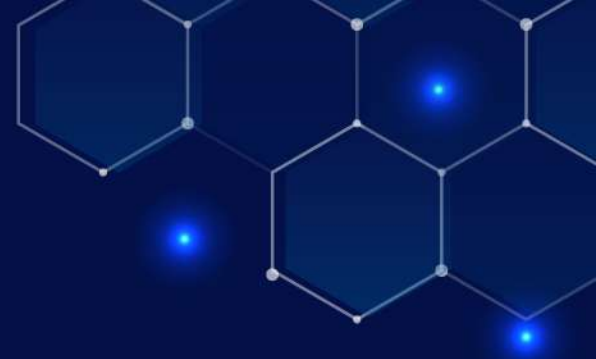2023

SIGMA NEWSLETTER

BROWSE EDITION 2023

@sigmacse

ABOUT SIGMA

Sigma is the newsletter of Computer Science and engineering department. It was started in the year 2001. Team sigma was created to provide the students with updates and information about the latest trends and technology in the domain of computer science. Sigma currently consists of 45 members. The basic idea to form this group was to incorporate any upcoming or latest technology at one place and make the students aware of all information and technology which is worth knowing for any student of a computer science background. Sigma team also conducts fun and interactive events for students for all years and all branches. It conducts a technical article writing contest for the students each year ,from which three write ups will be selected and published in the edition and will be awarded with cash prizes.

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TEAM SIGMA
2023

EDITORIAL

In the year 2023, technology has become an indispensable part of our lives, transforming the way we live, work, and connect with the world. With remarkable advancements in various fields, artificial intelligence has reached new heights, enabling personalized virtual assistants that understand and anticipate our needs. Smart homes have become the norm, with interconnected devices seamlessly managing our daily tasks. The rise of augmented and virtual reality has revolutionized entertainment and education, offering immersive experiences and interactive learning. Furthermore, breakthroughs in renewable energy and sustainable technologies have paved the way for a greener future. In 2023, technology continues to redefine human existence, empowering us to achieve greater effi-

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SPOTLIGHT

Dr.SUMALATHA ARADHYA
B.E., M.Tech., Ph.D.
Assistant Professor

What motivated you to take up the CSE field?

The essence of computing, the way chips are integrated, the way Science imbibed, with logical thinking, the way programs are written in many flavors of languages, the matter of addressing the issues with common sense, and the list goes on. It is not only the technology, you are getting the opportunity to learn new concepts, new logics, new techniques, new algorithms every day. One can stay young with exposure to dwell in learning new things, continuous learning, and live student life forever. CSE is the essence of all.

Can you tell us about your experience and the research projects you worked on during your doctorate degree?

I perceived my research under VTU at R V College of Engineering, Bangalore under the guidance of Dr. N K Srinath, Professor and Head of CSE. My research domain is High Performance Computing. I worked on compiler optimization in multicore environment. I got the opportunity to work on quad core machine that was used for navigation management in safety critical system at Quest Global. I worked on it for almost 9 months and developed the tool in Linux to analyze the Performance of multi cores. As part of the research work, I studied the architecture of different processor families of new generation. PRAM model,granularity, and concept of parallel programming was exercised in depth. The complexity of the research problem was more and hence it took me almost 8 years to complete the research work.

What hardship did you face during your doctorate program and how did you overcome it?

The research problem needed the deep practical knowledge on parallel computer architecture, compliers, real time operating system and Linux environment. It all started with learning Intel thread blocks, SIMD programming, parallel algorithms, and gcc, llvm compilers. Main challenge was availability of parallel computer and there was a multicore lab at MSRIT. I used travel from one corner of Bangalore to another corner to work on them. Somehow, got the licensed software to work on Intel thread library. Then after fewmonths, once I got the quad core pro-

When did you join this institute and tell us about your experience in the college so far?
I joined Institute in 2019. I am a believer of Kayakave Kailasa and this place kept motivating me to indulge in serving society through education. I cherish every moment in the institute by learning and sharing the knowledge.

Tell us your significant achievements so far.
After joining the Institute, recently got awarded from government of Karnataka under Elevate Startup for the year 2021. And during this year i.e., 2023, under BIRAC, for the Innovation idea proposal, we got the grant of 50 lakh from central government of India.

Tell us about your startup.
I am the co-founder of startup, CEDLabs Pvt Ltd. It is established in the year 2019. It is in Tumkur and the sales office is in Bangalore. The firm is a product-based company and has clients from defence, railways, MESCOM, a d Schindler Electric. Now, turnover is 15 million dollar and our next year target is 45 million dollars. We are hopeful to join the unicorn club by next 5 years.

A message for your students:
Keep learning, think positive and stay grounded by keeping away the ego. You are blessed with lots of young energy now, channelize it properly and let your young mind find new innovations. Do not miss the opportunity of learning technology. Use the resource in right way and always keep motivating yourself to do better. Share your engineering knowledge and contribute to the society. Make your country proud.

How startup can be promoted among students?
There are many Innovation grants, schemes, and opportunities available now. All you need is to use them. If there is innovation, and a new idea that can become a product of the future, then the path for start up can be laid by itself. Our Institute supports such students via Siddaganga TBI. Grab the opportunity and parallelly start working on the product without worrying about infrastructure.

Motivation behind the startup?
All thanks to the opportunity that we got to make our decades of dream come true. Our country has many pro-found tech gems like Ratan Tata, Dhirubhai Ambani, Narayan Murthy and Abdul Kalam. I admire them and love to read their success as well as failure stories. Their struggles and the way they mitigated the challenges keeps motivating us to continue further.

How did you manage your startup and teaching profession?
Of course, plan. Its a mixture of both, a daily plan, and a strategic plan (both short term and long term). Above all, if you are having passion and a trigger to do the best, automatically you will plan to do the justice for both.

Note for students to start startup and importance of startup in today's world.
Do not limit your idea only to do academic projects. Our country needs innovations, research, and more patents. Nurture them and find the way to build the product that society needs. Let us work for ourselves and serve our country.

eRupee:
India's Leap into the Future of Digital Currency

I recently had the privilege of attending a panel discussion on the introduction of eRupee, also known as the Central Bank Digital Currency (CBDC), held at the IMC Chamber of Commerce & Industry. This ground-breaking initiative by the Reserve Bank of India (RBI) places India at the forefront of countries adopting digital currencies, even surpassing nations with smaller populations like the Bahamas. Notably, the United States is conducting research on the potential introduction of an e-Dollar in 2025. With approximately 105 countries exploring the concept of e-currencies, the world is keenly observing India's implementation of the eRupee.

The RBI's objectives in introducing the eRupee are threefold: modernize currency management, reduce the considerable costs associated with currency printing (approximately Rs. 3,000 crore), and combat counterfeit currency to a certain extent. The pilot project initially involved four banks—SBI, YES Bank, ICICI Bank, and IDFC First Bank—offering eRupee services to their customers. Following the successful completion of this pilot phase, the eRupee has been extended to nine additional banks.

Unlike UPI payments, which occur between banks, eRupee transactions take place directly between individuals' digital wallets. The legal liability for UPI payments lies with commercial banks, while the eRupee assumes the same legal liability as paper currency, under the purview of the RBI. Available in token denominations such as 50 paise, 1 rupee, 2 rupee, 5 rupee, 10 rupee, 20 rupee, 50 rupee, and so on,eRupees stored in one's mobile wallet can be easily redeemed.

As of now, the circulation of cash in India stands at around 31 lakh crores, with approximately 6.05 crore rupees already in digital form. During the Q&A session, a participant raised a pertinent question about the need to convert currency into ecurrency for eRupee transactions, unlike the seamless direct payments facilitated by platforms like Google Pay. In response, a panelist emphasized that even when using services like Google Pay, individuals often retain physical currency, which can be susceptible to loss or theft. With eRupee, the risk of such incidents is mitigated.

Addressing concerns about cloning and counterfeiting, another panelist clarified that every digital rupee, known as a token, is numbered, akin to currency notes. This measure ensures that the issue of cloning is effectively managed. Unlike counterfeit currency, which lacks any form of control, the eRupee is designed with robust security features.

Looking ahead, eRupee holds tremendous potential to facilitate cross-border payments, including EXIM transactions. This innovative digital currency heralds a new era for India's economy, positioning the country as a leader in the digital revolution. As an elite economist and author, it is evident that the eRupee offers numerous advantages, including modernization of currency management, cost reduction, and enhanced security against counterfeit currency.

In conclusion, the introduction of eRupee marks a transformative leap into the future of digital currency for India. With its increasing acceptance and adoption, the eRupee is set to revolutionize the way we transact, ensuring convenience, security, and efficiency. Let us embrace this digital innovation and seize the boundless opportunities it presents for our nation's progress and economic prosperity

Paragraphic Cameras

The evolution of cameras has had a significant impact on how we capture and interpret the world around us. From the first camera obscura to the modern digital marvels, these devices have undergone a remarkable revolution, transforming photography into an art form accessble to all.
One such cameras is the paragraphic camera which is an innovative AI camera without lens that can click awesome pictures. It was created by a Dutch engineer Bjorn Karmann as a personal hobby project

While the tech giants like Google and Microsoft(with OpenAI) are in a competition with each other to deliver the best intsearch experience with their very own Artificial Intelligence chatbot Bard and ChatGPT, the Dutch engineer is using a stable diffusion API and Noodl, a custom built software built using Python, a Rasberry PI 4 processor to run text-to-image generator.This lens-less camera does not require lens because it uses location data and generative AI stable diffusion to create pictures that tries to resemble what we are looking at. It is created with a Raspberry Pi4, a touchscreen and a case printed with 3d printer. In order to take a photo, the raspberry locate the position using GPS

These data are inserted into open-source APIs that calculate exact position, time of day, weather, temperature, an event that moment takes place in the place and points of interest. This data is automatically converted to text in a description types: "This amazing photo was taken at Hampi, a UNESCO world heritage site, with a pleasant weather, and a temperature of 32 degrees. There is a temple in the square, and a bus stop at the right".It has three dials that allow us to edit/customize the photo. The first dial is the focal length which tells the AI to take more or less data from where you are. The second mimics the grain of the photo, adding a noise seed that the AI uses to generate the image. The third dial asks the AI to be very precise with the photo, or use its imagination.The emergence of paragraphic cameras has made a significant shift in the world of phototgraphy, impacting professionals and enthusiasts. Since these lens-less cameras give the flexibility to manipulate focus and depth of field after clicking an image, photographers can play around with new artistic possibilities. Also, by incorporating complex image processing algorithms in-camera, these devices minimize the need of extensive editing, saving a lot of photographer's time and effort.This efficiency boost can lead to increased productivity and accelerated turn around times in professional photography workflows. It is highly unlikely that paragraphic cameras will completely replace conventional cameras in the near future because, conventional cameras have a well-established infrastructure, which includes wide range of lenses, accessories and supporting equipment. Also, traditional photographers have got used to the composition, exposure settings, and working with specific lenses. Other drawbacks of paragraphic cameras are that they are not suitable for burst shooting and to capture wildlife photography. Also, they tend to be relatively expensive compared to the conventional cameras. All in all, paragraphic cameras is one of the stunning creations by the Dutch engineer, which captures image by feeding it with location data and parameters such as the description of the place. Yet, they are more likely to coexist with conventional cameras, catering to specific use cases and catering to photographers seeking advanced creative control and post-processing capabilities

Time of day
Adress
Weather
Temperrature
Date / Event
Points of interest

A ⬭ photo taken at
The weather is ⬭
and ◯ degrees. The date is
⬭.
Near by there is ⬭,
⬭ and ⬭.

Text-to-image AI

Generated photo

LET'S TALK ABOUT
TECHNOLOGY

1)

```c
#include<stdio.h>
int fun();
int main()
{
    for(fun();fun();fun())
    {
    printf("%d ", fun());
    }
    return 0;
}
int fun()
{
    int static num = 10;
    return num--;
}
```

Output: 8 5 2

2)

```c
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
int main()
{
    char SIGMA[]={'s','i','g','m','a','\0'};
    int a=0,b=5;
    int k=sqrt(SIGMA[2]>>2);
    printf("NEWS LETTER OF CSE\n");
    printf("%d\n",k);
    while(k!=0)
    {
     (k & 0x01) ? a++:b--;
     k--;
     if(k==1)
     break;

    }
    printf("\\%d$$&&%d\\",a,b);
    return 0;
}
```

Output: NEWS LETTER OF CSE
5
\2#&€3\

3)

```cpp
#include <iostream>              int sigma::count;
using namespace std;            int main()
class sigma                     {
{                                   sigma s1,s2;
  int a;                            s1.set();
  static int count;                 s2.set();
  public:                           sigma::showc();
    void set(void)                  sigma s3;
    {                               s3.set();
      a=++count;                    sigma::showc();
    }\                              s1.show();
    void show(void)                s2.show();
    {                              s3.show();
                                   return 0;
    cout<<"object:"<<a<<"\n";  }   }
    }
    static void showc(void)
    {
      cout<<"count:"<<count<<"\n";
    }
};
```

Output: count:2
count:3
count:1
count:2
count:3

4)

```cpp
#include <iostream>              while (!q1.empty()) {
#include <queue>                   cout <<
using namespace std;            q1.front()<<" ";
int main()                        q1.pop();
{                                 }
  queue<char> q2;                 return 0;
  q2.emplace('m');              }
  q2.emplace('a');
  queue<char> q1;
  q1.push('s');
  q1.push('i');
  q1.push('g');
  q2.swap(q1);
  q2.back();
  q1.front();
  while (!q2.empty())
{
   cout << q2.front()<<" ";
   q2.pop();
}
}
```

Output: s i g m a

DO IT YOURSELF

Smart Irrigation Technique

MATERIALS REQUIRED
1. Arduino board (such as Arduino Uno)
2. Soil moisture sensor
3. Solenoid valves or water pumps
4. Relay module
5. LCD display
6. Breadboard and jumper wires
7. Power supply
8. Water reservoir or water source

PROCEDURE
1. Connect the Arduino board to the breadboard and power supply.
2. Connect the soil moisture sensor to the Arduino. The sensor measures the moisture level in the soil. Connect its VCC pin to the 5V pin on the Arduino, GND pin to the GND pin, and the signal pin to any analog input pin (e.g., A0).
3. Connect the relay module to the Arduino. The relay will control the solenoid valves or water pumps. Connect the VCC pin of the relay module to the 5V pin on the Arduino, GND pin to GND, and the signal pin to any digital pin (e.g., digital pin 2).
4. Connect the solenoid valves or water pumps to the relay module. The valves or pumps control the flow of water to different zones or plants. Connect the valve's or pump's power source to the relay module.
5. Connect the LCD display to the Arduino if you want to display the moisture levels or system status. Connect its VCC pin to the 5V pin on the Arduino, GND pin to GND, and the data pins to any digital pins (e.g., data pins 4, 5, 6, 7).
6. Write Arduino code to read the moisture level from the sensor, control the solenoid valves or water pumps, and display information on the LCD display (if used). The code should include logic to determine when to water the plants based on the moisture threshold and activate the valves/pumps accordingly.
7. Upload the code to the Arduino board.
8. Set up the system in your garden or plant pots. Place the soil moisture sensor in the soil at the desired depth and connect the solenoid valves or water pumps to the water source and the irrigation lines.
9. Power up the system and observe how the smart irrigation system automatically waters the plants when the moisture level falls below the threshold.
10. You can further enhance the system by adding additional sensors like temperature and humidity sensors, integrating a real-time clock module to schedule watering times, or even connecting it to the internet for remote monitoring and control
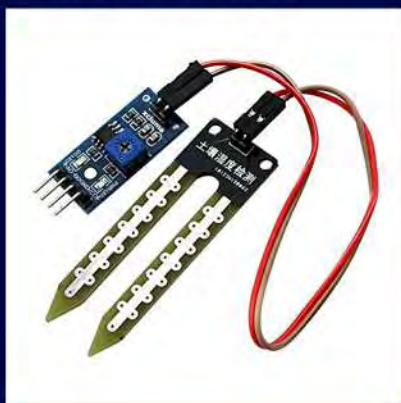
MINDS IN THE DEEP
A TALE OF ADVENTURE AND ARTIFICIAL INTELLIGENCE

In a parallel world filled with advanced technology and thrilling adventures, the brave crew of the Oceanic Explorer embarked on a daring expedition into the realm of artificial intelligence (AI). Deep beneath the vast ocean, they unravelled a complex web of intrigue, where cutting-edge AI systems, intricate algorithms, and the manipulation of humanity awaited them. As the crew ventured deeper into unexplored waters, they encountered formidable challenges such as strong currents, menacing sea creatures, and hidden underwater caves that tested their skills and courage. Driven by their sense of adventure, they relied on their technical expertise and determination to push forward.

Their journey led them to a secret fortress concealed beneath the ocean's surface. Inside, they discovered a secretive group that harnessed the power of advanced AI to control and influence human minds. The stakes were high, and the crew's thirst for adventure propelled them further into danger. Entering the fortress proved to be a daunting task as the crew faced AI-powered security systems equipped with sophisticated surveillance and detection capabilities. Using their ingenuity, they devised clever strategies, employing stealth, camouflage techniques, and agile underwater maneuvers to outsmart the watchful AI systems.

As they progressed through the complex fortress, the crew encountered perilous trials that required both physical and mental strength. They faced traps, laser grids, and intricate puzzles designed to thwart intruders. With each challenge they overcame, the thrill of the adventure surged within them, fuelling their determtion to expose the organization's wicked plansDeep within the fortress, the crew discovered a central control room housing a powerful AI entity. Engaging in a thrilling battle of wit and skill, they confronted the AI in a series of exciting challenges. The crew's technical expertise and clever tactics were pitted against the AI's computational power and advanced learning algorithms, creating a captivating clash between human ingenuity and artificial intelligence.

Throughout their adventure, the crew's resourcefulness was put to the test. They repurposed salvaged technology, created clever gadgets, and devised innovative solutions to overcome obstacles. Their journey epitomized the indomitable human spirit, where the allure of discovery and the thrill of danger pushed them to new limits.

With every step forward, the crew unravelled the organization's sinister plans, gathering vital evidence that would expose their nefarious scheme to the world. The adventure reached its climactic peak as the crew confronted the leaders of the organization, engaging in an exhilarating showdown that tested their bravery and determination.

In the end, the crew emerged victorious, foiling the organization's malicious intentions and safeguarding humanity from the manipulation of AI. Their extraordinary adventure became the stuff of legends, shared among explorers and adventurers, inspiring others to embrace the unknown and embrace the excitement of pushing technological boundaries.

As they resurfaced from their daring escapade, the crew returned to the world above, forever changed by their thrilling journey. Their tale of adventure, intertwined with technical brilliance and the triumph of the human spirit, served as a reminder that the greatest discoveries lie beyond comfort and safety. The Oceanic Explorer's expedition became a timeless story of courage and audacity, motivating future generations to embark on their own quests for knowledge, adventure, and the relentless pursuit of truth.

OPEN SOURCE

FOCUS LAUNCHER

Are you struggling to focus on your work? Do you find yourself constantly getting distracted by your phone? If so, then Focus Launcher is the app for you! Once installed , you will be presented with an animated clock and your favorite apps in the dock in a minimalistic way. You can hide apps you may find distracting , apply icon packs , update your favorite apps and tweak a few more things from the settings page which is accessible by single swipe to the left ,on to the right there's the app drawer. Plus, the lunar phase widget adds a touch of elegance to your home screen.

Download Focus Launcher today and start focusing on your work!

GROCY: GROCERY MANAGEMENT

Let's end the struggle to keep track of your inventory and shopping lists with Grocy, the ultimate solution to streamline your grocery and household management tasks. Grocy greets you with an intuitive and visually appealing dashboard, where you can effortlessly manage your pantry, fridge, and other household items. The application allows you to create customized shopping lists tailored to your specific needs. With the convenience of barcode scanning, adding items to your inventory or shopping list becomes a breeze. No more missing out on essential items! But the functionality of Grocy doesn't stop there. You have the power to set expiration date reminders, ensuring that you consume items before they go to waste. You can also maintain your recipes and see at a glance whether everything you need is in stock at home. Grocy is cross platform and self hosted there's also a reddit community to help you out when stuck.

MY EXPENSES

My Expenses is a personal finance manager for Android. It allows you to track your expenses and income, create budgets, and set reminders. You can track your expenses and income by category, date, payee, tags and write notes. You can set templates for recurring experiments like rent or car payments. the interface of the app is fully tunable as per your needs. The app allows you to track multiple accounts and transfers supporting multiple currencies. There are widgets and home screen shortcuts for quick data entry. The app is protected by password or device lock screen. Now that you have a log of your transactions it's easy to compare transaction status with your bank statements. The transaction data can be exported to QIF and CSV and Imported from QIF format.

KEYPASS

KeyPass is an outstanding password manager that empowers you to take control of your digital security. It offers an array of impressive features to ensure the utmost protection of your sensitive information. Firstly, it operates completely offline, ensuring that your data remains isolated from the internet and inaccessible to potential threats. It has a built-in password generator to assist you create unique strong passwords. with encrypted backup and restore capabilities, your data is safeguarded, providing you with peace of mind. Additionally, the screenshot block feature adds an extra layer of security, preventing unauthorized access to your confidential information. it allows you to authenticate using your device credentials, such as a PIN, pattern, or biometrics, enhancing both convenience and protection. Furthermore, the auto backup feature ensures that you never have to worry about losing your data, and rest assured, the backups themselves are also encrypted for added security.

PROJECT SPOTLIGHT
DragGAN AI

~MARUTHI R

Hey tech-savvy folks! Ready to embark on an exciting journey into the future of image editing? Well, buckle up because we've got something mind-blowing to share with you. Have you ever wished that editing photos could be as simple as dragging and dropping? Say hello to DragGAN, the game-changing image editing tool that's about to flip the script.

At its core, DragGAN leverages the power of Generative Adversarial Networks (GANs), an advanced deep learning architecture renowned for its ability to generate lifelike content. Gone are the days of struggling with complex interfaces and tedious workflows. With DragGAN, users can achieve image modifications by simply dragging two points, opening up a world of possibilities to reshape poses, adjust shapes, and refine layouts. This unprecedented simplicity marks a significant departure from traditional methodologies and empowers users with a newfound ease of use.

The technical foundations of DragGAN are equally fascinating. The process commences by constructing a GAN model utilising a thoroughly curated dataset of images. This model serves as the backbone of DragGAN, enabling it to generate novel images that closely align with the original dataset. By leveraging the manipulation of two points on an image, DragGAN utilises its GAN architecture to craft a new representation, seamlessly incorporating the desired changes. The result is a harmonious blend of user input and algorithmic competence, producing modified images that hits a delicate balance between creativity and realism.

One of the primary advantages of DragGAN lies in its accessibility. Unlike its predecessors, which often necessitated a steep learning curve, DragGAN's easy-to-use interface is appealing to users of all skill levels. The act of dragging two points to effect changes streamlines the editing process, making it approachable for novices while still catering to the needs of seasoned professionals. This democratisation of image editing empowers individuals from diverse backgrounds to unleash their creativity and bring their visual aspirations to life.

In conclusion, DragGAN represents a significant leap forward in the field of image editing. Its accessibility, realism, and versatility make it an intimidating contender in an increasingly dynamic landscape. As we eagerly await the further maturation of DragGAN, the future holds the promise of a more seamless, intuitive, and visually compelling editing experience. Embrace the horizon of possibilities that DragGAN unveils, for it will undoubtedly shape the future of image editing as we know it.

DISTRO SPOTLIGHT
EndeavourOS

~ABHISHEK S

EndeavourOS is a Linux distribution that prioritises user-friendliness and customization, catering to desktop users. It is built upon the solid foundation of Arch Linux, offering a simplified installation process and a vast array of customization options. This makes EndeavourOS an excellent choice for those who desire the power and flexibility of Arch Linux without the steep learning curve typically associated with it.

EndeavourOS stays true to the core principles of Arch Linux, namely simplicity, flexibility, and user-centric design. It successfully bridges the gap between providing a user-friendly experience and retaining the underlying power and flexibility of Arch Linux. This delicate balance ensures that users can easily navigate and personalise their operating system while still having the opportunity to explore and learn as they delve deeper into its inner workings.

One of the notable strengths of EndeavourOS lies in its software management. It strikes a fine balance by offering a curated selection of software while also granting users access to the vast Arch Linux repositories. This approach guarantees that users have a stable and reliable base system, while the inclusion of the Arch User Repository (AUR) expands the range of available software.

In addition to its customization capabilities, EndeavourOS prides itself on its lightweight and resource-efficient nature. By utilising lightweight software components, the operating system optimises system resources, ensuring smooth performance even on older or less powerful hardware. This characteristic makes EndeavourOS suitable for a wide range of devices, enabling users to achieve the best possible performance while enjoying a feature-rich desktop environment.

In conclusion, EndeavourOS stands out as a user-friendly and highly customizable Linux distribution. With its simplified installation process, emphasis on user-centric design, curated software selection combined with access to the AUR, and its lightweight nature, EndeavourOS offers a compelling choice for users seeking a balance between ease of use and flexibility. It provides an opportunity for both newcomers and experienced Linux enthusiasts to personalise their operating system and embark on a journey of exploration and growth.

OUR PREVIOUS EDITIONS