everything else sums to 0 and you still need motion, I will not have a 0 as the output. This is not strictly needed but it is nice to have in many cases. For example, if a wheel needs to continuously be rotating and the PID is just to maintain a given velocity.

Terminology:-

So now we know the form of this controller we can look at what each term does.

Proportional Term (KP)-

The proportional term is your primary term for controlling the error. This directly scales your error, so with a small KP the controller will make small attempts to minimize the error, and with a large KP, the controller will make a larger attempt. If the KP is too small you might never minimize the error (unless you are using D and I terms) and not be able to respond to changes affecting your system, and if KP is too large you can have unstable (ie. weird oscillations) filter that severely overshoots the desired value.

Integral Term (KI)-

The integral term lets the controller handle errors that are accumulating over time. This is good when you need to handle errors steady-state errors. The problem is that if you have a large KI you are trying to correct error over time so it can interfere with your response for dealing with current changes. This term is often the cause of instability in your PID controller.

Derivative Term (KD)-

The derivative term is looking at how your system is behaving between time intervals. This helps dampen your system to improve stability. Many motor controllers will only let you configure a PI controller. In some cases, this can be negative.

Which permutations of P, I, & D do I need?

In many applications, you will not use all 3 terms. So why not just always use all 3 terms? The fewer terms you use the easier the controller is to understand and implement. As you will soon see some modes can cause instability (ex. extreme vibrations) in the controls. Just about every filter will have the P term. So, let's just assume that KP is in our filter. Now the question is do I want to add just I, just D, or both into my filter. If you want you can only have a P term. This is the simplest type of controller to tune since you only are playing with one value. The downside is that your controller will not smoothly correct itself for sudden and sustained error. If you add a D term you will be more susceptible to noise and random values. So if you have very noisy data or random impulses that your sensors measure, you might want to leave the D term out. The downside of leaving the D term out is that you are not responding to those random values that might be legitimate, so you will have a slower response time. An example of this is if your motor hits a rock it will take longer to increase your commanded value since you are not looking at how the error is changing with time. However, if you are working on a robotic arm, you might want the D term so you can quickly respond to changing forces.

The I term gets tricky. In many cases, you will want the I term so you can recover from an error that is slowly accumulating. The downside is that the I term is slow to respond. This slowness can lead to instability in your control.

How to tune your filter?

Tuning a filter can be difficult since a device (say a motor) might need to respond to different conditions. For example, if you tune your motor with no load it might not perform optimally with a load, and if you change the load you might need a different set of values to get optimal control. So often you are trying to find a set of parameters that works best in all cases and not necessarily optimal for any given case. There is another approach where you get different constants (the K values) to use in the filter and you choose which set to use based on the actual values in the system. There are many ways to tune a PID controller. The two best ways that I know are manual (I know people don't like manual things that rely on having an expert around) and Ziegler–Nichols method. With that said I have found that I can get better results by manually tuning a system, however, you can use the Ziegler–Nichols method as a starting point.

Manual Tuning

If the system is online, one tuning method is to first set KI and KD values to zero. Increase the KP until the output of the loop oscillates (or just performs well), then the KP should be set to approximately half of that value for a "quarter amplitude decay" type response. Then increase KI until any offset is corrected insufficient time for the process. However, too much KI will cause instability. Finally, increase KD, if required, until the overshooting is minimized. However, too much KD will cause slow responses and sluggishness. A fast PID loop tuning usually overshoots slightly to reach the setpoint more quickly; however, some systems cannot accept overshoot, in which case an overdamped closed-loop system is required, which will require a KP setting significantly less than half that of the KP setting that was causing oscillation.

Effects of increasing a parameter independently

Parameter	Rise time	Overshoot	Settling time	Steady-state error	Stability
K_p	Decrease	Increase	Small change	Decrease	Degrade
K_i	Decrease	Increase	Increase	Eliminate	Degrade
K_d	Minor change	Decrease	Decrease	No effect in theory	Improve if K_d small

Ziegler–Nichols

Another heuristic tuning method is formally known as the Ziegler–Nichols method, introduced by John G. Ziegler and Nathaniel B. Nichols in the 1940s. As in the method above, the KI and KD gains are first set to zero. The proportional gain is increased until it reaches the ultimate gain, K_u , at which the output of the loop starts to oscillate. K_u and the oscillation period P_u are used to set the gains as shown: So, this was all about PID Controllers and my working in the same for Various Projects. I hope you like it

Ziegler–Nichols method

Control Type	K_p	K_i	K_d
P	$0.50K_u$	-	-
PI	$0.45K_u$	$1.2K_p/P_u$	-
PID	$0.60K_u$	$2K_p/P_u$	$K_pP_u/8$

Written By:



**Gunjan
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4th Year, E&I



GAS REFILL NOTIFICATION SYSTEM

The usage of LPG cylinders in our household for cooking purposes has indeed become an inseparable aspect of our lives. But, isn't it really irritating when you're famished and getting ready to cook something really tasty and your gas fireplace bails on you. And to worsen the situation, let's say you don't even have an extra gas cylinder. Well, It's really troublesome when the fuel gets completely consumed without our knowledge or any prior warnings. So, don't you think it'd be a real help if we could estimate beforehand when the fuel is likely to run out and book for a new fully filled gas cylinder accordingly? Huh! Sounds like a relief. So, keeping this real life problem in mind, I've designed the prototype of a mechanism that solves the above issue. This prototype is eligible of constantly measuring the weight of the cylinder instead of its volume. subsequently, the moment when level of gas(that we measure in kilograms) drops below a specific point (setpoint = the minimum weight/ the amount of remaining gas) which shall be previously set, we will be sent a notification on our smartphones warning us regarding the amount of fuel left. This will remind us to book a new gas cylinder. The components used in this prototype are, a NodeMCU, which serving as the microcontroller, a loadcell, and a HX711 amplifier module for measuring the weight and the input.

Project By:



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3rd Year, E&I



CNC MACHINE

While learning about CNC machines (which stands for Computer Numerical Control), I was so intrigued by its conceptualization and applicability that I couldn't stop myself from giving a shot at building it. It is a simple CNC Machine that prints the text and the images that are given to it as inputs. We can print anything ranging from a type of design to 2D drawings/images. In this model, I have connected two stepper motors one for the X movements and another for Y-axis movements. All these motors are connected to the Arduino through the motor shield L293D. There are three softwares required to operate this, namely, "Arduino IDE": to upload the code in the Arduino board, "Inkspace" for the design, sketching and converting to G-code. Lastly, a "Processing IDE3" to run the G-code.

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INTEGRATION OF AI AND IOT

How does the term, "Artificially Intelligent Things" sound to you? Interesting,right!

Artificial Intelligence alone can do wonders. Concepts that were being termed as fictional not so long ago have now creped into our everyday lives; be it a simple web search that can provide us with tremendous amount of information within a fraction of seconds, or a weather forecast, or a not-so-simple prediction of a disaster which saves thousands of lives. Ever imagined how Google Lens instantly returns a plethora of information on the provided image,or how Netflix recommends you movies or Spotify recommends songs based on your music taste? Well all we need to do is provide our systems with loads of data and it's then their job to analyse and process the data, and then come back to us with specific desired outputs. Nowadays it's fairly easy to get your hands on tremendous amounts of data; as, data is generated by us at all instants, even as we get by our regular day-to-day life, be it while browsing stuff or riding out on a vehicle to buy items from a shop. And this data is used in the creation of even more data.

Pheww...It's data data everywhere.

Internet of Things on the other hand is a concept of making regularly used items smart enough so that they become capable of taking their own decisions and implementing them. It describes physical objects embedded with sensors having the ability to read data, compute and perform tasks in accordance with their inputs. Let's say that we enter the house and the light switches on by itself,then you see your fridge had realised that there were no more eggs left so it'd placed the order that has been delivered at your doorstep.This was an example of home automation. Similarly examples of some more IoT devices are wearable health monitors, biometric security scanners, smart fire-alarms, door locks, etc. The Internet of Things therefore involves billions of physical devices around the world that are now connected to the internet, all collecting and sharing data via wireless networks and taking required actions.

Come to think of it, how do robots and self driving cars work? They create and maintain maps of the environment that they are in with the help of variety of sensors and cameras embedded into them and based on what they perceive, or what kind of data they're fed with, they compute what and where their next step should be. They use powerful machine learning algorithms which are made efficient with neural networks to understand their surrounding and provide them with further instructions, while the various sensor arrays and actuators help them to execute to instructed task and interact with the physical world with little or no human intervention. AI enables IoT systems with decision making, data handling and processing capabilities, thus playing an important role in IoT applications and deployments.

It won't be wrong if we state that Artificial Intelligence and Internet of Things are way more powerful when they're made inter-dependant on each other. AI is the brain of a system while IoT enables the system to interact with us and carry out the said tasks. Independantly, both the concepts are being employed rigorously in various fields, but once we start blending both in every sphere, we'll become capable of giving birth to breathtaking technology that will provide us with miraculous results.

Written By:



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3rd Year, E&I



DESIGN



DONAGE

DONAGE a word used for bridge used for donation a ui/ux project made for maintaining transparency between the donor and donee. It can be utilised as the most effective platform to connect the diverse society. Donor can extend a helping hand to any person and make the donation reach them via volunteers. People can even run campaigns to raise fund for a cause of betterment.

To maintain the transparency and to ensure the donation have reached the worthy hands people can keep a track and locate easily.

The process can be made quick and trustworthy with access to the authorised medical information regarding oxygen cylinders availability and hospital beds.

DONAGE a word used for bridge used for donation a Ui/Ux project made for maintaining transparency between the donor and donee. Giving a helping hand to rescue someone from their misery (not only during the pandemic times) is imperishable. It's the right of the people to live a basic life, if not with luxuries. The network that we are trying to build sustains all through the era of homo sapiens.



Project By:



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Pattnaik**
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(People's Choice Award Winner at UMO DXS21)

Heevo, made up of the words Health and Evolution is a UI/UX project aimed to tackle issues in the Healthcare sector by means of e-consults & AI assistance to provide them with better health management services.

The objective was to create an application which could help achieve an optimal balance between fighting the covid-19 pandemic and the maintenance of essential health services by ensuring access to safe and high quality medical facilities.

Comprising of a smooth and efficient UI, the app was built to be spontaneous less demanding and to give fast access to data, enabling doctors to respond to a emergency case very quickly while also allowing patients to take as much time is necessary to associate themselves with the specialists even remotely. The application ensures that the users have a smooth interaction journey in managing their health needs. The ultimate goal was to create a fundamentally new strategy to digitise the health services for people.



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COHEAL

(Finalist at UMO DXS21)

COHEAL - Your essentials at a Go, is a healthcare project, designed to bridge the gap between lack of supplies and their distribution to the needy at the critical times. A huge population struggles to get the important life saving drugs, oxygen cylinders, beds, ICUs and other covid essentials which leads to a huge loss of lives.

The problem was addressed by creating a platform where availability of all sorts of healthcare information from various sellers/dealers/distributors across an area are gathered for the users to access effortlessly, without having to deal with extreme situations. This can not only help the general public from getting deceived with the manipulated information but can also serve them with authenticated sources of data. In short, it can save a life!

From substantial research to understand the depth of the situation to building a solution using design elements, it was a journey of 2 months. After interacting with different people about the problem faced by them, we concentrated our idea of using a small and easy application to solve their problems. We tried developing a product which could be used as a one stop solution for accessing healthcare at fingertips.



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AVYK

The prime objective of this project was to create an app that is eligible of making suggestions to its users that help them in attaining a healthy lifestyle during the Covid-19 pandemic. Social instability is a major issue which has restricted the masses from socializing and rising corruption in social assistance funds and unfair grade level system has contributed to disseminating negative stigma. The app makes a constant effective effort in bringing awareness among the Gen-Z generation regarding implementation of sustainability and laying a ground for transformation.

Through extensive brainstorming, substantial surveys and qualitative research, we reached a solution for building an application that would cater to the mental, physical and social health of the Gen-Z.

We studied contemporary applications having similar targeted audiences and analysed its strength and weaknesses and took proper inspiration to utilise it. Then we decided upon a proper theme, colours and design to make it look more engaging, playful and to provide the users with a gamified experience. The delicacy of the pandemic scenario was kept in mind and a flawless UI was made that would successfully set the Gen-Z on the path of self development and human welfare.



Project By:



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**Ridisha
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2nd Year, EE



**Abinash kumar
Sethy**
2nd Year, EE



**Sraddha
Pattnaik**
2nd Year, EE

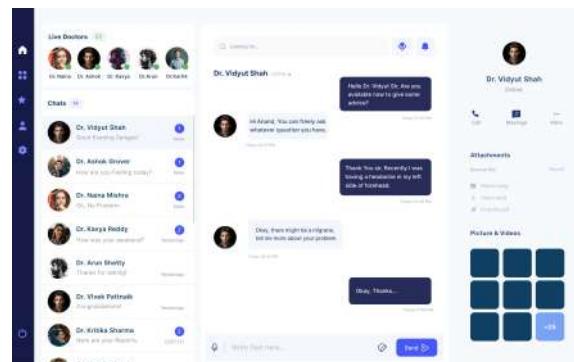


INSTANT CHAT WITH DOCTOR

Instant Chat with Doctors, is a feasible electronic gateway which proves to be a boon for the healthcare sector. Gone are the days where a patient waits for hours in queues to seek a doctor's visit. As a team challenge, we look upon a way to overcome the problems faced by the users and doctors, by making a superlative and uncomplicated workflow to meet the needs from both the sides. It is a product within a single chat window for the consumer's gratification and ease, where you don't have to wait for any particular doctor for your checkup. Instantly talk with any doctor available online..

Some of the features that you get are Single Click Consultation, Medicine conveyance, Transparency in transactions, Audio and Video archives. Keeping in mind the future enhancement. There's a lot of potential in the upcoming future aspects of the project given the market is expected to grow at a CAGR of 14.9% over the forecast period from 2019 to 2026 as more hospitals and healthcare facilities will introduce online consultancy.

Healthcare and fitness apps rose to popularity with the emergence of wearables and IoT. It has been a challenging task for us, as designers, to deliver an outstanding app that addresses the problem from both users' and doctors' points of view. The whole process of understanding the problem, conducting surveys and collecting feedbacks helped us well in proposing the best solution.



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CELEBRATING THE DIVINE FEMININE

There exist 'Nine manifestations of Goddess Durga' in hinduism. They are especially worshipped during the festival of navratri, where each of the nine manifested forms are venerated respectively for each day.

We tried to portray the forms of our divine goddesses through letters in this above project. we used fonts like Gilroy, Roboto, Abeezee for the cause.

Shailaputri : Derived from two sanskrit words, Shaila-putri means the daughter of mountains. The orange color used here, depicts the joyful and caring nature of Shailaputri.

Brahmacharini : The purple colour used for this, portrays the calm and divinity goddess Brahmacharini.

Chandraghanta : The red colour is used to convey the ferocious nature of goddess Chandraghanta.

Kushmunda : Blue stands as the best color to show the calm and fierce nature of goddess Kushmunda.

Skandamata : The orange and yellow colours used here represent the intense yet poised look of goddess Skandamata when she sits on a lion.

Katyayni : The magnificent blue color represents a mother protecting her child.

Kaalratri : The anger of goddess Kaalratri is depicted through the dark blue colour and the bright red color of the tongue describes her ferociousness.

Mahagauri : The combination of white & maroon is symbolic of maternal affection.

Siddidatri : The bold pink color symbolises the purity of lotus which the goddess sits upon.



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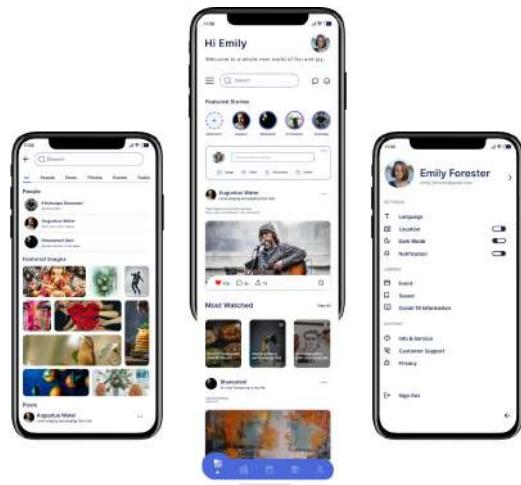
**Sangyashree
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MAITRI

The outbreak of the pandemic itself and the subsequent containment measures have taken a toll on the mental health of individuals. People are frustrated and unhappy from being forced to stay at home. With the increasing duration of lockdown, they are losing their patience and most importantly it's affecting their mental health which leads to problems in their daily life. So, we thought of an app that will keep people engaged during the difficult times. Treating a patient who is suffering from illness is more difficult than treating a person who is a potential patient. The main idea behind this is to create such an environment that people won't fall into trap of mental disease.

Maitri could help people in these times by providing them a space where they can connect with peers, attend events, listen to the shows of their choice and of course play different games with their friends and family to uplift their mood. Here games can act as ice-breakers between strangers and with help of event feature people will be able to join the event of their choice and organize events which can provide a source of income to many. The effectiveness of the people will result in creation of positive atmosphere which will help people to prepare themselves for the next wave.



Project By:



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**Tanisha
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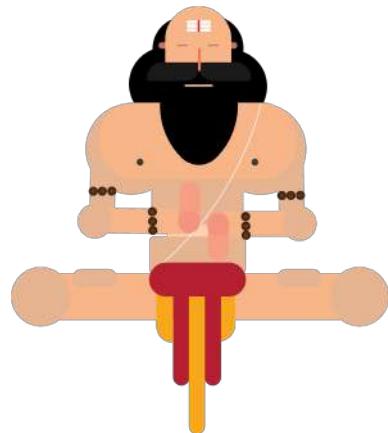
SAPTARSHI

When we look at the constellations, the most prominent constellation that we see in the northern sky is the 'Asterism of the Big Dipper' which is also known as 'Saptarshi Mandal'. The seven stars are named after the seven sages of ancient India who had enormous contribution towards reforming the Indian culture and society. They are believed to be the mind born sons of Lord Bramha. Their knowledge and guidance has shaped India, as we know it today.

So, have you ever thought, how these great sages looked when they lived? If you google it, you can find thousands of illustrations depicting their looks. In this project I tried to illustrate these sages through various shapes.

These are the steps I followed during this project: -

1. Research - While illustrating all these sages, I did deep research on these sages which included their history, birth, achievements and their contributions to Indian society.
2. Sketching – This is one of the important stages of the project where I had to select apt shapes in order to illustrate the sages properly.
3. Design – This is the final step of the whole design process in which I completed designing the characters with the help of Adobe Illustrator and Photoshop.



Project By:



**Haritosh
Tripathy**
4th Year, TE



ANTIQUE 3D APPLE MACINTOSH 128K

This was one of my favourite renders in Blender 3d. The idea came to my mind when I saw Saptarishi Prakash's skeuomorphic Mac illustration in Figma that looked insanely real, and that was made in 2d with gradients, drop shadows, and inner shadows used in various combinations. I thought if that is possible in 3d. I started mood boarding and collected many photos of retro macs as a reference. The modelling took less than 2 hours and I love the fact that everything is made from procedural textures. The postproduction and compositing were later done in Adobe Photoshop. The colour grading gives it that vintage look that was missing in the render. I released this on Engineer's Day which was coincidentally just after this year's Apple Event!



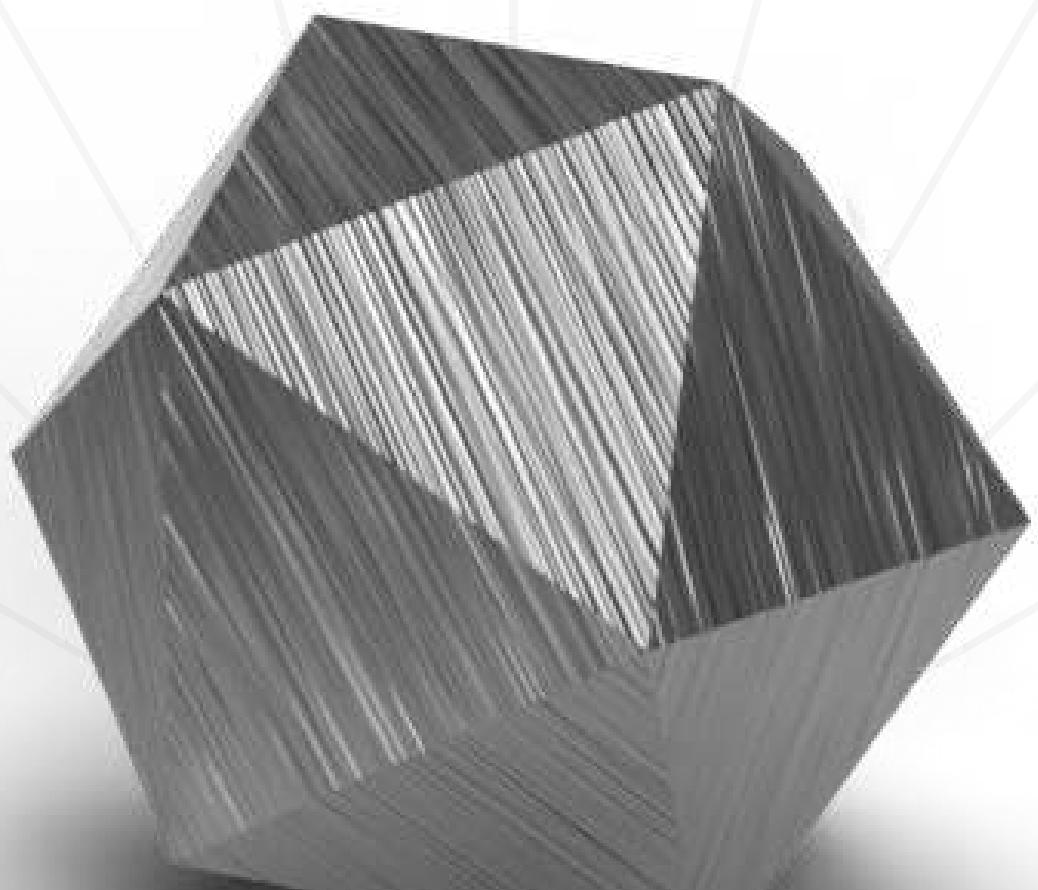
Project By:



**Ashish
Mohapatra**
2nd Year, IT



OPEN SOURCE



JOURNEY TO MY FIRST K8S CONTRIBUTION

It all began when I accidentally came across a video related to Docker and Kubernetes on a YouTube channel, Tech World with Nana. That's when I thought of giving a shot at this emerging tech domain. I watched a video lecture describing the basic concepts and commands to use Docker and Kubernetes. After completing that lecture, I had already nurtured enough interest in this domain to dig further into the rabbit hole. Post that, I explored a lot about the various opportunities related to DevOps, be it open Source or hackathons or jobs/roles related to DevOps. Not long after, I discovered about CNCF, which I would like to refer as the 'Mecca' for DevOps enthusiasts like me. I learnt about SIGs (Special Interest Groups) and how they can become a starting point for any average beginner's contribution journey. Later, I happened to follow CNCF and its subsidiary handles on Twitter and stumbled upon a post calling for people willing to shadow in different sub-teams of the SIG-release for the K8s 1.23 release cycle. Yes, that was the key to unlock the door which led me into the K8s community.

I applied for shadowing in the teams managing Release Notes and Docs. Few days later, I received a mail from the Release Notes lead, Cici Huang, informing me that I have been selected for the role and can join the slack channel dedicated to the release notes discussion.

Fast forward, a week later we had our onboarding meet followed by my first release team meeting. It was a cheery occurrence to interact with all the shadows and leads spread across different time zones, all energetic and willing to make the 1.23 release a great success. I spent the next couple of weeks understanding how things work in a release cycle, basically going through role handbooks, guides and completing the pre-requisites for making contributions to the org.

Having done the setup, now was the time to take up responsibilities. In a subsequent release phase, Alpha.3, I made sure to talk about it ahead of the release cut. And started working on it. It took me a while to understand the various sub-commands and flags of Krel (the automation tool for generating release notes).

Finally!!! I succeeded in raising my first PR to the Kubernetes project. There were two PRs one for the release notes and one for the release notes website. In due course, I was also amazed to ascertain that Git as a tool and GitHub as a platform are both quite powerful and make the lives of developers a lot easier.

Written By:



Parul Sahoo
3rd Year, CSE



CELEBRATING OPEN SOURCE : HACKTOBERFEST

Deciding To Participate In Hacktoberfest

I had known of Hacktoberfest since the sophomore year of my graduation. Although I did participate in Hacktoberfest 2020 back then, I was not able to contribute properly due to lack of interest and time. This year I was not quite interested in participating in the month-long open source celebration. This was majorly due to the unpopularity of DevOps and related tools in the program. There weren't many opportunities for people belonging to the DevOps niche to learn more about the said sub-domain through open source contributions in Hacktoberfest. Then What changed my mind? Well a friend of mine is to be credited for my participation. She mentioned about it during a text conversation and that did spark some curiosity to atleast visit the Hacktoberfest website once. And that one visit was enough to compel me to switch from not participating to enthusiastically searching for repos and issues I could contribute to (just wanted to add in that the whole theme of Hacktoberfest 2021's website is aesthetically pleasing!!).

Selecting Repositories and Issues

Having adored the vista of the website, I hopped over to the projects section, which enlisted all the projects that were participating. I found a few organizations which included projects that required skills which I had acquired earlier in my freshman and sophomore year. Consequently I scrolled through the issues list. Initially it was a bit disheartening to see all the riveting issues having been already assigned. "Wait a min.. I can draft tutorials for users to follow while using the product? Well that sounds fun and challenging". And that's how I grabbed a couple of issues opened to create user guides for specific use cases. No sooner I had been assigned with the issues than I started working on them.

Creating Tutorials Is No Duck Soup

The next step involved, understanding the contributing guide and delving into the official docs hosted on their website. The tutorial should essentially consist the whole step by step procedure of creating an application on Appsmith and use different data sources to fetch, query and update the database. I had to create two applications using Notion Database and Amazon Redshift as data sources. I began with reading the docs of Notion and Amazon Redshift to create databases and store data. Eventually I learned to make the data accessible from third party applications like Appsmith. At each stage of the process I took screenshots of the progress and updates that were apparent on the screen. On successful integration of API with data source I tried giving the application a fancy look using the various UI widgets that Appsmith has to offer. Then was the time to jot down them in the form of an easy-to-follow guide and add them in a markdown file.

Ohhh.. an interesting thing that I found during this stage was, pressing ctrl + Alt on windows(and cmd + Alt on Mac OS) opens up the GitHub web code editor which saves the time, effort and data used to clone big repositories into your local machines. But there's one gotcha! One cannot access a terminal from that code editor. Since, I just had to add texts and code snippets and not really execute or test any code the GH online editor was convenient for me. To know about the different markdown syntax and the code highlights customization according to the programming language was probably the most fascinating for me. I had also taken up another issue that required me to enable an auto complete feature for styled components' theme definitions. This issue required the knowledge of Typescript and a thorough understanding of the codebase.

Post PR Chore

Having created a Pull Request the next thing was to wait for maintainers to review the PR and mention updates required to enhance the quality of the PR(if any). Later, on updating the PR accordingly, it was approved. I can recall myself being completely impatient during the time interval between the PR creation and PR merge. And the childish glee that was instilled within me with each PR merge, is inexplicable. To sum up this October, there can't be a better description than, "code, create a PR, wait for approval and repeat".

Rewarding Open Source Contributors

Finally, at the end of this hectic month-long celebration, there were packets of delight being distributed amongst all the hardworking open source contributors for their contributions towards various communities. These packets of delight came in the guise of swags. Who doesn't like swags? And if the swags include cool t-shirts and stickers, I believe no programmer can resist themselves from getting their hands on them.

Written By:



Parul Sahoo
3rd Year, CSE



MY JOURNEY FROM OPEN SOURCE TO HACKERRANK

I was always interested in Open Source and e-contributions since a long while but was not able to start, thinking it's not very beginner-friendly. I began searching about how to get started with it and finally landed up at GirlsScript Summer of Code.

My first contribution was to a project named, Water Monitoring System, since, the initial issues in that project were 'Good-first issues'. It was initially difficult to get a hang of the whole process (fixing the merge conflicts and much more) as I was very unfamiliar with git and all the projects which were hosted on GitHub, so I followed some youtube tutorials and blogs for the same.

Post that, I got interested in various other projects named Crop AI, GirlsScript Boilerplate Website. Here I developed my skills set even more. It was during the contribution to the documentation of this project that I got to learn about Sphinx and React core which taught me a lot. Once I figured out how things operate, it was fairly straightforward to work with. Later, I started taking up a variety of challenging issues and bugs to solve and secured a spot as the top contributor of the project. My journey with GSSoC has motivated me to explore the open-source world even more!

After GSSoC I participated in many more open source programs like, Student Code-In 2020, Contributor's Hack 2020 and many more. These contributions to opensource and a few small internships lead me to an internship offer at Hackerrank.

I can recall the day when I got an email from Hackerrank that "My Github Profile caught their eye". The best day of my life till date. Without a second thought I applied for a SWE position and had an interview scheduled with the CTO of Hackerrank, where we discussed my past projects/internships and the tools and technologies I had worked with. After a couple of days, I had my second interview call with a Sr. Engineering Manager; the structure of the call was pretty much the same as the first one. I got a chance to showcase what I had worked on in the past as well as areas that I am interested in. After the interview, he said they would get back to me and within a week I had an offer from Hackerrank. I was really excited to join! I worked on an upcoming project, 'HEXAGON', on Frontend, mainly using React. Initially I struggled with integrating react components but then it became a piece of cake. I also got a chance to lay hands on UI/UX design. Apart from technical learnings, I also learnt about stand-ups, teamwork, and gained effective communication skills, to not be scared of seeking help and asking for help only after trying enough. The culture and work-life balance at Hackerrank are the best things that I have experienced. Everyone is kind, friendly and helpful. Lastly, my journey at Hackerrank is one of the cherished journeys I have ever set out on.

Written By:



**Adyasha
Mohanty**
3rd Year, IT



ARTICLE



MY COMPETITIVE CODING EXPERIENCE

Problems! Although much dreaded, yet they have become an inevitable part of each of our lives. Imagine a world devoid of problems. Well, it simply ain't possible! Isn't it? So, the least we can do is, make pretty good usage of our wits and try to tackle with every single one of them. Competitive Programming is one such domain that teaches you the power of solving almost all our real world problems.

My experience with competitive programming has been totally different. I encountered my first CP problem when I didn't even knew what CP was. Back in my school when we were taught how to print '*' pyramids, I came across a website called codearena by hackerearth which allowed the user to enter a duel with a random opponent over a CP problem and the one to solve first wins. In the first few attempts I used to understand the questions but since I had zero knowledge of efficient algorithms and how to solve a given problem using a particular algorithm,

I used to always write a brute force code and expected it to pass. But everytime only a few test cases (probably the ones with less input) used to pass, rest all used to get a 'time limit exceeded' response. I used to ignore that thinking it is an issue in the website.

Then I passed school and forgot about the website until I entered college. I heard seniors and my batchmates talking about the same website and a few others. I thought myself lucky to be using that website already, until I came to know algorithms and data structures. Suddenly my perspective about those problems changed. I realised that it has been me all along who used to write an inefficient code, thinking it is the site's problem that the solution isn't accepted. I started studying DSA rigorously with a goal to by-heart each algorithm. But that's where I made a huge mistake. I started by-hearting the code as well without understanding how it works. Whenever I tried to solve a CP problem, I used to understand the problem but never used to get which algorithm or data structure to use. Soon I realised that learning all the algorithms isn't going to work. Understanding the algorithm and implementing the code by myself was more important than just learning it by-heart.

At this point I became a lot slower than before. From 2 problems a day with an incorrect solution I downed to one problem in 2 or 3 days that too after following an editorial. Soon following the editorials became an habit. I knew only basic DSA very well and most of the problems went beyond my thinking. I almost gave up thinking competitive coding isn't for me. Then I found out there are competitive coding competitions held too where a bunch of people participated to find the fastest coder. I started taking part in almost every competition and fail in each one with only 1 or 2 problems solved out of 6. At least there were no editorials accessible while the competition was running. I solved that 1 problem on my own. But one thing I should have done is follow the editorials after each competition. I didn't do that because most of the editorials talked about algorithms I didn't knew and used to think I was copying someone else's solution!

This is when I found a free course on GeeksForGeeks.

This course of 11 weeks had a collection of problems over basic data structure and algorithm. I solved each problem religiously and got a thorough understanding of which data structure to use when. At least I could now understand editorials for problems. That was all the motivation I needed to start pacing up again. Slowly I started increasing the number of problems per day, sometimes spending a whole day understanding one problem. I started taking part in all the 3 contests of codechef per month. I learned a lot about how to approach a problem and currently when I see a problem I can frame a basic approach to it even if I don't completely know how to solve it.

My experience with CP has been excellent and to summarise I would say that I learned 3 things: First, don't wait for finishing all the DSA before starting to solve problems. Start solving easy problems first, you can learn DSA along the way.

Second, don't follow editorials too early, wait till you run out of ideas. and Third, Always check editorials after you solve a problem. You may find a much better solution to the problem and it won't be cheating.

Lastly, what matters the most is practice, each problem you solve matters.

written By:



Risabh Kedia

3rd Year, IT



ALGORITHMS & MODERN TECHNOLOGY

Day and again we see modern tech emerging with new possibilities making life easier and simpler. But at the same time the more edges we discover, the more complex the stuff gets that is making it possible. By saying "stuff", I want to highlight the Hardware and Software which are the core part of any technology we encounter.

But what does Software mean ? We can easily get away by saying that software is collection of codes / programs that run to give a desired output. But this trivial definition is not what we are going to talk about. By Software I mean the Algorithms running behind the scenes to provide the modern cut-through tech with the seamlessness that we can experience without being bothered about the complex mechanisms making them possible.

Let's take a few examples to clearly understand what I mean:

1. High Speed super computers - No doubt computing has seen an unimaginable rise in the speed and accuracy since the discovery of the early vacuum tube computers, to based computers, to modern microprocessor based computers. It won't be incorrect to say the computing efficiency has improved tremendously due to major advancements in the hardware technologies. But the software that runs today's modern computer also has a major impact on the speed of computing. The data processed by the computer is increasing day by day. Not only this, we need instantaneous results to our computational problems. Thus, we need to run several tasks at a time to achieve optimal time usage. This demands for efficient scheduling algorithms that allocate processing resources to different processes based on their time and spatial requirements. Some examples of scheduling algorithms are Round Robin algorithm, First come first serve scheduling, Priority based scheduling. One, or a combination of these scheduling algorithms are used to achieve optimal CPU usage.

2. Google Maps - We all have used google maps sometime or the other, whether to look for a nearby coffee shop or while relocating to a new place. Google maps uses a very common path finding algorithm called Dijkstra's shortest path algorithm. As the name suggests, it is used to find the shortest path between two given places. Not only this, google maps has a location database that stores the coordinate of each location in a binary format. Searching through this database where there are millions of entries, in a matter of seconds, can be made possible by something called 1-D implementation of a Quad-tree. Such an implementation of the location database also enables to find nearby locations of interest.

3. Automated Assembly Lines - As the tech industry is growing the demand of tech is tremendous than ever before. This creates a need to quickly assemble products while spending the minimum resources, to meet the demand of large number of orders. This is actually a trivial algorithmic problem that can be solved using dynamic programming where we know the time spent at each assembly station.

4. Artificial Intelligence - Maybe this is the most used Buzz word since a long time. A huge part of AI is based on random predictions and improvement upon those predictions. But it won't be wrong to say that the algorithms used for AI are mostly powered by the algorithms used to correctly predict the result while taking care that those results are produced in the least time possible. We need to find a relation between the input data and the output data. In other words we try to find patterns in the large amount of data. Hereby relationships and patterns in large amounts of data are searched for in an automated way. Thus the use of algorithms in AI is the fundamental basis. They are used to analyze data, to gain insight and to subsequently make a prediction or create a determination with it. The better the algorithms are, better and quicker the result is. Thus, a thorough understanding of algorithms will always help us to improve upon these pre-existing algorithms and make better usage of data and information at hand to achieve the best out of the technological resources, helping us to implement brilliant solutions.

Written By:



Risabh Kedia

3rd Year, IT



NFT - THE NEXT BIG THING?

NFTs are a hot topic right now. These crypto-assets are essentially certificates of ownership, and they make it possible to buy and sell any digital asset, virtually. NFT stands for non-fungible token. You've heard of bitcoin, the first widely adopted cryptocurrency. But old-school forms of money are represented digitally, too. For instance, USD Coin represents the U.S. dollar, and China recently launched the digital Yuan. These are fungible assets. But non-fungible assets -- items that aren't easily interchangeable, like paintings, songs, or even tweets and NBA tickets -- can be represented as digital tokens, too.

What is the difference between them? In simple terms, if bitcoin is like a coin, NFT is like a unique digital certificate tied to a unique digital asset. An NFT is not the same as physical ownership of a physical item, but you can own the NFT of digital ownership records for physical assets. NFTs rely on blockchain technology. They require blockchain protocols that support smart contracts which means once a transaction occurs, the change in ownership is reflected automatically. Secondly, the blockchain also keeps a record of all the transactions connected to the NFT and the property it represents. The legendary "Doge" meme from 2010, which portrays a shiba inu dog named Kabasu and inspired the creation of cryptocurrency dogecoin, sold for \$4 million as an NFT in June. Twitter CEO Jack Dorsey's first tweet NFT sells for \$2.9 million. Ebay's senior vice president announced that the company would let users buy and sell NFTs on their app. This option will be added to the app in a few months. Not only this...after being restricted to technocrat circles, Non-Fungible Tokens (NFTs) are finding wider adoption as even celebrities are jumping on the digital artwork bandwagon- touted as the next big thing in the world of blockchain, art, and e-commerce.

With an NFT, the rules of ownership are built into each code. NFT code includes primitives (simplest elements in the code) representing the following: Ownership, Transfer, Access Control & Rules for display. How can one buy or sell NFT? You can head over to OpenSea.io, click in the upper right-hand corner, and login. You'll need to set up an Ethereum wallet with Metamask, more than likely, then you'll be on your way! This is just the beginning.

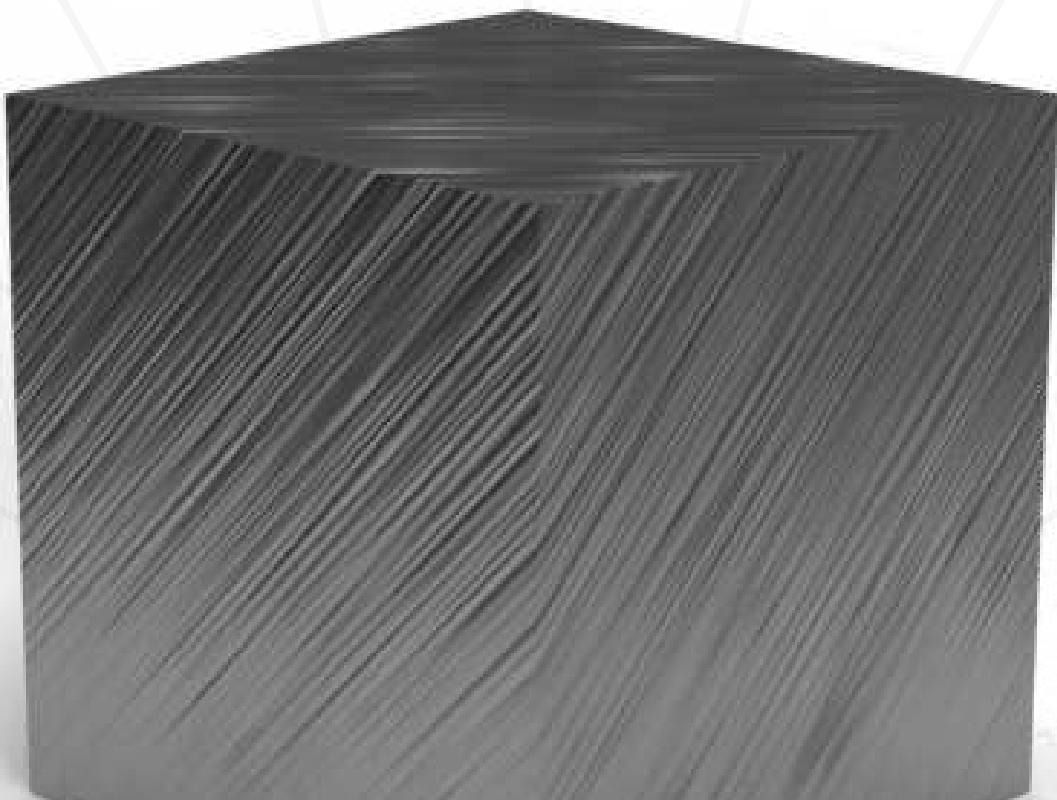
Written By:



Jessica Nayak
3rd Year, CSE



ALUMNI



ALUMNI SPEAK



Satyajeet Patnayak (2015-19)

Being a Mechanical guy, I might be one of the unique persons to be a part of Zairza. But I certainly do consider myself lucky to have received amazing friends, working on crazy projects attending, spectacular events and lots more. Getting into Zairza has given me a lot of memories to cherish. Keep Wondering, Keep thinking and keep Creating.



Abhishek Mishra (2016-20)

The most beautiful part of Zairza is that it lets you discover yourself. It presents freshmen with many options to let them know and discover what exactly interests them. Be it resources, guidance, alumni support, etc., Zairza has always been able to guide the members in discovering what exactly interests them.

Besides this, the brainstorming sessions have always helped in shaping the thought process while making approach to solve different problem statements.

By the time one completes their graduation, they would be able to gauge the difference Zairza has made in their life. For me that difference was magical and for others too! :)



Binayak Behera (2017-21)

Hi Folks,

My 4 years of experience in CET is synonymous with my life at Zairza. Everything I learned in my college life is because of this place. If you are thinking of building anything possible, you should be in this club, because that's our motto 'Wonder, Think, Create' and every member of the club will support you in every way possible and make it happen. It was because of seniors and my peers, especially Ankit Bhai, who pushed us to always learn something and we were able to achieve some great things due to that. This community has given me a lot of things, and I am pretty happy to see it progressing in a wide variety of domains. Anyone passionate about building new things, this is the right place for you in CET. The only advice I can to my juniors is to keep thinking of new ideas and work hard to make them a reality and take a break sometimes and have fun and make some memories with your peers.

ALUMNI SPEAK



Ashish Mohapatra (2017-21)

It's been a while now, but Zairza seems to still reside in me. I feel so proud to hear about all your great achievements gained by the Zairza family. I feel blessed to be a part of this highbrow family. It's all about seeing connections others can't, seizing opportunities others won't, and forging new directions that others haven't. Move out of your comfort zone, build, break and learn. Lastly, everyone is capable of success, you will reach heights. Cheers!



Pratik Panda (2017-21)

A graphic designer's main aim is to make the audience look into the content from a different perspective and to make it visually appealing. Our seniors have always stood up to the expectations of the people which they have from a newsletter issued by Zairza. My journey at zairza started in my second year. I began by designing small posters and other graphic content for the various fests and events happening in zairza. But since my induction, I have seen the design wing of Zairza grow and expand with many innovative members and their quirky & creative posts for Zairza. We have started with designing posts for festivals and events and soon expanded ourselves to teach juniors UI/UX design. People here are very creative and I hope that this enthusiasm is carried forward to the upcoming generations and the inductees bring about more innovative designs and approaches to the design thought process.



Muskan Khedia (2017-21)

Zairza provides the opportunity to meet like-minded people crazy about developing out-of-the-box software, hardware and designs. I feel fortunate to be a part of this family. Working together on the projects has made college learning practical and easy. Zairza is not only a robo-sof club but a family for life.

Zairza is known for its remarkable achievements. Have confidence in yourself and keep working, success will come along your way. Consistent guidance from seniors have helped me in my goals and I wish the same for you. All the best for your future endeavours!

ALUMNI SPEAK



**Sarthak
Rout (2017-21)**

The best thing that CET possibly gave me was the opportunity to be a member of Zairza. I still remember my initial days, afraid and nervous, but at the same time excited to begin a whole new phase at a completely new place. And being a part of Zairza was the perfect way to begin with. It not only helped me explore so many possibilities, but also got me an amazing bunch of friends. I got the chance to work and interact with the seniors I still look up to. The support and guidance I received here has in my ways shaped me into who I'm today. Everyday spent there still holds a special place in my memory and will always do.



**Jiban Jyoti
Panda (2017-21)**

Zairza has a special place in my heart. I am honestly very grateful towards Zairza for having given me the opportunity to meet some amazing friends and seniors who helped me in my ups and downs and mentored me throughout my tenure in the club. The memories of farewell, pizza parties, midnight discussions and organising perceptual brainstorming sessions, still take me to the best days of my life. Zairza is not just a club but a family which helped me in every possible way to carve the best out of me. Glad to be a part of this family.





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SAC, Canteen area, CET, Bhubaneswar