DEPARTMENT OF COMPUTER SCIENCE

MSc DATA SCIENCE

CONVERSION OF HUMAN FACE INTO CARTOON IN VIDEO CHATTING MODEL (VIDEO TO CARTOON IN CHAT)

By

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DECLARATION

I Confirm that the work I've submitted is all my own. There were no previous submissions or if there were, they are correctly cited. I've also properly identified and acknowledged every work that is eligible to be acknowledged to the others, using the reference technique stated in the course manual.

ABSTRACT

Cartoons are the most effective communication tool [1]. Is this far off? no. Here we will see why cartoons are so effective at communicating with people, and why it is more difficult to get their message on board than any other form of communication. In this decade of technology everything needs to more secure and more efficient for understanding. Now people are doing video chat on video calling applications and these applications do not give any security to the video of the second person. For, example he may use video for illegal use. Anyone from participants of call can record the video and use it for any other wrong or illegal purpose.

So, there should be technique that does not allow any person to record video while video chat. There were many techniques developed but no one can secure live video chat. But if we use cartoon instead of real images of participants of video chat then we can secure live video chat.

After applying the upper solution, we got very good results that we expected. It was looking very enjoyable moment when take first test on video chat. It is really good to have good results from the applied solution.

ACKNOWLEDGMENTS

First, I want to express my gratitude toward Dr. Zhenhua Feng for supervising, for helping me to picking up this tough work to assisting me during my difficult time, till I completed it, and for always providing me with the most helpful comments.

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1. INTRODUCTION

Progress in the field of information technology has accelerated over the past some years. Technology denotes to use of different technologies, skills, intelligence, & technologies to produce products for suitability of the people. This development disturbs not individual the technological sphere of culture. Automation & digitization are urgent needs in this world and they are rapidly being adopted.

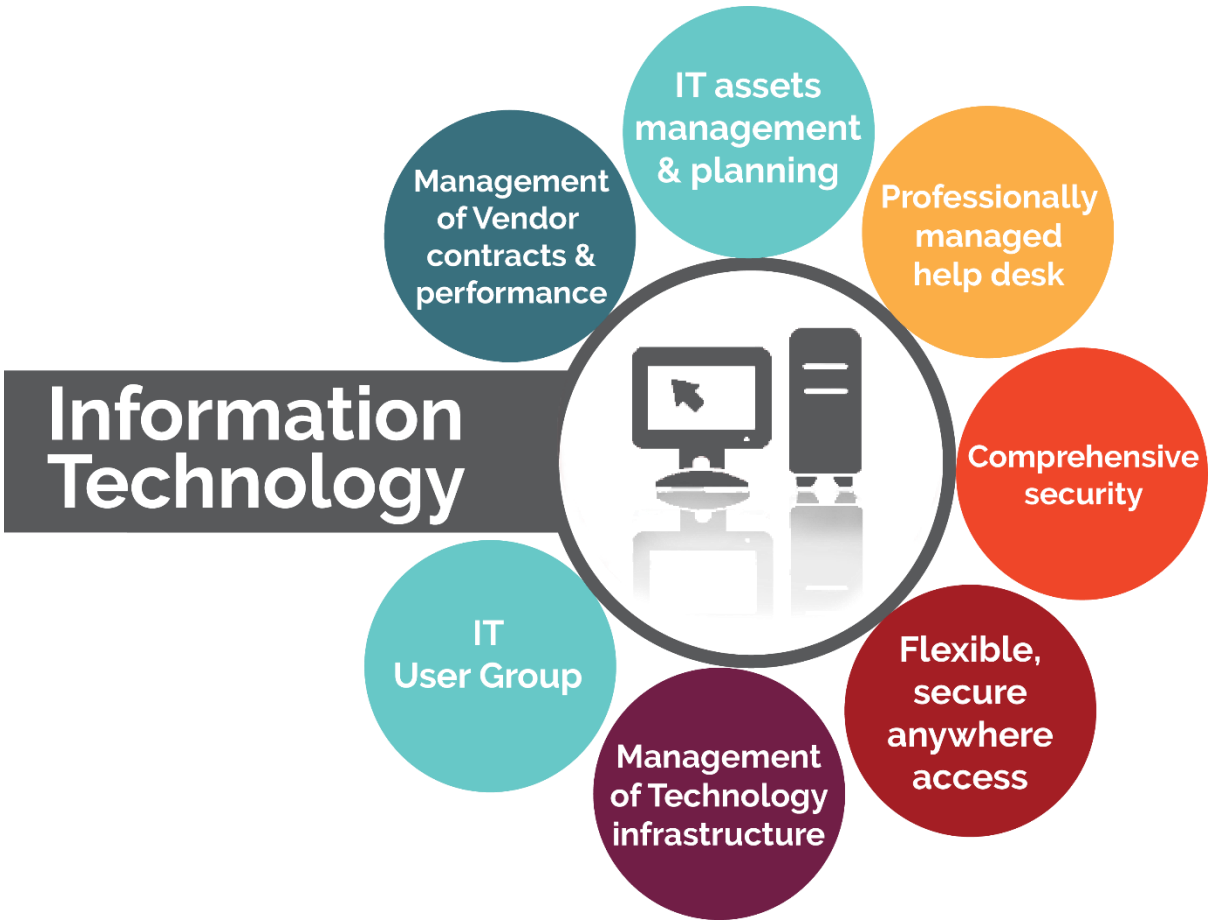

Figure 1: evaluation of information technology

Everyone loves to watch cartoons because they challenge the imagination and tell fascinating and magical stories. Many people think animated movies are fun for kids, but adults can too, and the best animated content for kids can be fun for the whole family as they explore the world around them. It can also help you learn more about.

Figure 2: Cartoon example.

However, animation is a massive industry for children, including entertainment cartoons, educational animated instructional videos, interactive content, and more. Also, the animation is a great way to engage children and take them from the real world to where fantasy, fairy tales, fun characters, and exciting adventures are integrated.

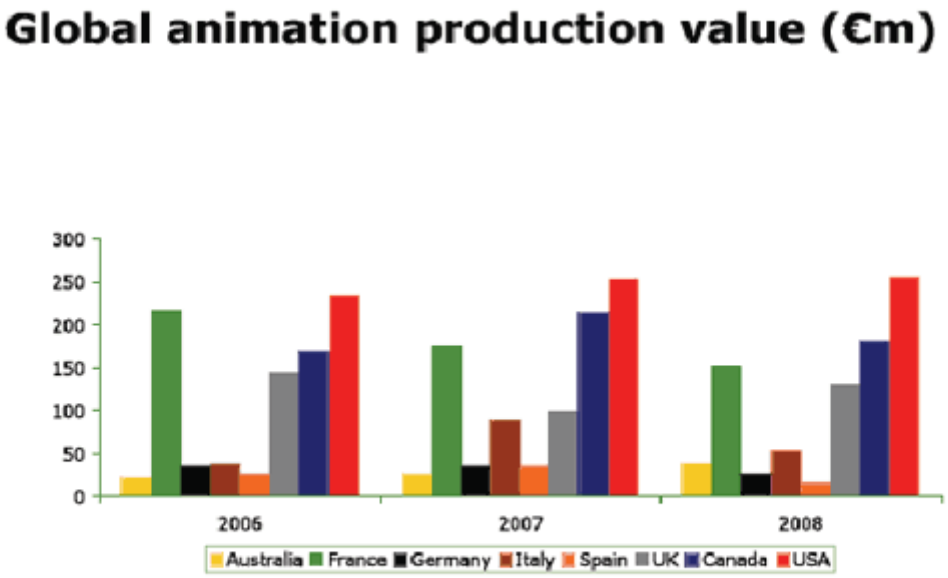

Figure 3: Animation industry growth graph

Initially, cartoons were drawings and remained full-size for tapestry, mosaic, pictures, & other formats. This cartoon was last phase in a sequence of preparatory paintings following the traditional practice of Renaissance studios. It is, almost always reproducible drawing, painterly parody, cartoon, comparative, and humorous encounter (often a political or social trend (highlighted in a documentary conversation or commentary) through contemporary events, folk customs, and tools), which is usually humorous, but it can be downright violent. Just as personal caricatures were aimed at audiences who knew the original, comics were also based on extensive familiarity with the subject matter [3]. He is used as a capsule version of an editorial when making political satire and is a moving commentary on social change, sometimes intended to manipulate social energy. (For information on comic effects, see Movie: Animation.)

Live-action and remakes of animated films can showcase numerous matters commonly trained in administrative practice & supervision paths. The analysis looks at the stages and defines which types of locations (dynamic or live) represent concepts better or emphasize concepts differently. Live-action pictures frequently feature identifiable real-world surroundings that use real actresses & actors. Instructors who commend the film as an educational tool generally recommend using live-action rather than animated scenes.

Image classification is a branch of computer vision that classifies images. This is an essential topic in today's context as large image databases have become very common. Photographs can be classified into observational and non-observational methods. This article explores classification in surveillance and investigates the effectiveness of two classifiers and two feature extraction methods. It has been shown that the classifier can classify images more accurately when training using CNN features. The photos category included binoculars, motorcycles, watches, airplanes, and faces from the Celtic 265 image archive.

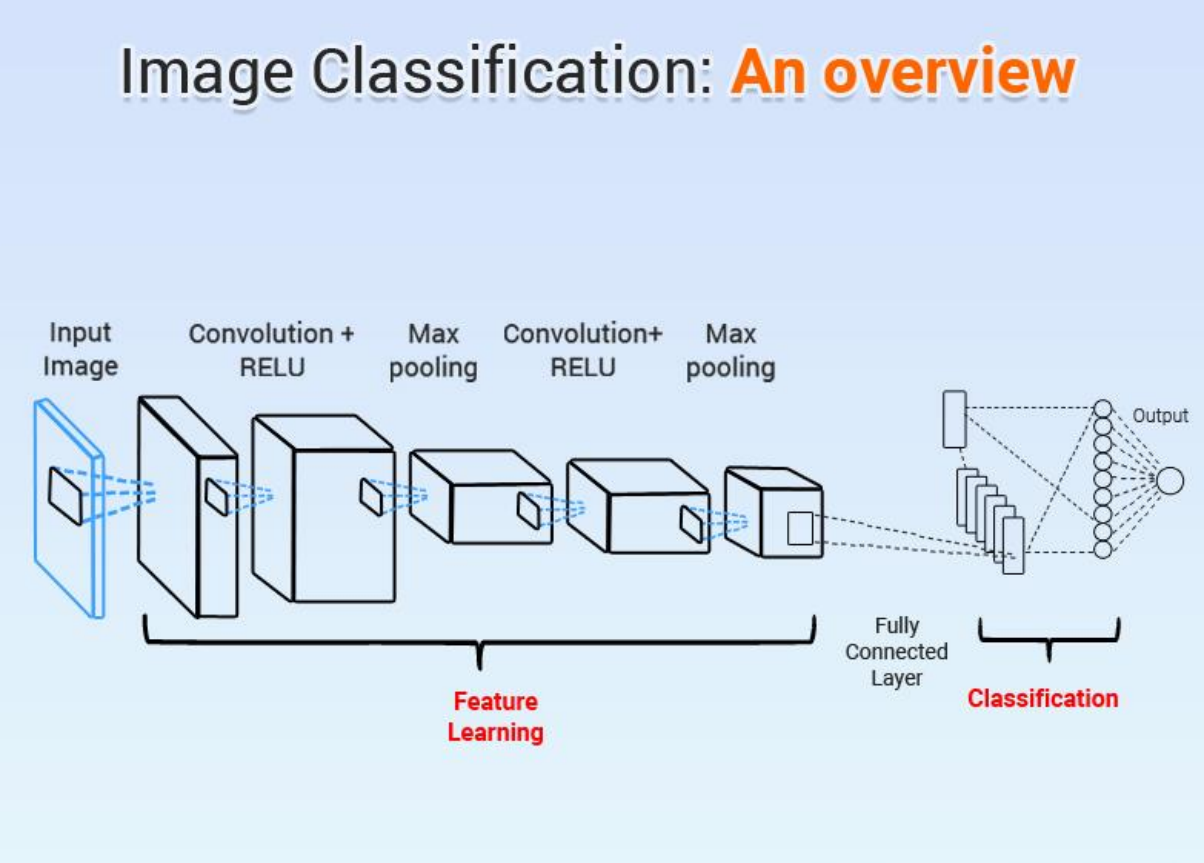

Figure 4: Image Classification

In the modern world of digital technology, mass communication is carried out in digital images. Countless photos need to be classified using intelligent and efficient algorithms or techniques from social media to regular web pages. Image classification technology is already being used in quality management systems, optical character recognition (OCR), remote sensing, and more. The human eye can recognize well-known among thousands of strangers, regardless of appearance, location, or change. Aspect. The human eye and brain use elements of visual interpretation to classify images, but computers can organize images using machine learning techniques. The ability to recognize images by extracting biological or artificial image classification, shape, colour, texture, etc [4].

1.1. Problem

Cartoons are progressing to their peak now, and all fields of life are using the cartoon's understanding of the people. For instance, if we talk about the education of children and graduation students, then we can see in this decade every topic of all subjects is represented on the Internet by using cartoons. On the other hand, if we talk about the business field, we can also see that many businesses are being represented using cartoon models. But if we talk about

the progress of the development in this technology field, then only images are posted videos are filtered into cartoons. The main problem is that no one method has been developed to filter live video chat into a cartoon on both sides. It is our primary goal, and we will analyze the solution to this problem in this thesis document. Cartoons are the most effective communication tool. Is this far off? No. Here we will see why cartoons are so effective at communicating with people, and why it is more difficult to get their message on board than any other form of communication. In this decade of technology everything needs to more secure and more efficient for understanding. Now people are doing video chat on video calling applications and these applications do not give any security to the video of the second person. For, example he may use video for illegal use. Anyone from participants of call can record the video and use it for any other wrong or illegal purpose.

Figure 5: Cartoon form video chat

No, the upper problem on that we are going to solve. Basically, when we talk about to develop something in computer science field then we are not solving the problem to only single direction. Actually, when an invention is made in computer related filed then we are being solving issues of several fields. For example, take the example of our given goal that we are talking is not only for user to user. We can use it in any direction of the real-life world. There are a number of fields in which we can use this invention. On the other hand, it is not only for

serious type working for example for chatting between users our any other purpose like business or educational purpose. This thing also being felt very enjoyable thing.

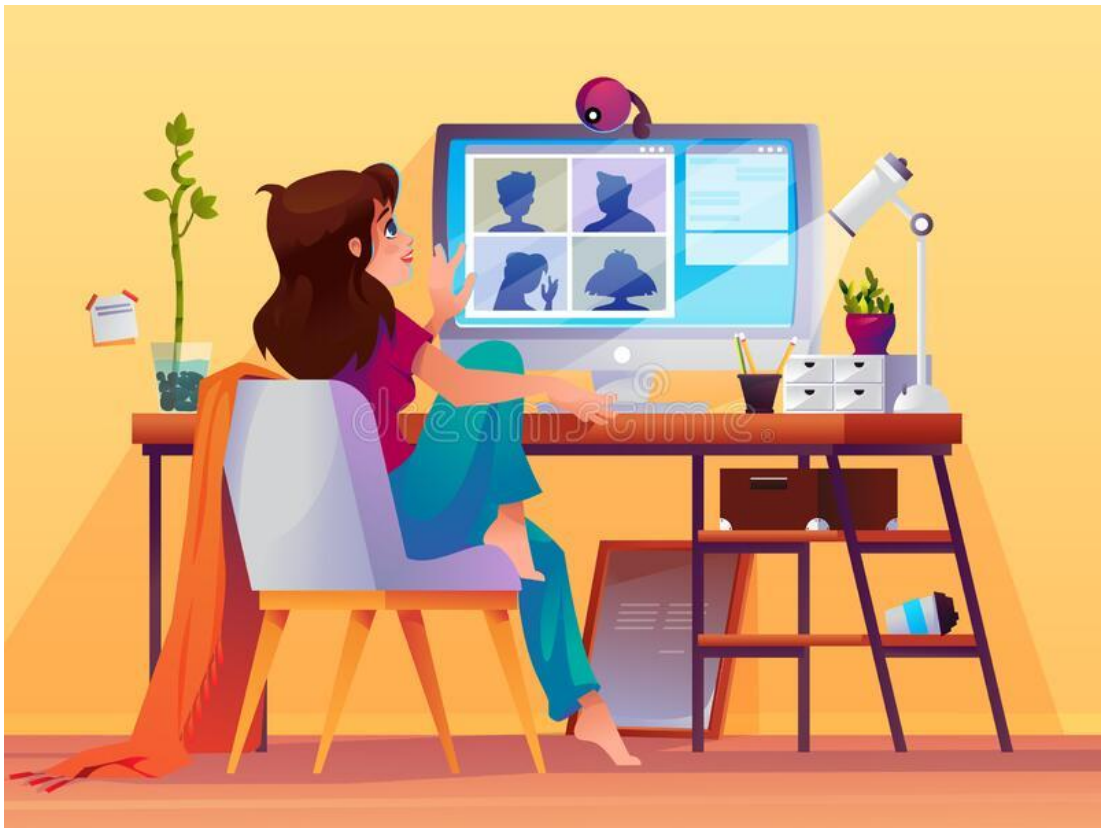

Figure 6: Cartoon video chat for education

So, there should be technique that does not allow any person to record video while video chat. There were many techniques developed but no one can secure live video chat. But if we use cartoon instead of real images of participants of video chat then we can secure live video chat.

After applying the upper solution, we got very good results that we expected. It was looking very enjoyable moment when take first test on video chat. It is really good to have good results from the applied solution.

This project aims to provide a solution to convert real snapshots or videos into animated images (comic) or video. The first conversion method requires skills & complex computer visuals. The main awareness of the work is transformed into art such as painting based on specified photos and videos. Comics are usually cast-off in a variety of the applications. By means of you see, cartoons are creatively created and require great and amazing human artistic skills. Drawing a certain number of cartoons for every animated movie takes a lot of time for the artist as the cartoon sketches must be accurately described to get good results. It is also converted to animation [5]. A few years ago, a special area called "Nonphotic Reality Rendering" was used

in image design. Existing algorithms have been developed based on the domain of styling images and can style any image, including designs, textures, effects, and more. Algorithms are established to alter actual images (snapshots) into the cartoon like images, many of which fail and some fail. Some of them did not pass and others did not meet all requirements. Besides, the cartoon image is more Byzantine than the real image.

1.2. Why Interesting & Important

When someone is about to do something different so, definitely it means that he/she is very interested that area of study or in a specific case study. And may be his thinking looks very great to the world. In the same way I am very interested in this topic. In this world researchers and students are trying hard to do new inventions because this invention will help others in their thinks or imagination. If we talk about our propose project then it is also getting done with the help of old research. For example, our project is about to convert the live video call into the cartoon on both sides. Now we can convert the post videos in cartoon or we also can covert our pictures in cartoon form. But our idea is little bit different to post video to cartoon or pictures to cartoon. There are some applications in the world that can convert the you live video in to cartoon form but our main idea is that we want to convert the live video chat of two or more participants into cartoons on both sides. Here is the most important question is that we should to decide that why we are going develop this project. It means why it is looking great and interesting to us. Because in software engineering or information technology the important thing is "WHY". It means that whether the project that we are going to do or done is meaningful or not. Because if a person or student think and idea and decided to do this then he has to answer this question that why he felt it interesting and decided to do.

Figure 7: Video to cartoon sample [6]

In first case if we talk about this project that we are going to do then we know that cartoon is the way of fun for not only kids also for older persons. We also know that in this decade people use video calling to interact with each other. Maybe they are aware from each other of millions of miles but while calling they enjoy each other's company like they are enjoying their company in a single room. But think about it when they will look each other in cartoon form while video call then they will must enjoy this application that we are about to done.

In second case that is also important is that it will give secure video call to each other because we know video calling is not. Someone can record the video for illegal use. So, if people will call in the form cartoon, then they will enjoy full secure call.

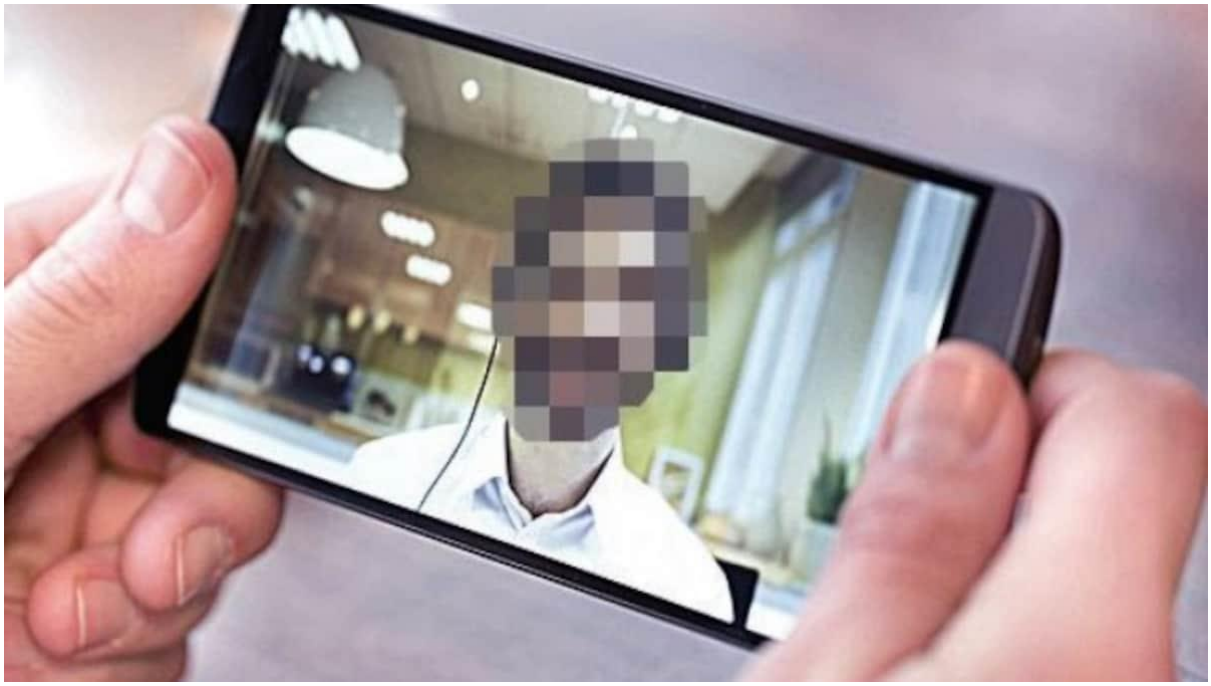

Figure 8: Secure Video chat example

As discussed before in this document that a project or research of someone will open door to some important research that other can use to do.

1.3. Why Hard

When we look for a new idea that is very new idea to people then it will must feel to hard throughout the development process. Basically, this is not work of someone single person. It is task of a complete team that may be consist of two or more people. Because when a single person tries to develop a new development then according to software engineer rules, he cannot manage the development process of a new invention. We know the idea of cartoons is implemented before many years and we also know that there are number of applications that use methods to convert the pictures and videos into cartoon automatically in seconds. There are several programming techniques and methods that are easily accessible that we can use for our idea. It is not an easy task because it is a different type of task [6]. When we are making our live video with cartoon filters then basically all computation is made in our mobile application but here, we need to setup more efficient method and an efficient connection is required. Because we are talking about the online video chat into cartoon. It will not only easy but also expensive task for us to do because as discussed in previous lines that we need a proper and good internet connection for video chat because all computations will be done in the online web server.

Here is some basic knowledge about the new ideas that how new creativity is very hard to done. We are often blinded by creative ideas that are trying to do our job well. Think about this for a moment. Have you ever tried to get creative but got nothing? Trying out proven creative skills (mind mapping, question-begging, sketching, layout constraints, etc.) or taking inspiration from the form of a blog or site like Reddit, but to no avail. I've been researching and building for years, but I've encountered this real problem almost every day. And no matter how hard you try, you feel trapped, curl up on the couch and watch TV and do nothing. Annoying. Throwing away a creative idea at any time is a terrible thing that can happen to creative people. Besides, the person who labels the sleeves, personally and professionally. I think one of the reasons we feel trapped and have a hard time coming up with ideas is that, surprisingly, we got to where we are today. Well, at least I didn't go down without explaining myself first. I've been studying creativity for the last 6 years, so it's hard to tell from what I know. There are no easy questions to help impress me right now. Anyway, it seems so. The mindset has shifted from 'seeking creativity' to 'becoming an expert'. And the value of this change of thinking is that it's harder for me to see new and unusual things (even when it comes to creativity).

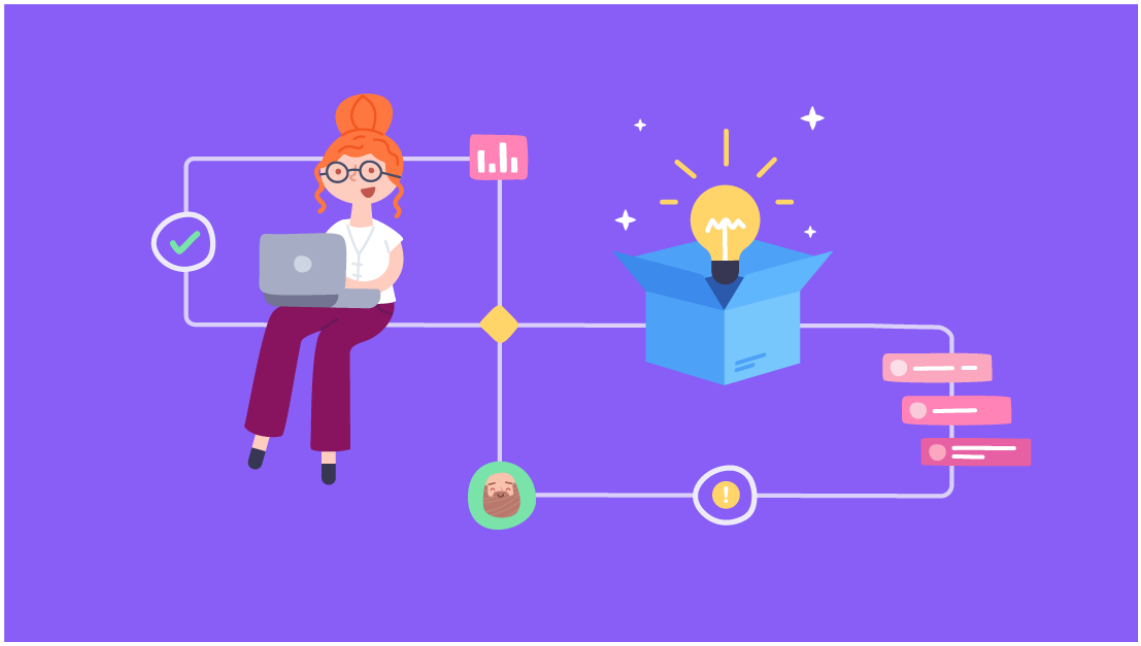

Figure 9: Creative Project Idea

1.4. Why Hasn't It Been Solved Before?

There are many reasons due this it hasn't been solved before now. As discussed before that many projects are the new ideas of the students or some else. if we talk about our project then yes it hasn't been solved before. According to our research about this project there is no

knowledge available about this unique idea on Internet. We know Google is a great search engine and everything in the world that exist will must accessible on Google. No doubt a lot of research work has been done about the cartoon filters using machine learning and other programming techniques. There are a lot of applications or software on the Internet that we can use to convert our pictures and videos into cartoon form but as discussed before our ides is little bit different. May be when while presenting our idea, someone else can interrupt and describe bad impressions about our project because he can say that it is done before now by someone else or maybe he can present a number of applications on the Internet that can be used to convert videos and pictures into cartoon. But whenever we present that we are going to convert video into cartoon while video chat between people on both sides.

Figure 10: Cartoon Filter

We propose a "cartoon animation filter", a meek filter that receipts a random motion modulates & input the motion output to make it more "live" or "dynamic". Almost all filter parameters are automatic. Users only need to set the required filter power. The beauty of animation filters is their simplicity and versatility. Manga animation is the art of manoeuvring that emphasizes the basics while minimizing unnecessary movement. Experienced animators closely monitor the audience's perception of movement in the scene, bringing it to life, literally [7]

1.5. Approach Components & Results

The project is done with the help of AI. Because This AI can cartoon any picture or video that you feed it in cartoon style of your choice. So, Python language used as programming language in this project. This project contains two major components that are, converting images in to cartoon and second is to arrange video chat online. In this document the approach is described in deep details.

So, after implementing the approach we found our project is meeting all requirements that we set before starting this project.

1.6. Aim of Project

For example, you know, cartoons are attractively created and require great and amazing human artistic skills. Drawing a certain number of cartoons for every animated film takes a lot of time for the artist as the cartoon sketches must be accurately described to find decent outcomes. It is also converted to animation.

So, according to upper lines that cartoons are not only for fun for kids or Youngs. We can use them in any direction. Our main object to convert the video call into cartoon on both sides. There can few aims of this project. First of all, this is a antique idea and second we want to give a favour to mobile users who may often call to their friends. So, they can use this application for fun and at the last the most important aim of this project is to provide the secure video chat to its users.

2. LITERATURE REVIEW

2.1. Research Work

In a research paper “Transformation of Realistic Images and Videos into Cartoon Images and Video using GAN” by **Akanksha Apte** is described that Converting actual international snapshots or movies into lively photos (cool animated film photos) or movies. First the method of transformation calls for complicated pc pictures and skills. Apply a generative opponent cartoon GAN Network (GAN) might be used for styling actual-international photos that use material loss , 2 loss functions, & antagonistic loss to get a pointy & clean picture. It is feasible to alternate with the assist of GAN for video in addition to its cool animated film aided version. Used to show GAN photos (snapshots) into the pleasant cartoons image (lively image). Name of the harm feature and its sorts with the assist of opposing harm and material disadvantages, we were given a bendy in addition to a clean area example photos. [7]

In 2020, some researcher work on convert image and video into cartoon, but everyone use there own technique, one is use GAN (Generative Adversarial Network) or other use scipy, tensorflow. GAN is best because it’s work convert videos into animation (cartoonized videos).

Hyungho Kim describes in his article “Domain Adaptation-based Labelling the human In Cartoon image” which explain that they classified this person by changing the style from a pre-trained segmentation model to an image translation method for cartoon images. Generally, at what time you test a cartoon on pre-trained subdivision prototypical based on the actual film, the outcomes will never look right. To resolve this badly-behaved, we need to create ground reality for new films and give them new training. This method is expensive & time uncontrollable. Therefore, we suggest a technique built on field optimization for labelling a person in a cartoon image (D-Alice), which uses the Cycle GAN based model to convert images to the new segmentation model. Untrained ones can be trained with unattached datasets. This allows you to execute new domains, such as cartoons, without having to train a fresh segmentations tamplet. There are components of the photograph extrude that aren't sufficient for distribution. This trouble can be solved via network correction. Domain photographs apart from the statistics used on this test can be carried out and tested. And now we're handiest going

to extrude the photograph in step with the human elegance and evaluate it however later we can be capable of paintings in extra special classes. [8]

In 2019, different researcher work on image and cartoon, firstly there used pre-trained segmentations model but its result is not good then there used cycle GAN -based model in future 2020, GAN network is used to convert video into cartoon video.

Another research paper "Technical Paper Presentation on Application of Cartoon like Effects to Actual Images" published by **Chinmay Joshi** in March – 2019 describes is that different technique used like photoshop, paint.net, adobe illustrator, windows MAC, pencil stretch, photoSketcher, Fotosketcher, Dumpr, Tuxpi photo editor. This technique used to convert image into cartoon. Also used CNN, TensorFlow, VGG19, VGG16 pre-trained model also use for this purpose. The systematic process of image to cartoon conversion and also algorithm and formulae is used. Networking education for special kinds of snap shots is time eating and calls for a number of computing. Hardware (GPU). Different content material snap shots can produce barely special varieties of snap shots. The accuracy of the cartoon-like impact relies upon totally at the sort of photograph provided. Paint.net is a face picture graph editor for Windows, primarily based totally at the .NET Framework. As one of the pleasant options to Microsoft Paints, Paint.net gives greater results and features, which include developing caricature photographs with personalized photographs. Images are included, the primary is the consumer`s enter photo and the second one is the fashion photo that is used to fashion the enter photo. We recommend developing a website, which includes a photo add capability that lets in the consumer to add their photo, then add the uploaded photo to the server the use of the Neural Style Transfer algorithm. Is processed with the aid of using and as a end result the photo is offered to the consumer at the website. Which the consumer can then down load and share. [9]

In the early of 2019, first work on image conversion into cartoon then with the passage of time also start working on video conversion into cartoon. In 2019, Researcher used different techniques but that is not fruitful, there had so many limitations. They work by using adobe photoshop and also use coding to train the model. But there didn't achieve the goal in the best way.

A paper “ToonNet: A cartoon image dataset and a DNN-based semantic classification system” writer **Yongxu Jin** & **Yanqing Zhou** describes many of those packages attempt to address cool animated film pictures, facts set of cool animated film pictures might be precious for those packages. We create our very own benchmarks set via way of means of the pictures accumulated from the Internet in distinctive lessons with a bit guide filtration. We use a whole lot of techniques to increase the Basel dataset to 10,000 pictures, along with snapshots of rendered three-D fashions with cool animated film shader, 2D three-D-2D changing approach the usage of cool animated film modelling approach and guide drawing. Styling filters included. Then, we provide an explanation for a way to construct a green neural community for semantic category of photo primarily based totally on tonne. We provide 3 strategies for constructing a DNN (deep neural community), exactly IUS: pass in combined stylisation, portraying inputs to lessen the difficulty of hand-crafted cool animated film pictures; FIN: Feature Insert Network, Insert community insights and precious international features; NPN: Network Plus Network, the usage of more than one unmarried network as a brand-new combined community. We show the usefulness and generality of our community techniques in our experiments. Using those strategies, category accurateness can attain 77% & 94%, that is a development of approximately 5% (top-1) in comparison to traditional DNN. - A cool animated film-fashion picture identity information set. Since we will not get sufficient information from Internet (approximately 4500 pictures afterward guide categorisation) we make known to numerous approaches to amplify our dataset, along with reduced 3-d models, 2D-3-d-3-d approach and hands-on. Includes snapshots of stylization filters advanced from Using those methods, we will without problems create new information primarily based totally on different resources. [10]

A research paper “Estimating reflectance and shape of objects from a single cartoon-shaded image” by **Yasushi Yamaguchi & Hideki Todo** shows that while many picture graph-sensible re-lights techniques offer a manner to convert the mild of items right into a virtual image, it's far presently hard to re-light up virtual illustrations with a cool animated film shading style. The important distinction among picture graph sensible and cool animated film shading patterns is that cool animated film shading is characterised via way of means of tender colour quantification and non-linear colour versions that result in significant reconstruction mistakes below the guise of bodily mirrored image. We`ve proven a brand-new shading evaluation framework for cool animated film shed items. The proposed shading evaluation once more

improves the visible look of the light's outcomes. Based at the colour map shading representation, we advise a smooth manner to outline enter shading as a clean form with a nonlinear mirrored image feature. We have assessed easy floor truths to examine our outcomes with the ones received in different ways. We include colour map shading illustration into our shading evaluation approach, which permits shading degradation in an easy not unusual place area and a non-linear colour map reflection. We`ve added a brand-new manner to offer mild interplay with virtual simulations; However, a whole lot stays to be done. [11]

The restrict is that our preliminary not unusual place area assumes an approximate shape. Because of this, mistakes are seen in complicated forms. Although we want a sturdy aspect detection procedure to outline not unusual place limitations appropriate for extraordinary metaphorical styles, that is a promising course for destiny paintings which could gain a greater quality preliminary not unusual place ground.

Qiaoyu Wang1 & Duansheng Chen1 describes in his article "An adaptive cartoon-like stylization for colour video in real time" which describe that Cartoon-like styling of colour video snap shots is one of the most important forms of non-image practical rendering. It has huge programs withinside the leisure enterprise because of its energetic style, bendy form & impartial formation. We use Gaussian filters to distinguish the rims of the Gaussian clear out - the adaptive cost of the Gaussian clear out out is decided with the aid of using the score of every pixel, in order that we are able to discover now no longer most effective the huge edges however additionally the noise effect. Can additionally reduce. We additionally convert tar into colour quantification pace variety to get a softer look. We`ve carried out a parallel processing set of rules for the Stylize Tune, like a cool animated film of colour video pix at the CUDA GPU [12].

We will look at the perfect filtering parameters to enhance the cool animated film primarily based totally styling primarily based totally at the picture content. We believe that different edge-saving smoothing methods, along with guided filters, primary shifts and minimizing L0 gradient, might be an imperative a part of this approach.

CHEN-PING ZHAO1 & HUA HUANG1 describes in his article " CARTOON-TEXTURE DECOMPOSITION & SIMULTANEOUS MULTIPHASE IMAGE SEGMENTATION" which describe that Conventional multiphase image segmentation Methods paintings nicely in splitting everlasting or neighbourhood portions into everlasting pics. However, actual pics typically have quite a few intensities because of the inconsistency of light, small details, texture

and noise. This poses a massive task to photograph distribution and critically degrades the overall progress of conformist approaches. In these paintings, we planned a new bodily separation version that unites photograph distribution and cool animated film shape analysis. We additionally brought a new release set of rules to resolve the proposed version. The degradation and distribution duties withinside the version had been carried out alternately and affected every other. As an end result of the degradation, the cool animated film issue is an unbroken hard estimate of the authentic photograph and consists of simplest the principal texture of the authentic photograph and the big edges. Widespread trials have showed that the planned technique can successfully conquer shortcomings of traditional techniques and carry out a great deal higher than traditional techniques in dispensing photographs with robust depth range because of texture, small scale details & noise. Demonstrated We`ve proposed a brand new gentle multi-segment segmentation framework that consists of the evaluation of the cool animated film shape of photographs. We additionally added a generation set of rules to remedy the proposed model. Degradation paintings and organization paintings alternately pass ahead and have an effect on every other. As a end result of the degradation, the cool animated film aspect is a continuing hard estimate of the authentic photograph and consists of best the principle texture of the authentic photograph and the large edges [13].

Yu Han, George Baciu & Chen Xu describes in his article “Lightness biased cartoon-and-texture decomposition for textile image segmentation” which describe that with the improvement of sturdy photo processing equipment withinside the fabric industry, cloth designers are starting to apply characteristic extraction strategies for each cloth fabric evaluation and sample layout. In the layout assessment process, one of the important troubles is the green distribution for fabric cloth snap shots. This is tantamount to dividing snap shots into numerous significant regions which can be frequently steady with layout patterns, repetitions, woven threads, or gadgets of fibre. The version carries a punch and texture dissolution process, which could lessen the impact of random structural noise at the distribution process; (1) To triumph over the mistake of nimbleness irregularity for distribution procedure, a unfair subject feature is delivered to degree quantity of aberration among the cool animated film picture and the cool animated film picture fragments. Textile picture regions can then be greater as it should be estimated; (2) Following the benefits of picture segmentation fashions primarily based totally at the Fuzzy Region competition, we additionally use the FMF (Fuzzy Membership Functions) to pick out picture areas. Though, to be able to save you FMF from

declining, a brand-new time period of penalty on FMF has been delivered in our version. In addition, the usage of the improved logarithm multiplication approach and Chambal's double projection approach, we achieve a green set of rules for fixing the version. Experimental outcomes display that the proposed version might also additionally produce higher distribution outcomes for fabric pics than the fashions primarily based totally at the traditional FMF. First, considering arbitrary texture sound is pervasive in fabric snap shots, we present manner of texture dissolution & punch in our fashions to limit the terrible effect of random texture noise on distribution tasks. The herbal cause for fixing the hassle of random texture noise from the manner of caricature and texture dissolution is that caricature snap shots observe the nearby speculation of higher nearby fragmentation than the unique fabric snap shots. Second, so as to conquer the minor inconsistencies that arise in every gay region, we introduce an area of bias withinside the mild measurement of the CIE lab SHADEATION space. This is performed to imitate the prejudice among the mild depth of a pixel and the mild depth of a pixel neighbourhood. [14]

Miyoun Jung & Myungjoo Kang describes in his article "Simultaneous Cartoon and Texture Image Restoration with Higher-Order Regularization" which describe that A variable colour picture degradation and protection model. Its cause is to repair a picture from its sullied sort, whilst concurrently dissolving picture into its cool texture components & animated film. Energy consists of well-suited superior regulators, which can be included with the brink indicator function. It now no longer simplest enables withinside the evaluation of cartoons and textures, however, additionally affords an excessive high-satisfactory picture recovery through enhancing the impact of the steps created withinside the methods of regularizing the entire transformation. To meet the proposed models, we provide rapid and green interactive algorithms primarily based totally on a variable distribution scheme and a developing logarithmic method. An included evaluation of the proposed set of rules is likewise supplied below sure circumstances. Comparisons & Arithmetical effects display that planned version is greater green than brand-new strategies for each photo decision and restoration. The proposed degradation version adopts an excessive diploma of regularization rather than a entire overhaul for the caricature component. It now no longer most effective enables withinside the evaluation of cartoons and textures, however additionally improves the impact of stairs in TV primarily based totally fashions and presents excessive pleasant photo restoration. In addition, we added the Adaptive Higher Order Regulator with the aid of using weight thru the default Edge Indicator function. They more advantageous the pleasant of each restored pictures and

dissolved additives, with edges or information preserved in restored pictures and caricature and texture additives disbursed appropriately. To meet the proposed models, rapid and green interactive algorithms have been proposed primarily based totally at the concept of a variable distribution scheme and the technique of multiplying alternating direction. [15]

3. METHODOLOGY

When we talk about some new ideas to do then the solution of that new idea may be very hard but when we successfully started the working with a excellent start then the project will end in a good results. And when we find a solution to this idea then we find it simple solution that we just invent to do. If we talk about our project then we know there is no any data and research is available that specifically hits our idea but we also know if we try to find a way that will be the key of our project. It is because there is a lot of research data is available on Internet related to cartoonlike the videos and images. As discussed before when something strange happens to us, they have to reconsider their position. Actually, this is not a recital. This is the work of an entire team, which may consist of two or more people. This is because when a person tries to develop a new invention, he cannot control the process of developing a new invention according to the rules of the programmer. We know that the idea of a cartoon was implemented a few years ago, and we also know that there are many applications that use the technology to automatically convert images and videos into cartoons in seconds. There are many readily available programming techniques and methods that you can use to bring your ideas to life. This is not an easy task as it is a different kind of task. When creating a live video using cartoon filters, basically all calculations are done in the mobile app, but here you need to establish more efficient procedures and efficient connections. Because the cartoon is all about online video chat. As mentioned in the previous line, this is not only easy, but also expensive, as all calculations are done on our online servers, so an accurate and good internet connection is required for video chatting.

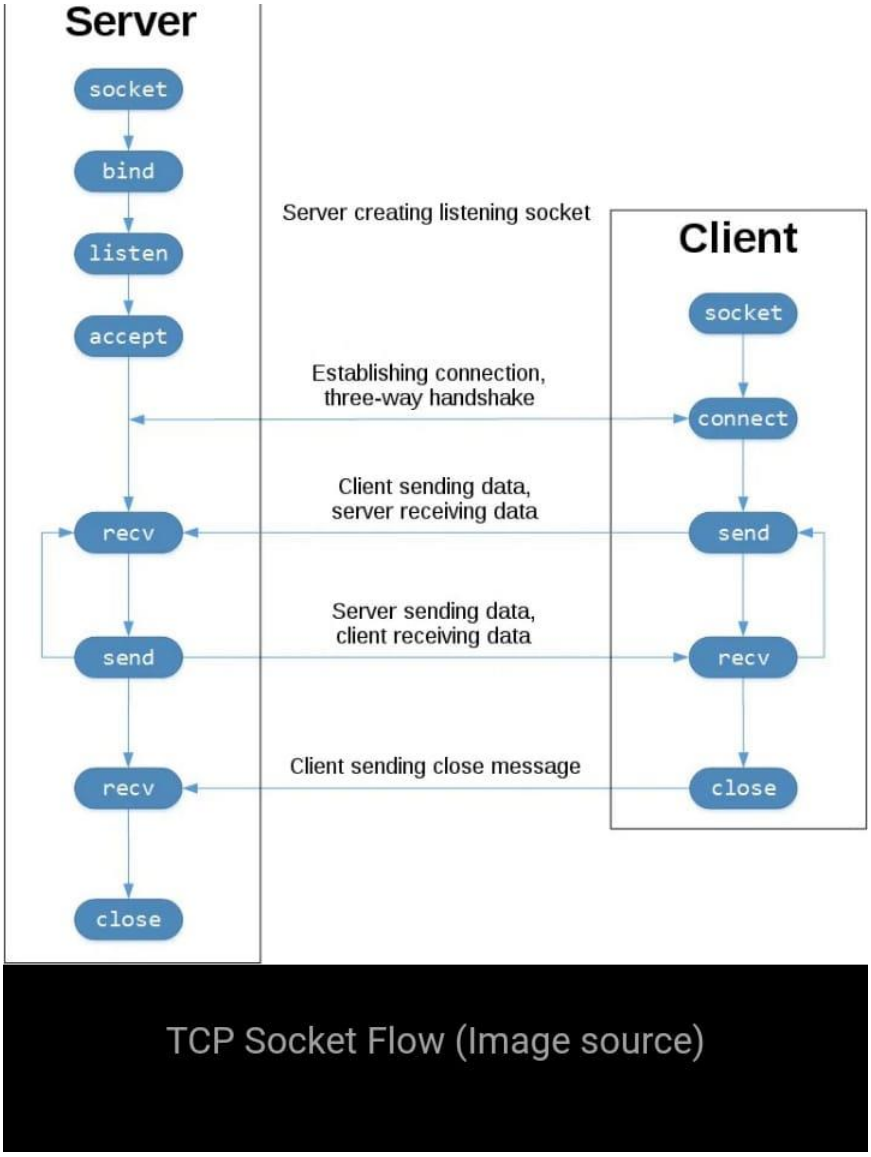

Figure 11: TCP Socket Flow

The main concept of this web application is that the programming code will be done in a cloud computing server and the bandwidth should be very high of the server that we will purchase on the someone host on the Internet. And if we talk about our programming techniques and methods then it should be in a standardize manner because we are going to create like a virtual reality while converting the videos of two or more participants of video chat into cartoon on both sides. And as discussed before that the quality should of server should be good enough to support the requirements of the application. So, when two persons having the same application of our webapp do a video chat among themselves then from one side the live video will be capture of the user and sent to the server and then the server will respond to this data and will convert the video into cartoon form while video chat and then send this cartoonlike video to the second person that is participant in the video chat. Then in the same way at second person

side video is capturing by the laptop or any mobile phone device and send to the cloud server and server will convert the video into cartoon form and send to the first-person side. These all procedures are getting done in a way that video will be getting show very smoothly.

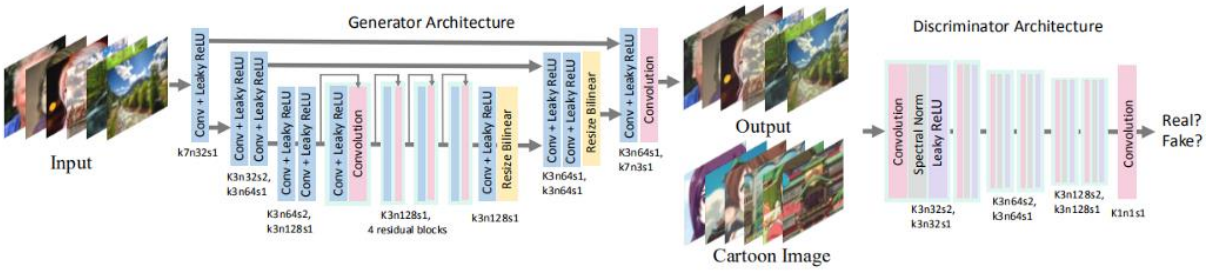

Figure 12: Main Architecture to process

Every project can be done in multiple ways. But we have to look at the best way to do it. We don't just analyse about the best procedures of the development. We also have to consider the other some aspects. Like we should have to consider the amount of our budget that whether we can afford the proposed solution or not. There are some other aspects that can also affect our proposed solution. So, our methodology about development our idea has one more way to do it.

In the upper methodology we demonstrate the solution that all computations will be done on the cloud server. If we analyse the upper proposed methodology then for this solution first of all we have to purchase a very expensive server on clouds that may increase the budget of our webapp and maybe it will be out of our affordable budget. We have second way to do it. The second way is that we can done our all computations related to converting the live video into cartoonlike form in mobile device level. This thing can create a load on mobile device but we also know that in this decade there are very high speed and high memory mobile devices are available in the market and they are not so expensive as compared to last 3 or 4 years. This thing will also increase the size of our mobile application. But as discussed before in the upper line that very high memory mobile devices are available in the market at cheap prices and every one can buy mobile easily. But all computations related to the users and system to manage users and our other features will be done on the server. This thing will decrease much of our budget and we can make our development in a cheap way.

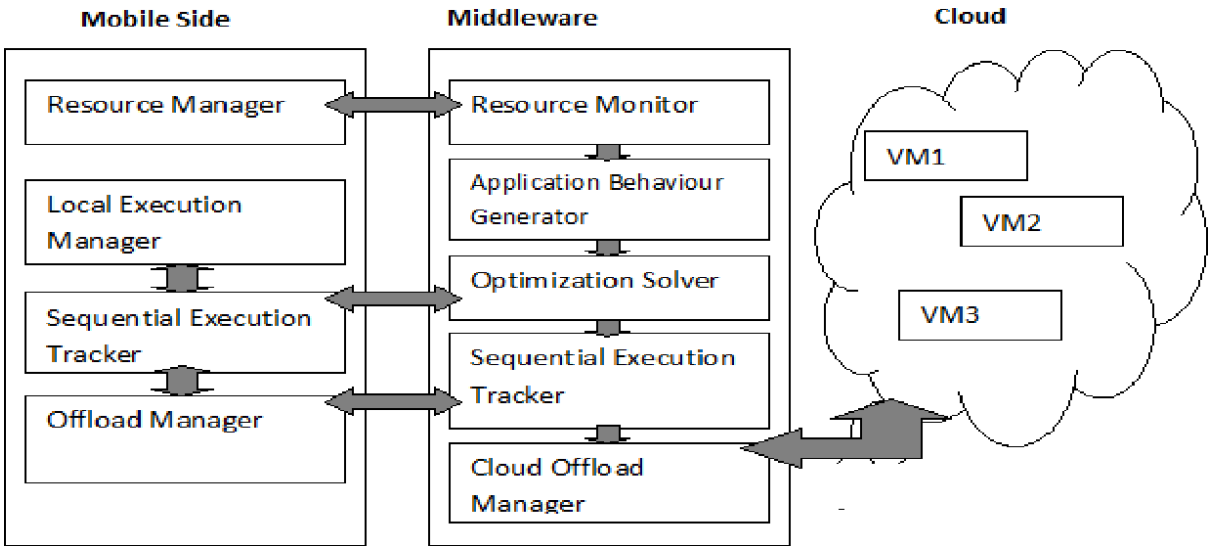

Figure 13: Computation at mobile side

If we talk about the development techniques to do this project in a given time then there are a number of software are available on the Internet that we can use to manage our project in a very standard way. We will use machine learning to do our task. AI provides multiple methods to do this task but as discussed before that our project is quite different to the previous work.

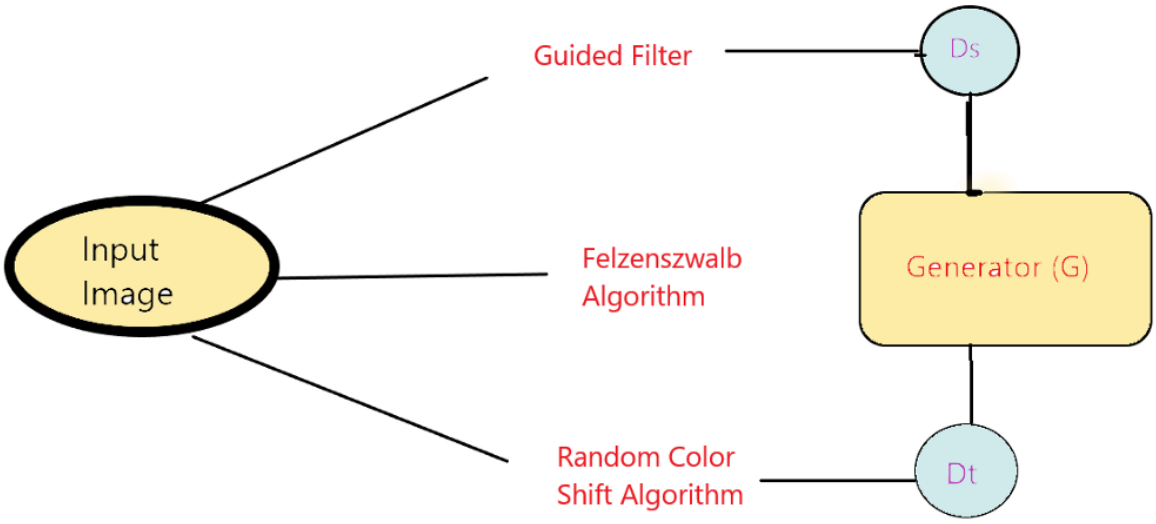

Figure 14: Input Image

3.1. Design Model

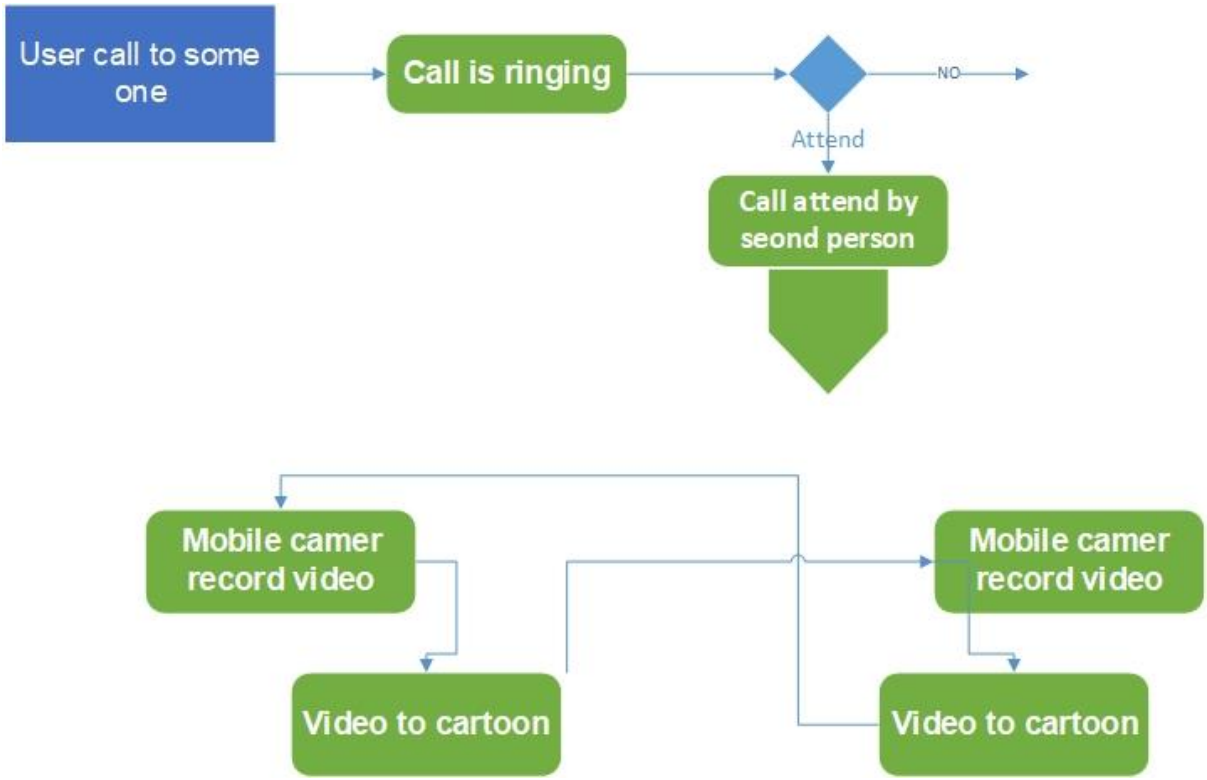

Figure 15: Main Flow

The upper model activity diagram is the basic activity diagram of our proposed system. It means that it is demonstrating the basic abstraction of the system. If we talk about the model from start to end. First of all, a person will connect to internet and open the proposed application then he will make a video call to someone then there are two options. First scenario is that may be the second person don't pick the video chat mean don't accept the video chat from first person then in case of this scenario the application will show the homepage to the user. But the second scenario is that the other person accepts the call and then there will be the process of video to cartoon on runtime will start. It means the application at first person side will take the video from camera and then convert it into cartoon from and then send video to the server side. On the other side there also, application take video from the camera and then convert it into cartoon form & then send it to server.

At the server-side server will exchange video of from one side to other and then form other side to first side.

3.2. Why Choose Machine Learning:

Computer programs are said to learn problems from their own experience and provide some performance. Machine learning data is an important component of a growing scientific field as performance for T as measured by P improves with experience. Use statistical techniques to train algorithms to classify or predict important ideas for data mining projects. So, the main question is here that why we used the machine learning and AI in our proposed solution. As told before that machine learning is progressed computer programming language.

4. DOCUMENTATION

```
import cv2
import socket
import pickle
import struct
import threading
import numpy as np
```

First of All, we install all the necessary libraries by using pip/ conda install cv2, socket, pickle, struct, threading and numpy one by one. Cv2 and numpy used for processing on the frames of videos, socket is used to create connection between client and server. Pickle used technique of changing a Python item to a byte movement in order that it is able to be saved in a file / database, keeping the repute of this system in sessions, or moving facts over a network.

```
clientsocket.connect(('127.0.0.1', 1234))
```

Here port used to communicate which take frame by frame from client and send these package to the server.

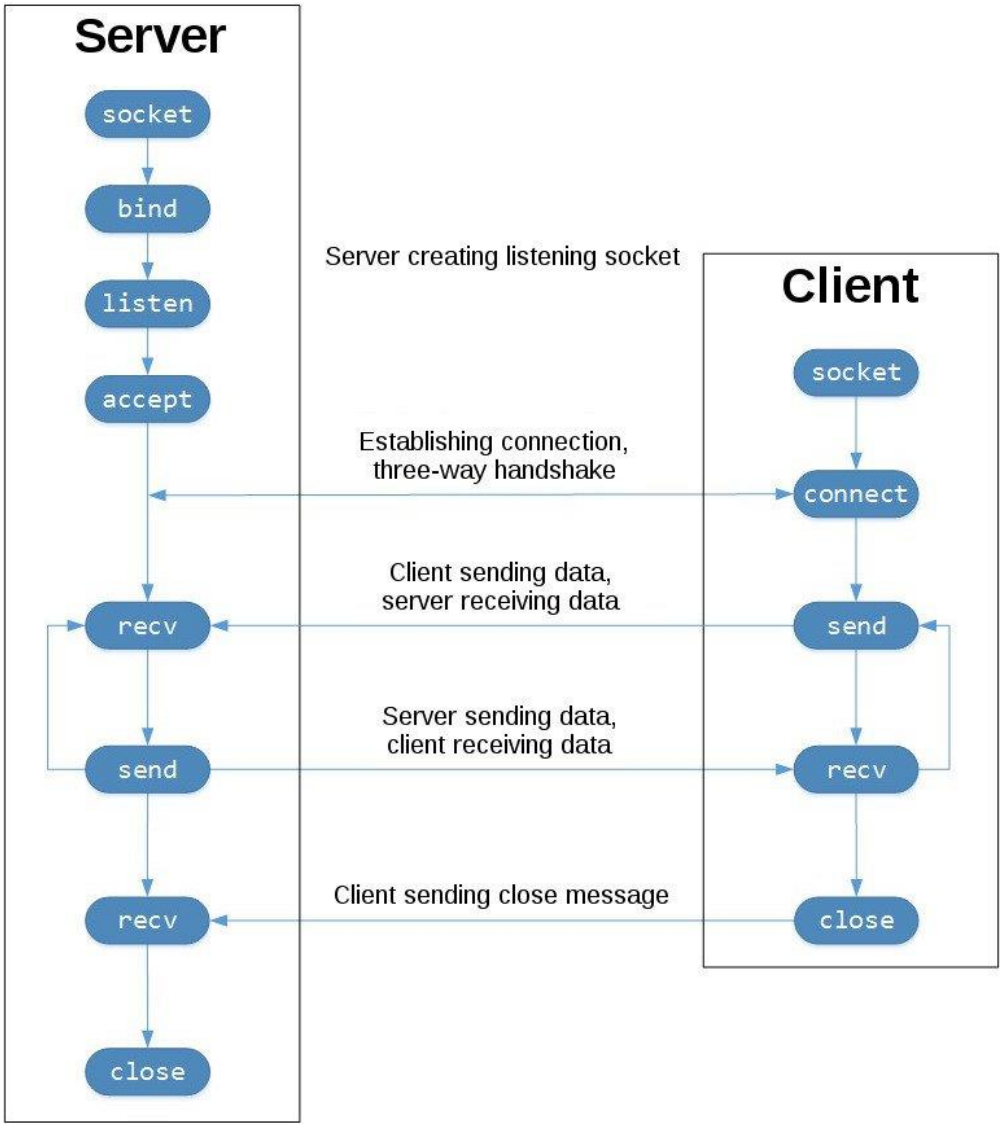

Figure 16: Basic Model of project

This is all work which can be done on the socket client and server side, firstly create connection, do communication (send and receive packages) and at the end close the connection on the both sides.

```
def CartoonFilter(img):

  #Step 1
  gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
  gray_1 = cv2.medianBlur(gray, 5)
```

```
    edges = cv2.adaptiveThreshold(gray_1, 255, cv2.ADAPTIVE_THRESH_MEAN_C,
cv2.THRESH_BINARY, 9, 5)

  #Step 2
  color = cv2.bilateralFilter(img, d=9, sigmaColor=200, sigmaSpace=200)

  #Step 3
  cartoon = cv2.bitwise_and(color, color, mask=edges)

  #Step 4
  img_1 = color_quantization(cartoon, 7)

  #Step 5
  blurred = cv2.medianBlur(img_1, 3)

  #Step 6
  cartoon_1 = cv2.bitwise_and(blurred, blurred, mask=edges)

  return cartoon_1
```

To send the frames of video, it's compulsory to improve the frames, passing frames from 6 steps:

- Convert into grey scale therefore to do best work on black white image.
- Blur the image for smooth the pixel of frame.
- Threasholding apply into image to convert completely into white color frames and backaground black.
- Then apply filter for best result
- After that apply masking to separate the part of frame.

Figure 17: Effect apply by using CV2

Pass the frames from all these steps to achieve best result and pre-processing the frames. Pre-processing, or picture processing, is a breakthrough in laptop imaginative and prescient, wherein the aim is to transform a picture right into a shape appropriate for similarly analysis. Examples of operations inclusive of publicity correction, shadeation balance, discount of picture noise, or growing picture speeds are extraordinarily essential and super care is appropriate in maximum laptop imaginative and prescient packages inclusive of computational images or maybe facial recognition.

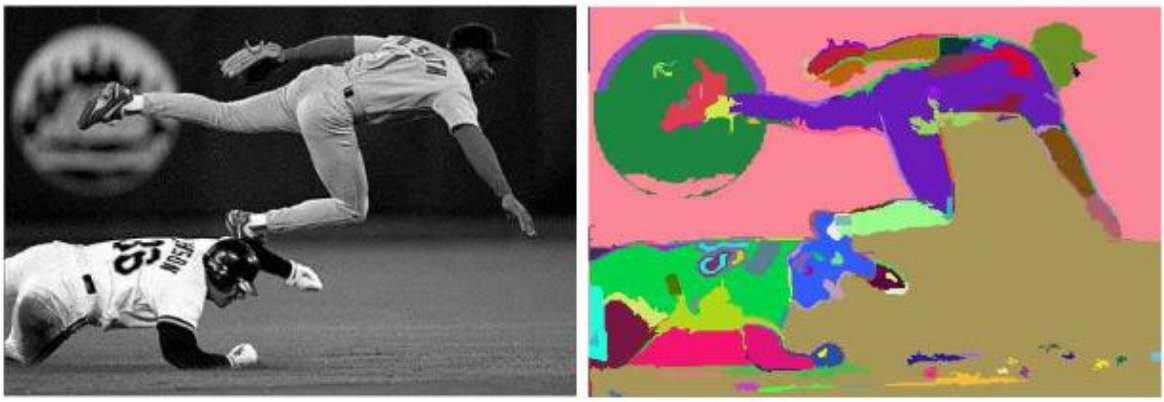

Figure 18: CV2 effect on image

In pc vision, pictures are described as a matrix of figures representative the precise colour. Every picture is taken into consideration displayable enter information in some of the paths, whether or non for example collection of pixel standards. Pictures maybe supplied in the three channels (blue, inexperienced and crimson), with a grey scale with pixel values that modify from 0 (‘black’) to 255 (‘white’), & most effective white or black values. The photographer is binary. Colour pictures are a piece greater complicated because of circumstance we are handling Three-D arrays wherein each picture element is supplied in three brilliant colour channels. This thing

maybe thrilling to the divide reliable picture in to its blue, inexperienced and crimson additives to apprehend how the layered shape of colour works.

```
def Main():
    video = cv2.VideoCapture(1, cv2.CAP_DSHOW)
    video.set(cv2.CAP_PROP_BUFFERSIZE, 2)
    clientsocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    clientsocket.connect(('127.0.0.1', 1234))
    data = b''
    payload_size = struct.calcsize("L")  # unsigned long integer
```

For real time capture the video by using Web camera or external camera can be used and by using socket create a connection.

```
while True:
    try:

        print("Sending Stream to Server Now")
        ret, frame = video.read()
        frame = CartoonFilter(frame)
        print("Frame successfully read by client")
        clientdata = pickle.dumps(frame)
        message_size = struct.pack("L", len(clientdata))
        clientsocket.sendall(message_size + clientdata)

        print("Client: Data Sent to server Successfully")
```

When live web camera on, one by one all the frames passing from the loop and send to receiver. There is a quit to the 2-manner conversation hyperlink among the 2 packages strolling at the socket community. The socket mechanism affords a method of interpersonal conversation (IPC) among which conversation takes area with the aid of using setting up touch factors called.

For example, `pipes are used to make pipes and sockets are made using 'socket' gadget call. FIFO affords two-manner conversation at the socket community. A community socket is made at every quit of the conversation. Each socket has a completely unique deal with. This deal with carries an IP deal with and port number.

Sockets are usually hired in consumer-server's programs. Server makes a socket, connects it to the community 'port-addresses' after which delays for purchaser to connect with the thing. Consumer makes the socket after which efforts to connect with socket of server. Once a linking is developed, facts is transferred.

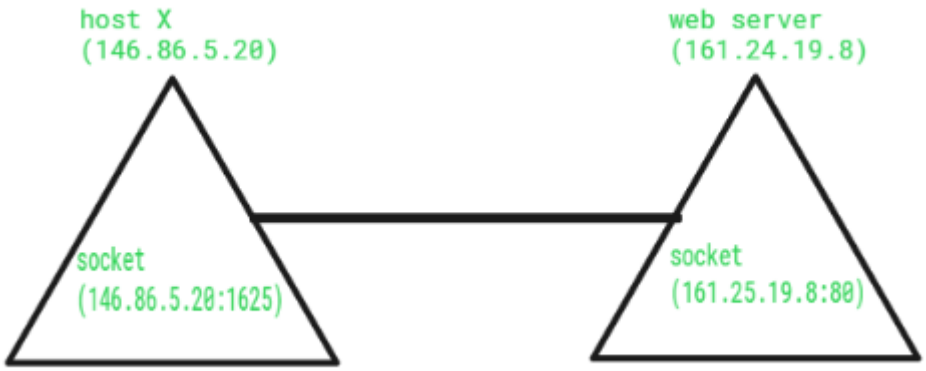

Figure 19: IP addressing for Socket

4.1. Types of Sockets:

Socket has two types.

Stream & Datagram (Socket)

1. **Datagram Socket:**

   It is a form of community wherein the relationship is low factor for sending & getting data packets. It`s like a mailbox. The mail (data) published withinside the container is gathered and brought to a letter container (receiver socket).

2. **Stream Socket**

   In a pc running system, a circulate socket is a kind of interposes conversation socket or community socket this is primarily based totally on a connection of

facts without file limits, with well-described apparatuses for making & detecting errors & abolishing connections. And offers precise flow. It`s like a phone. A connection is installed among the phone (heads) and a conversation (facts transfer) takes place.

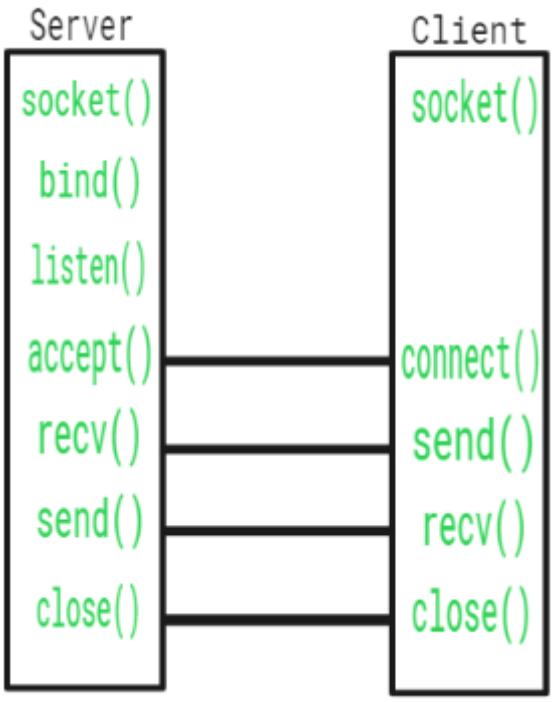

Figure 20: Socket Activity diagram

Description:

In the socket, client and server connect, client send connection and server accept the connection. Client send data in the form of package by using TCP and server received the package. Server send packages to client and client receive the package. By using TCP, continuously communicate when all the packages have transferred and communication is complete at the end from both sides must be close the connection.

```
print("Client: Receiving Sream from the Server Now")
        while len(data) < payload_size:
            data += clientsocket.recv(4096)

        packed_msg_size = data[:payload_size]
        data = data[payload_size:]
        msg_size = struct.unpack("L", packed_msg_size)[0]

        while len(data) < msg_size:
            data += clientsocket.recv(4096)

        frame_data = data[:msg_size]
        data = data[msg_size:]

        server_frame = pickle.loads(frame_data)
        server_frame = cv2.resize(server_frame, (600, 600))
        client_frame = cv2.resize(frame, (200, 200))
        server_frame[400:, 400:] = client_frame
```

```
        cv2.imshow('Client Side', server_frame)
        cv2.waitKey(int((1 / 30) * 1000))

        if cv2.waitKey(1) == 27:
            print("you closed")
            clientsocket.shutdown(2)
            clientsocket.close()
            cv2.destroyAllWindows()
            break
    except:
        cv2.destroyAllWindows()
        print("other person closed")
        break

video.release()
```

This is the typical event flow for a socket-oriented connection:

1. The socket () API creates an endpoint for the message and returns a socket narrator representing the endpoint.
2. When a utility has a socket signifier or descriptor, it could muddle a completely unique call to the socket. Servers need to be named to be able to be reachable from the network.
3. Listen () suggests consent to simply accept API purchaser connection requests. When a Sun () API for a socket is launched, that socket can't actively provoke connection requests. Listen () is launched after allocating the socket with the API socket () API and bind () binds a call to the API socket. A listen () needs to be launched earlier than accepting the API () API is launched.

4. The server makes use of the Accept Request () API to simply accept customer connection requests. The server needs to effectively trouble the bind () and listen () API earlier than liberating the Accept () API.

5. When a connection is set up among the movement socket (among customer and server), you may use both of the socket API information switch APIs. Clients and servers have some of

information switch APIs to pick out from, inclusive of Send (), Receive (), Read (), Write () and others.

6. When a server or customer desires to close down operations, it troubles a proximity (API to launch any gadget sources obtained via the socket. [16]

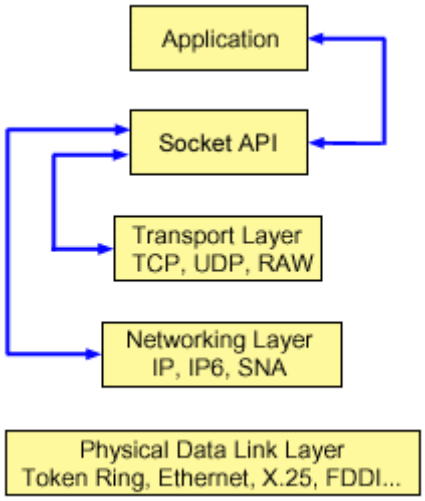

Figure 21: Socket Working with OSI Model

4.2. Output

Figure 22: Output screen shot 1

Figure 23: Output screen shot 2

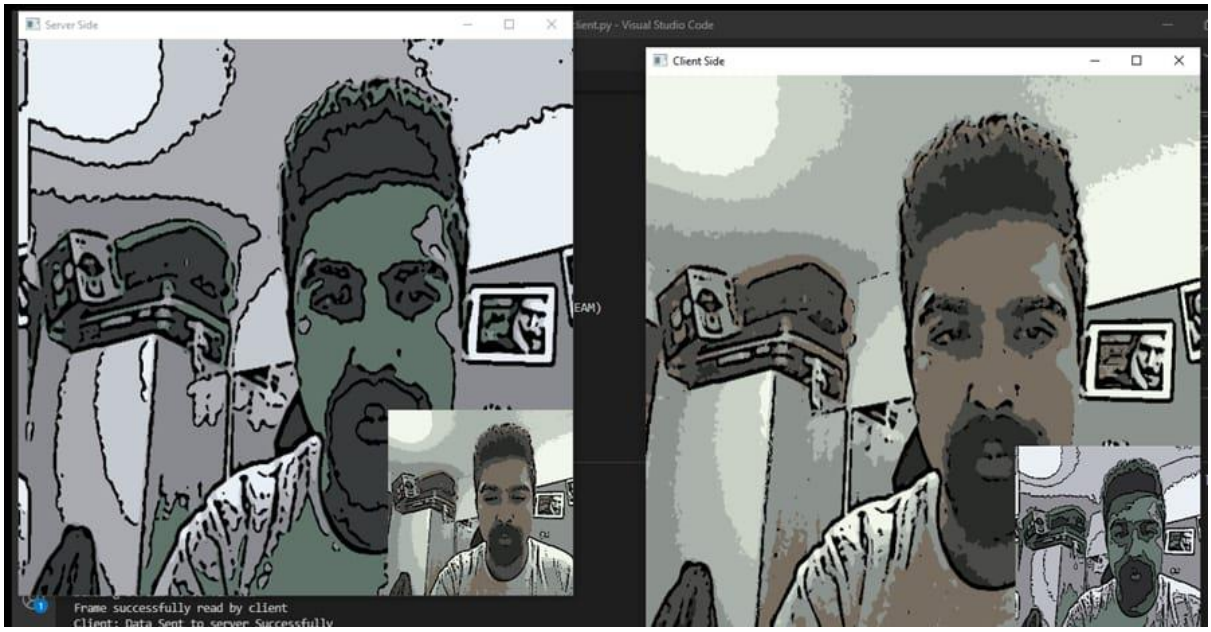

Figure 24: Output 3

5. PRESENTATION OF RESULTS

Results Obtained:

I read previous work about convert video into cartoon in the real time conversation. But no one work at this topic. In 2020, one researcher **Akanksha Apte** work on Alteration of the Videos clips & Genuine Images into the Cartoon Videos & pictures using of **GAN** but it's not work in the real time video call. One thing is same used of OpenCV to read the image or video. But we used **socket** for client and server to convert video into cartoon [16].

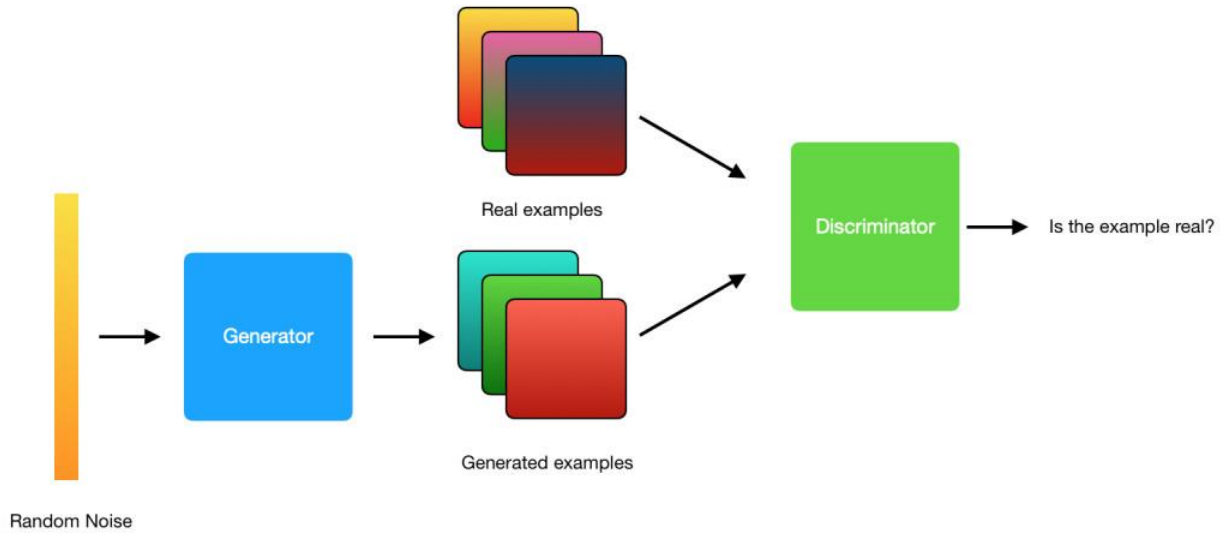

Figure 25: GAN

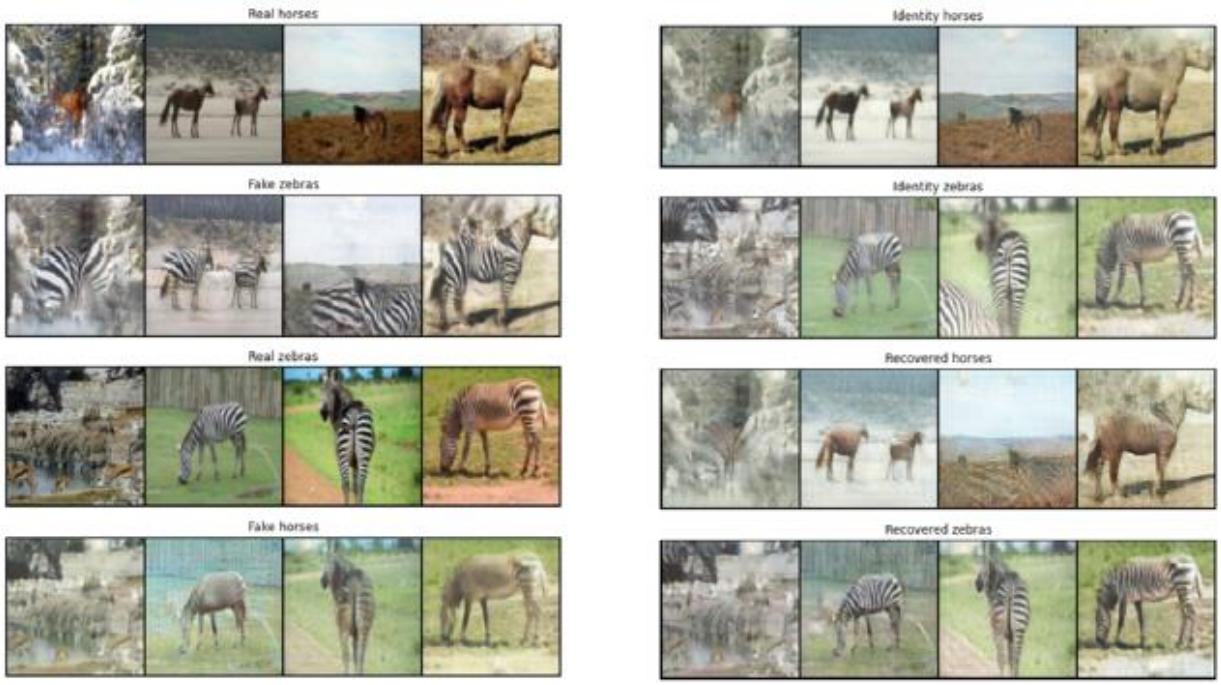

Figure 26: Cycle GAN

In 2018, **Chinmay Joshi** work on Practical article Demonstration on the Applications of Animation like Things to Real Images in which used different technique used like **photoshop, paint.net, adobe illustrator**, windows MAC, pencil stretch, photo Sketcher, Fotosketcher, Dumpr, Tuxpi photo editor. This technique used to convert image into cartoon. Also used **CNN, TensorFlow, VGG19**, VGG16 pre-trained model also use for this purpose. The systematic process of image to cartoon conversion and also algorithm and formulae is used. But their work is not related to real time video conversion. [16]

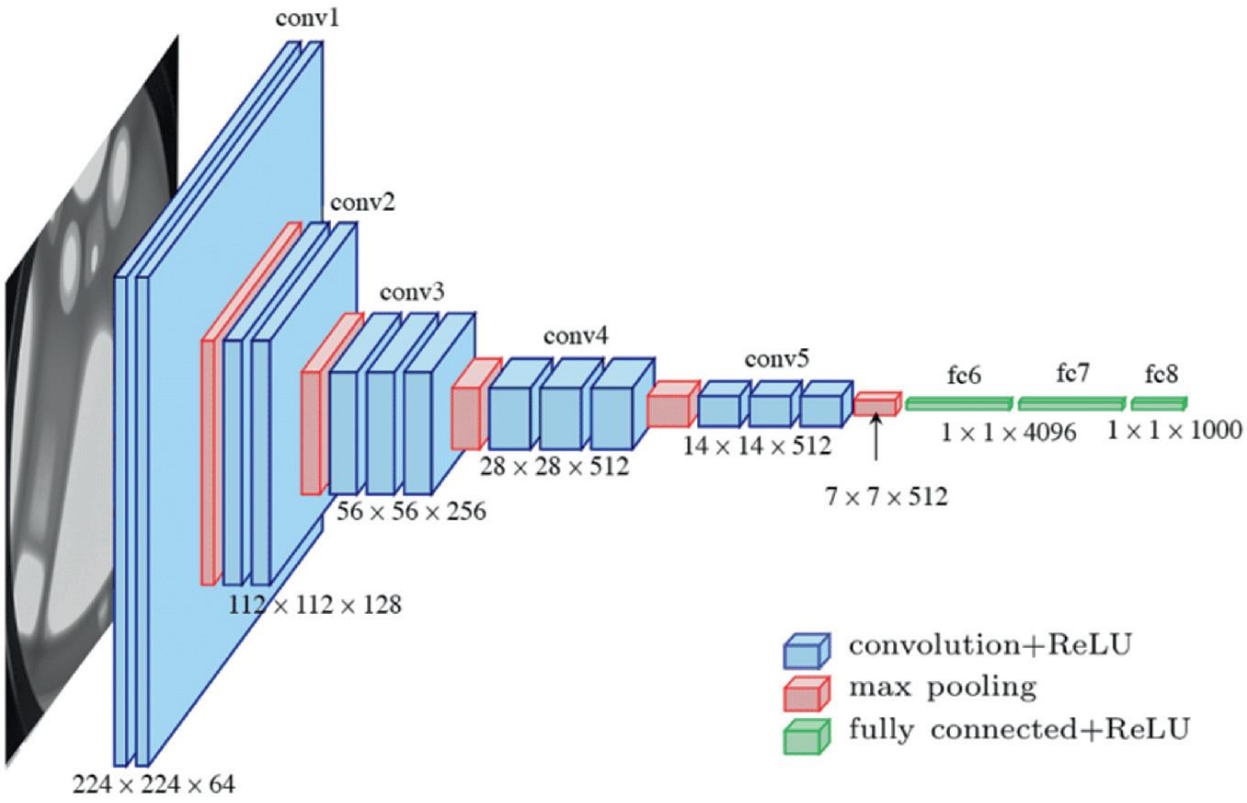

Figure 27: VGG19

The pre-processing required in Conway Net is plenty much less than different class algorithms. While the filters are homemade withinside the preliminary methods, with plenty of training, ConvNet is capable of analyze those filters / features. [17]

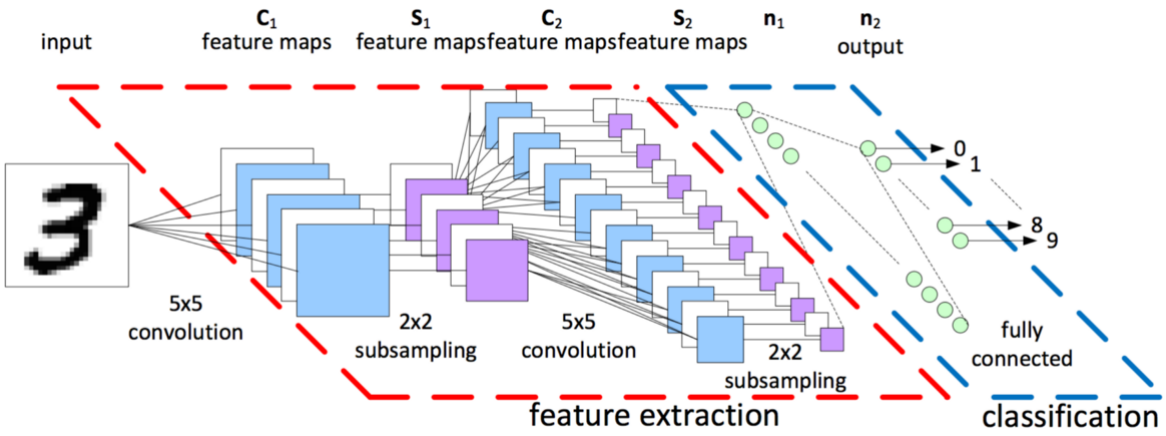

Figure 28: CNN working

The shape of the Conv Net Internet resembles the connectivity sample of neurons inside the human thoughts and is activated through the employer`s supply of seen pallium. The series of such fields extends to the entire seen location. All preceding researchers did now no longer use the idea of socket patron and server, nor did they use any unique hardware that become used

before, the mission required desirable first-class hardware and additionally desirable internet speed. Using pc imaginative and prescient, NumPy processing on pics is splendid which improves the accuracy of analysing the body border definitely to definitely distinguish among video and heritage satiation frames. This is the primary use of socket to make connection among patron and server.

Data Science [19].

5.1. Machine Learning

Computer programs are said to learn problems from their own experience and provide some performance. Machine learning data is an important component of a growing scientific field as performance for T as measured by P improves with experience. Use statistical techniques to train algorithms to classify or predict important ideas for data mining projects.

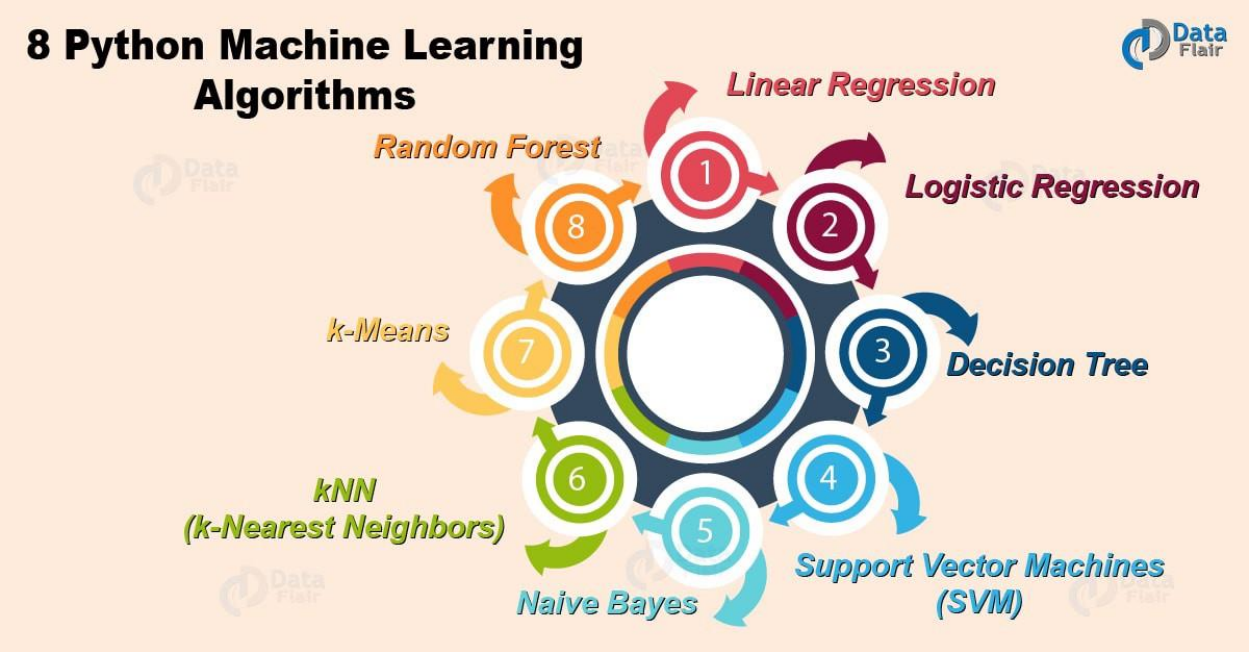

Figure 29: Machine Learning

This perception then drives decision-making inside packages and businesses, preferably affecting key increase metrics [16]. As huge records expand and expands, the marketplace call for records scientists will increase, for which they want to pick out the maximum applicable enterprise questions after which the records to reply them.

5.2. Deep Learning

It's a kind of ML, a kind of the AI. AI is a universal term for technologies that allow systems to impersonator human actions. It refers to a group of trained procedures on the machine learning information that style it all probable. DL ('Deep learning') on further side is an form of ML that only disturbs the erection of the humanoid brain. These procedures try to make decisions in a way that consistently examines information with a given reasonable building. To attain this goalmouth, It usages a hierarchy of set of rules called neural networks [17].

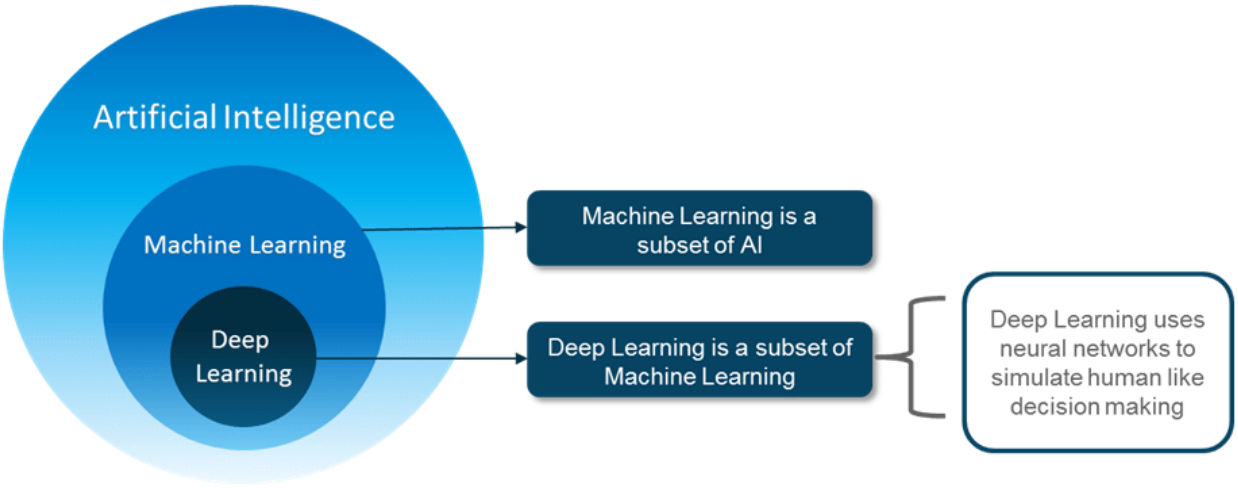

Figure 30: Deep Learning

5.3. Computer Vision

Computer Vision is a branch of the AI (Artificial Intelligence) that allows computer systems to gather expressive data from the digital videos, pictures & other graphic information & to make or commend actions grounded on the that data.

Computer vision the whole thing in the same method as humans' vision, except for the human head [17]. It trains machines to perform these functions, but with data, algorithms and cameras, it must do so in less time than the retina, optic nerve, and visual cortex do. Systems trained to validate products or study production assets can quickly surpass human capabilities because they can analyse thousands of products or processes per minute and detect obscure defects or problems.

Figure 31: Computer Vision

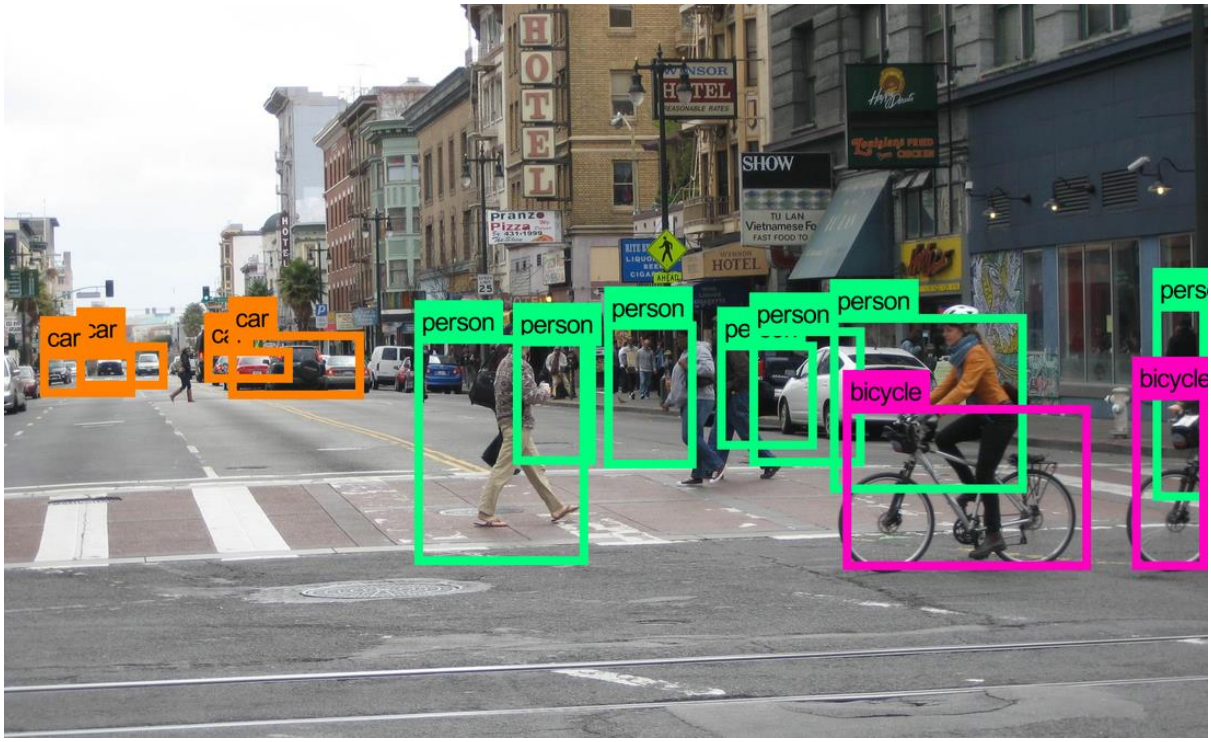

Figure 32: Computer vision example

Computer vision requires a lot of data. Continue to run data analysis till you understand differences & lastly identify image [18].

K-means Algorithm

The K-Means algorithm is an interactive process that efforts to gulf a dataset obsessed by separate, non-invasive, predefined, subgroups (clusters). Here, apiece information point goes

to the lone 1 cluster. You want to compare information facts in a bunch as closely as probable and keep them as far apart as possible.

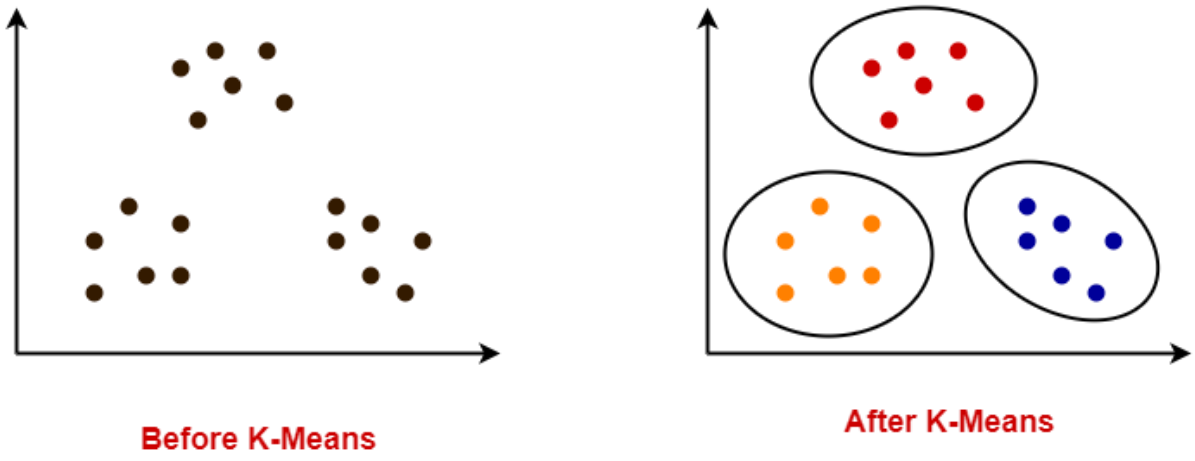

Figure 33: K-means Results

Why Used K-means in our project:

- Since clustering algorithms such as K-means use distance-primarily based totally measurements to decide the similarity among statistics points, it's far endorsed to standardize the statistics in order that the statistics has an average of 0 and a preferred deviation of 1 due to the fact Almost usually in any dataset the capabilities may have one-of-a-kind devices of dimension like age vs. income.
- Given the parallel nature of the K-means and the random beginnings of the centroids at the start of the set of rules, one of a kind preliminary connection can result in one-of-a-kind clusters because the K-means algorithms can also additionally get caught withinside the nearby excellent and the worldwide won't be as united. Therefore, it's far endorsed that the set of rules be run the use of the numerous preliminary connections of the centroids and the outcomes of the race be decided on which yields a small quantity of rectangular distance.

Socket:

Sockets permit communique among exceptional tactics at the identical or exceptional machines. More specifically, it`s a manner to speak to different computer systems the use of well-known Unix record descriptors. In Unix, each I / O system is completed via way of means of writing or studying the record descriptor [18].

Toward the consumer: The consumer tries to satisfy the server at the server's gadget and port to request a connection. The consumer additionally desires to become aware of himself to the server in order that its miles linked to a neighbourhood port wide variety that he's going to use at some point of the connection. This is typically assigned via way of means of the system.

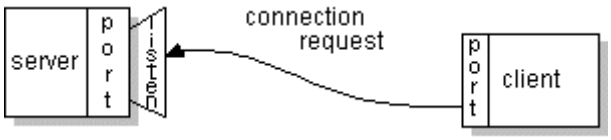

Figure 34: Connection request

If all is going healthy, server receives the linking. After receipt, server connects a new socket to identical nearby port & its faraway quit factor is likewise set to the customer`s cope with and port. It desires a brand-new socket in order that it could preserve to pay attention to the authentic socket for connection requests, looking after the desires of the incorporated customer.

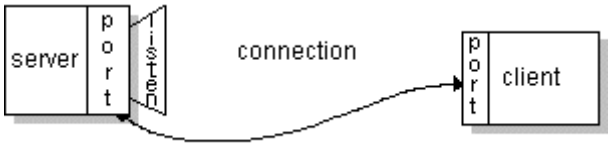

Figure 35: acknowledgement of connections

- At customer hand, if relationship is recognized, sockets are efficaciously formed & customer can usage the sockets to talk through the servers.
- Sockets had been first delivered at 1.2 BSD after which delicate to their modern-day shape with 1.2 BSD. The socket characteristic is now to be had with maximum modern-day UNIX device releases. [19]

NumPy:

NumPy is the default packaging convention for clinical computing in Python. A Python library that provides many exercises for short string operations, including multitasking arrays of objects, various additional objects (including masked strings and matrices), math, logic, sorting, & shape manipulation[21]. Moisture is primary item withinside the principal a part of the package deal. It summarizes the n-dimensional collection of homogeneous statistics types, with some of operations executed withinside the code compiled for performance. [20]

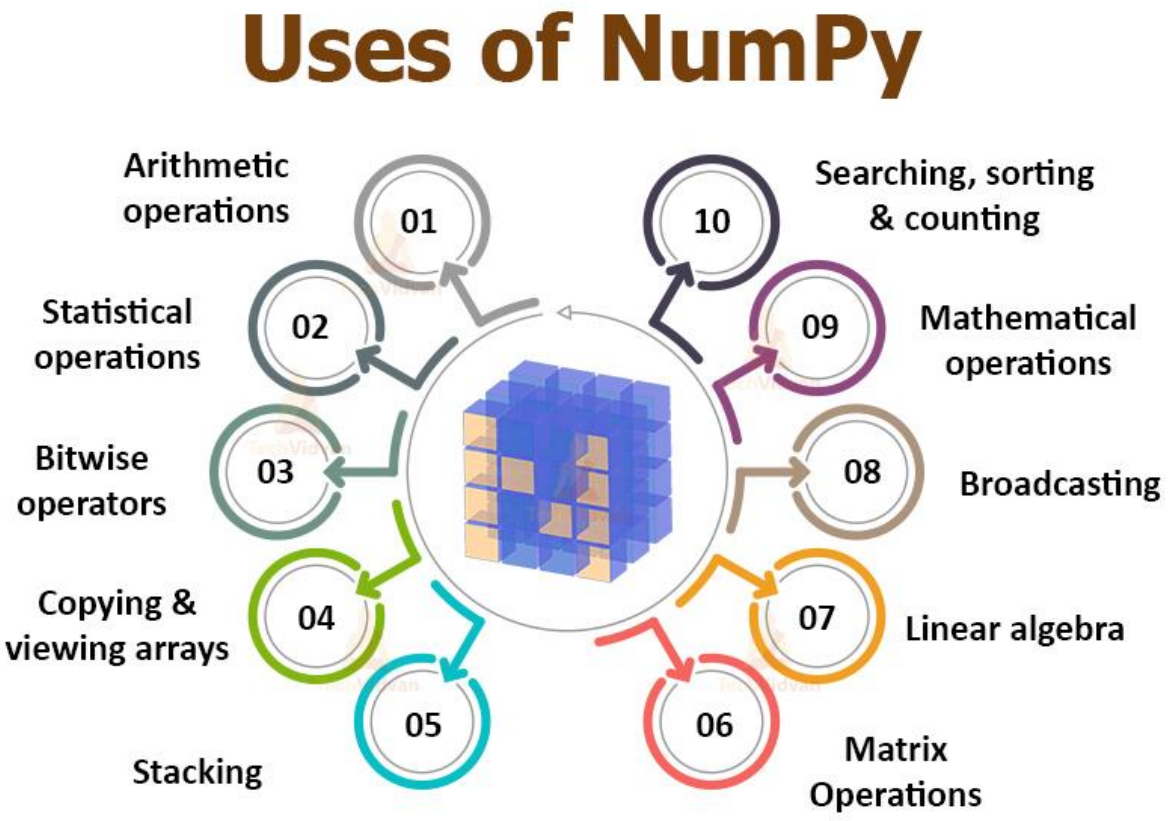

Figure 36: Numpy

• Moisture permits superior mathematical and different forms of operations on a huge quantity of data. In general, such operations are accomplished extra successfully and with much less code as tons as viable the usage of settings withinside the Python build.

The growing proliferation of clinical and mathematical Python-primarily based totally applications is the usage of NumPy collection Although they normally guide Python configuration inputs, they convert such inputs to pneumatic arrays earlier than processing, and that they frequently output pneumatic arrays. In different words, to apply today`s clinical / mathematical Python-primarily based totally software program extra effectively (possibly most), simply understanding the way to use Python's integrated configuration kinds isn't enough - a person It is likewise vital to understand the way to use the NumPy collection. [27]

Pickle:

Pickles in Python are particularly utilized in serializing and de-serializing the shape of Python objects. In different words, it's far the method of changing a Python item to a byte movement in order that it is able to be saved in a file / database, maintained software reputation in sessions,

or transmitted facts over a network. - The cooked byte movement may be used to recreate the unique item category via way of means of commencing the movement.

But facts by myself isn't always enough. To efficaciously disassemble the item, the cooked byte movement instructs the pickler to reconstruct the shape of the unique item with educational operands, which assist to settle the item shape. [27]

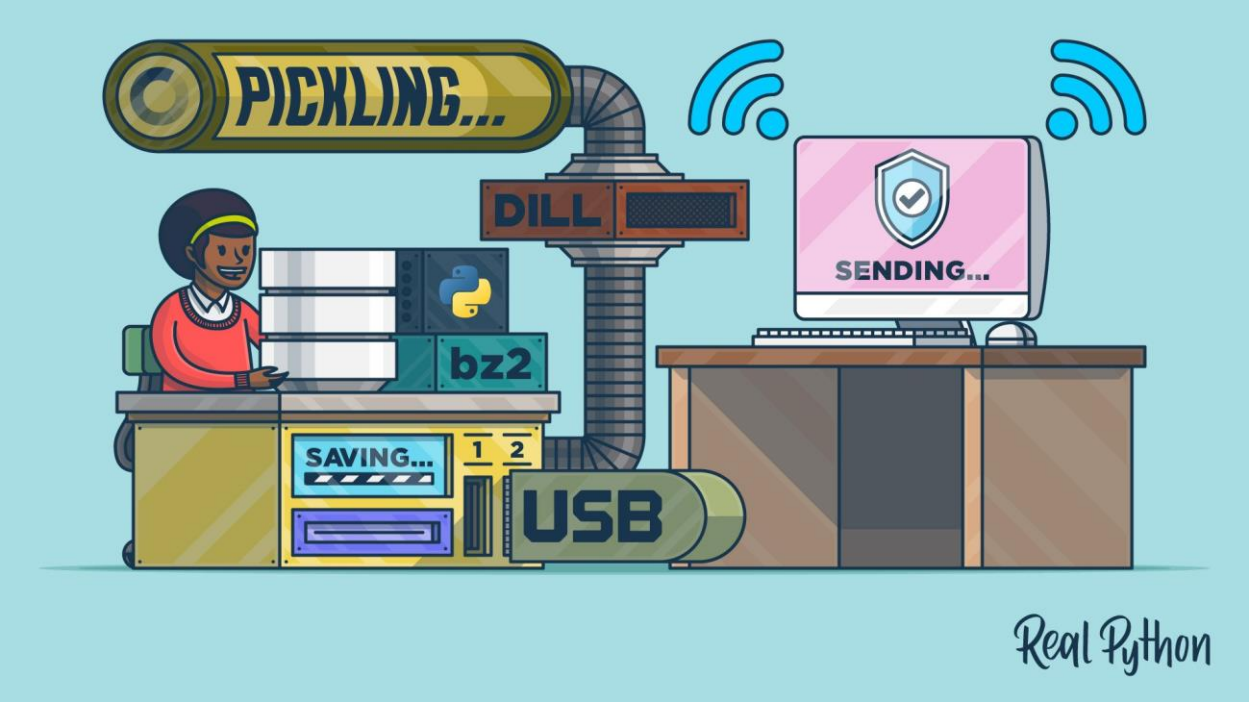

Figure 37: Pickle working

According to the Pickle Module documentation, the subsequent kinds may be decided on:

- None, true, and false
- Accurate numbers, lengthy accurate numbers, floating factor numbers, complicated numbers
- Normal and Unicode strings
- Tuples, lists, units and dictionaries that incorporate most effective slippery gadgets
- Functions are described at the best degree of the module
- Built-in capabilities are defined at the best degree of the module
- Classes which can be assigned at the best degree of the module

CRITICAL REVIEW OF RESULTS / TESTING:

As discuss before, in the previous part till now not any other researcher work in the real time conversion of frames of video into cartoon by using socket. In 2020, some researcher work on conversion of frames of video into cartoon but no one work on socket. Sockets are usually communicated between client-server's applications.

Firstly, work on images, to extract the feature the human being, then work on cartoon, to extract their feature. With the passing of time then researcher discover one thing start to work on the next work. Then work on conversion of human faces images into cartoon, with the completion of this work start working on the frames of videos. Now in real time conversion frame of video into cartoon.

Are now no longer one. Great photograph statistics set. MNIST is one of the maxima broadly used datasets withinside the discipline of easy photograph popularity the usage of device learning. It is a database of handwritten numbers, containing 60,000 schooling samples and 10,000 check samples. Celtic 256 [are small data sets like Griffin et al. 2007]: A hard group of '256' item classes which includes 30607 images, Pascal: A growing photograph database from 2015 and consists of classification, detection, segmentation and character format tester, MSRC [Includes image information for Shooton et al. 2006], Microsoft, CIFAR 10/100, etc. It is essential and superior to create a cool animated film fashion photograph database. We want a statistics set with plenty of tags and plenty of statistics to identify. However, now no longer many cool animated film datasets are to be had at the Internet. Baghdanov et al offers a cool animated film dataset, however it does now no longer meet our desires as it's miles on the whole used for item detection. U et al additionally offers a small cool animated film information set, which include Tom and Jerry, to estimate cool animated film similarities. Since we can`t discover the realistic dataset to use, we in the end determine to create our very own dataset. There are many approaches to assist create cool animated film photograph information. Ha et al broaden a way of mechanically drawing sketches primarily based totally on a neuronal illustration. This technique can offer quite a few comic strip drawings in a well-timed manner, however the exceptional isn't always properly sufficient due to the fact the statistics units they use include best man-made doodles. The principal motive is that the Japanese generally have quite a few complicated colours, however the cool animated film picture we want consists of only some easy colours. Looking at a supply cool animated film picture, it is able to convert the goal picture right into a cool animated film fashion, however the end result isn't always

stable. Therefore, other researcher feel need to work further to understand the reality behind the image.

To handle this project, faces analysis error during connection creation, to achieve best result from frames of videos passing so many different methods of cv2, then achieve the desire result, to transfer the packages of frame from client to server and vice versa. To overcome all these difficult used different approaches and also use the NumPy to achieve task goal.

Result of coding in different system do behave different. Some code work best in window but is not working properly in Linux and Mac OS. Therefore, we user write a code run in different systems and also different OS, to check the working of coding how much efficiently it's work. In our case, code working properly in different systems. Sometime due to change in version of python libraries it's create issue. Due to updating of python libraries some function can be created for previous version while it's not work on the other vision. Therefore, when user push project on git there must be a requirement file where all the version of necessary libraries has written. Firstly, install all the libraries then run the work.

CARTOONIZATION is a conventional artwork in itself, however evolution withinside the discipline of gadget getting to know encompasses nearly each discipline. Today in this text we're going to find out about a brand-new technique called `White Box CARTOONIZATION' which reconstructs a photograph in a lively manner via way of means of focusing at the expression that brings out the elements. And tasks are made absolutely controllable and flexible. [27] I wager all people may be interested by cartoons and they may be a crucial a part of your childhood. And except those amusing memories, it could be a profession preference for a number of us. The in advance fashions that counselled the equal method used the black field version, the previous version achieves awesome accuracy however the stylization degradation reasons a few terrible issues. As every cool animated film workflow considers specific features, those versions have a corresponding impact on black field fashions.

One application is similar but not all the feature are same. Work on the video conversion into cartoon but don't use of socket. That something is new in our project which unique our project from others.

6. CRITICAL REVIEW OF PROJECT OBJECTIVES

6.1. Reflection

Before starting work it was getting feel so, hard to do but in the upper lines we show that what are the main object of our work and what simple we researched from Internet. There are numerous research articles are available on the Internet related to the converting images and videos into cartoons. As discussed before that an invention or research work can not only solution to a single problem but also an entering point for other multiple problems. We kept this thing in our minds and while researching we found some research papers that are very close to our project. Our idea is quite different to all other projects available on the Internet but the idea is little bit different. But if we talk about convert the video into cartoons then we explored many programming techniques that we can used to convert simply video to cartoon form. On the other hand, the second functionality of our system is to provide real time video chat. So, it had been also done before many years. [27]

Figure 38: Project Summary reflection illustration

Our methodological learning objectives are based on each extracted insight, allowing us to manage and manage the framework. This allows you to meet the needs of your artists with different styles and different uses. To authenticate the efficiency of this method, standard comparisons, quantitative analyzes, and user studies were performed, and our technique outdoes the preceding method in wholly comparisons. Lastly, the extirpation training validates

the effect of each component in our structure. Comics are a general graphic-arts procedure that is extensively used in a variety of scenarios. Modern animation workflows allow artists to create content using a variety of media. Some popular products are created through an image carbonation process that converts real photos into materials that can be used in cartoon scenes. There are many popular libraries and tools, so you can take a variety of steps to find a solution to a problem in this area. One of the most popular libraries is OpenCV (learn how to combine images using OpenCV). [27] Previous models offering the same approach used the black box model, where the first model provides higher accuracy, but suffers from serious problems with poor styling. Because each manga creation workflow takes into account different features, these variations have a corresponding impact on the black box model. To overcome the shortcomings of the previous model, the white box model was developed with a greater focus on different styles of drawing and human attitudes towards caricatures. This model decomposes images in three different cartoon views, which are further referenced to improve the network for creating canton images.

- This will help highlight smooth surfaces in images with subtle low-frequency components anywhere the paint scheme & shallow touch are maintained along the texture edges, & detail.
- It will help you get full structural information and reduce color blocks if you have developed a structured view to implement a compatible color algorithm like the Felzenswalb algorithm that reduces the visual effect on the celluloid style stamping process. May I help you.
- Helps preserve painted areas and edges. The 3D image is converted to a single-band intensity map that helps preserve color and brightness, compromising pixel intensity, following a manual artist's approach of fitting the outline first. And then draw.

So, definitely it meets our requirements and it will benefit the users that want to enjoy their video call and want a secure their video chat from illegal use.

6.2. Summary of Work

Initially, cartoons were drawings and remained full-size for tapestry, mosaic, pictures, & other formats. This cartoon was last phase in a sequence of preparatory paintings following the traditional practice of Renaissance studios. It is, almost always reproducible drawing, painterly parody, cartoon, comparative, and humorous encounter (often a political or social trend (highlighted in a documentary conversation or commentary) through contemporary events, folk

customs, and tools), which is usually humorous, but it can be downright violent. Just as personal caricatures were aimed at audiences who knew the original, comics were also based on extensive familiarity with the subject matter [3]. He is used as a capsule version of an editorial when making political satire and is a moving commentary on social change, sometimes intended to manipulate social energy. (For information on comic effects, see Movie: Animation.)

Live-action and remakes of animated films can showcase numerous matters commonly trained in administrative practice & supervision paths. The analysis looks at the stages and defines which types of locations (dynamic or live) represent concepts better or emphasize concepts differently. Live-action pictures frequently feature identifiable real-world surroundings that use real actresses & actors. Instructors who commend the film as an educational tool generally recommend using live-action rather than animated scenes.

First of all, we got a unique idea the is to convert the video into cartoon form in a video chat on both sides. Then we took research about it and found that there are very less research papers are available on the Internet. So, this thing encouraged us and we got a motivation from it that our idea is unique and we should have to work on it. As discussed before many times that there are projects available on the Internet that can convert post images or videos in to cartoon form only but our idea is quite different to it. We used the research related to simply converting the images or videos into cartoon form. Because in methodology part it is described enough that we can done this project in multiple ways. It is because we had to combine two different applications. First is the cartoon converter and second is video chat application. So, we Researched about converting the normal video into cartoon then we found machine learning techniques that were very helpful and efficient in working.

This AI can cool animated film any photo or video which you feed it in cool animated film fashion of your choice!

Let's see the way it works and a few first-rate examples. You may even strive it yourself at the web page they created as I did for myself!

Researchers from the well-known Style 2 Paints studies group have simply launched a brand-new paper this is capable of cool animated film your images and motion pictures in a particular cool animated film fashion! This is known as image carbonization. It makes use of the GAN

framework to analyze from cool animated film-fashion behavior. The right issue approximately this new technique is that it's far gaining knowledge of every extracted illustration separately, permitting their framework to be controllable and adjustable in order that it suits the artist's fashion higher in exceptional use cases. There are two major techniques to convert images or videos into cartoon form that are GAN or Open CV. We used Open CV method to do this.

However, data alone is not enough. To successfully disassemble an object, the processed stream of bytes instructs the collector to reconstruct the original object using instruction operands that help determine the object's structure.

After this we implemented our solution and then tested our solution for errors. And finally our project now meet all requirements.

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