# A close up of a logo Description automatically generatedA red square with white text Description automatically generated

INDIVIDUAL ASSIGNMENT

**LEVEL 5**

**COMP50008**

Enterprise Cloud and Infrastructure Automation-1

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Hand Out Date: 13th November 2023

Hand In Date: 8th February 2024

**INSTRUCTION TO CANDIDATES**

1. **Students are advised to underpin their answers with the use of references (cited using the Harvard Referencing Style).**
2. **Late submission will be awarded zero (0) unless extenuating circumstances (EC) are upheld.**
3. **Cases of plagiarism will be penalized.**
4. **The assignment should be submitted as a softcopy:**
   1. **The softcopy of the written assignment and source code must be uploaded to the given link in the LMS.**

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# AWS REKOGNITION

# What is AWS?

Amazon Web Services (AWS), the most popular cloud platform, offers a comprehensive range of more than 200 fully operational services from data centers across the globe. Countless users, including corporations, growing startups, and leading government agencies are leveraging AWS to reduce expenses, enhance flexibility and accelerate innovation.

## AWS – The Leading Cloud System

**Most Functionality** - Compared to cloud providers AWS stands out with its range of services and features. It offers a multitude of options, including cutting edge technologies, like machine learning and artificial intelligence data lakes and analytics and the Internet of Things. Additionally, AWS provides infrastructure technologies such as computing power, storage solutions and databases. This comprehensive offering empowers developers to bring their ideas to life swiftly, easily, and at a cost.

One area where AWS excels is in its selection of databases tailored for application types. This allows users to choose the database tool based on factors like cost-effectiveness and performance.

**Largest customer and partner community** - AWS boasts a thriving community with millions of users and tens of thousands of partners spread across the globe. Customers, from industries, including startups, large corporations and public sector organizations utilize AWS for a range of purposes. The AWS Partner Network (APN) comprises thousands of software vendors (ISVs) who tailor their technology to run on AWS well as numerous systems integrators who specialize in AWS services.

**Most secure** – AWS is built to be the safest and most flexible cloud computing platform in use today. The military, international banks and other organizations with the highest level of security requirements have their core infrastructure designed to meet those needs. This is backed by a wide range of cloud security offerings including support for 143 safety and compliance certifications, over 300 safety regulation governance services and features among others.

**Fastest rate of innovation** - The use of the latest technologies with AWS allows one to innovate and discover faster. They are always pushing the limits of innovation, creating technologies that would change any industry completely. For instance, AWS started the serverless computing space in 2014 when it launched AWS Lambda that enables programmers to run their code without having servers set up and maintained. Amazon SageMaker, a fully managed machine learning service developed by AWS allows scientists and non-scientists alike to employ machine learning even without any prior knowledge in the area.

**Most demonstrated operational expertise** - You can depend on AWS's unparalleled maturity, experience security, and performance for your most critical applications. Millions of users globally have been consuming cloud services from AWS for more than 17 years, using them to address various use cases. Amazon has the most operational experience in terms of scale among all cloud providers.

# AWS (AMAZON) REKOGNITION

The same vetted, highly scalable deep learning technology that Amazon's computer vision scientists have been using to analyze billions of photos and videos every day is the foundation of Amazon Rekognition. You don't need to be an expert in machine learning to use it. A straightforward, user-friendly API is included with Amazon Rekognition, enabling it to easily analyze any image or video clip saved on Amazon S3. We constantly add new labels and face comparison features to the service, and it constantly learns from fresh data.

Adding image and video analysis to applications is made simple with Amazon Rekognition. All you need to do to use the Amazon Rekognition API is submit an image or video, and the service can:

* Recognize text and labels (things, ideas, people, scenes, and activities).
* Recognize unsuitable content.
* Offer incredibly precise face search, face comparison, and analysis tools.

You may detect, analyze, and compare faces for a wide range of use cases, such as public safety, cataloging, people counting, and user authentication, using Amazon Rekognition's face recognition APIs.

The following are typical use cases for Amazon Rekognition:

**Searchable image and video libraries:** With the help of Amazon Rekognition, you can find labels—such as objects, ideas, and scenes—that exist in photographs and stored movies.

**Face Vitality Indicator** – Amazon Developers can prevent fraud in face-based identity verification with the use of Rekognition Face Liveness, a fully managed machine learning (ML) capability. With the aid of this technology, you can confirm that the person in front of the camera is real and that their face isn't being mimicked by an actor. You may identify spoof assaults on cameras, such as printed pictures, digital images/videos, or three-dimensional masks, by using Rekognition Face Liveness. Additionally, by inserting pre-recorded or deepfake films straight into the video capture subsystem, it aids in the detection of spoof attacks that avoid using a camera.

**Face-based user verification** - By contrasting a user's live image with a reference image, Amazon Rekognition enables your applications to verify user identities. (Anon., n.d.)

# How Amazon Rekognition works

Amazon Rekognition offers two sets of APIs (Application Programming Interface). For image and video analysis, utilize Amazon Rekognition Image and Amazon Rekognition Video, respectively. Both APIs do image and video analysis and offer insights that can be applied to your apps.

For instance, a photo management application's user experience could be improved with the help of Amazon Rekognition Image. When a user uploads a picture, your app can identify faces or objects in the real-world using Amazon Rekognition Image. The user could then search their photo collection for images that contain a particular object or face once your application has stored the data returned by Amazon Rekognition Image. More in-depth inquiry is feasible. The user could, for instance, search for faces that are grinning or that match a specific age range. A range of inclusive or exclusive filters can be used to filter any detected label results (objects or concepts).

You can follow a person's path through a stored video with Amazon Rekognition Video. As an alternative, you can search a streaming video for people whose facial descriptions match ones that Amazon Rekognition has already stored by using Amazon Rekognition Video. You can aggregate results by timestamp or by video segment, and sort by timestamp or label name when using video analysis operations.

Deep learning image analysis is made simple to use by the Amazon Rekognition API. RecognizeCelebrities, for instance, provides details for up to 100 celebrities that are found in an image. This contains details on where to find out more about a celebrity and where their faces can be found in the image. (Anon., n.d.)

# Companies that use Amazon Rekognition

Advertising and Marketing

1. **Canva** – AWS Professional Services suggested a cloud-based data lake to hasten the deployment and lower the cost of creating a solution to improve Canva's IT security posture. These days, Canva can handle and store over 50 million log records daily, enriching them with more threat indicator data. Canva is able to detect possible threats and compromises more quickly thanks to the solution, which enables the company to take proactive measures before cyberattacks happen by searching and analyzing log data through dashboards and visualizations. (Anon., n.d.)
2. **Pinterest** – Pinterest's Lens camera feature, which is used to perform hundreds of millions of visual searches every month, uses machine learning (ML) engines that are powered by AWS storage and compute solutions. (Anon., n.d.)
3. **Snap** – Snap made the decision to upgrade its antiquated, monolithic infrastructure by moving to an AWS microservices architecture. Snap reduced the median latency of sending Snaps by more than 20 percent and scaled up to handle more than 10 million queries per second while optimizing infrastructure costs with Amazon DynamoDB. For the hundreds of millions of Snapchat users worldwide, the new microservices architecture offers a consistent experience and increased operational reliability (Anon., n.d.).

Financial Services

1. **Goldman Sachs** – Working in a highly regulated sector, Goldman Sachs uses the cloud every day to safely manage, distribute, gather, and access millions of files. Since vendors, clients, and government agencies all depend on having vital information at the appropriate time, timeliness is essential. (Anon., n.d.)
2. **Intuit** – The Intuit team selected Amazon Keyspaces in order to maintain its Apache Cassandra-based functionality and achieve its operational efficiency targets. (Anon., n.d.)
3. **Itaú** – The company and Amazon Web Services (AWS) inked a long-term strategic partnership to expedite IT modernization and provide the flexibility and scale needed to enhance the banking experiences of the company's clients. With AWS, Itaú Unibanco launched Pix instant payment services, completed more than 100,000 implementations in 2021, and cut client-impacting incidents by 75%. As of right now, Itaú Unibanco accounts for 20% of all Pix volume in Brazil. (Anon., n.d.)

Healthcare and Life Sciences

1. **AstraZeneca** – To speed up the drug discovery process, AstraZeneca deployed its machine learning model to the cloud using Amazon EC2 P3 instances and Amazon EKS. (Anon., n.d.)
2. **Philips** – AI ToolSuite is a scalable, secure, and compliant machine learning platform on Amazon SageMaker that Philips developed in collaboration with AWS. This platform includes features for training, data annotation, model deployments, experimentation, and reusable templates. With the help of these capabilities, various business lines will be able to innovate quickly and effectively while still upholding centrally controlled governance. In the end, Philips hopes to make proactive, individualized care possible, which could greatly enhance patient outcomes. (Anon., n.d.)
3. **Moderna** – In order to speed up and lower the cost of introducing novel, life-saving treatments to the market, Moderna leverages a wide range of AWS services to support all facets of its digital, data-driven corporate operations. (Anon., n.d.)

Hospitality and Travel

1. **Accor** – Accor's hospitality ambassadors can obtain loyalty program information up to six times faster than they could with the previous system thanks to the migration of its databases and infrastructure to the cloud. The hotel chain introduced the Accor Consumer Digital Card in 2018, which uses cloud technologies to centralize each customer's unique preferences. Accor's hospitality ambassadors can determine which guests are returning and which are first-time visitors to their hotels with the help of this information. They can generate customer profiles that include personal preferences for things like preferred meals, drinks, and services needed. (Anon., n.d.)
2. **Airbnb** – Over the past three years, Airbnb has experienced substantial growth. The business uses 200 Amazon Elastic Compute Cloud (Amazon EC2) instances for its search, memcache, and application servers in order to meet demand. Elastic Load Balancing, which Airbnb uses inside Amazon EC2, intelligently divides incoming traffic among several Amazon EC2 instances. Airbnb uses Amazon Elastic MapReduce (Amazon EMR) to efficiently handle and analyze 50 Gigabytes of data per day. Additionally, 10 terabytes of user photos as well as backups and static information are stored by Airbnb on Amazon Simple Storage Service (Amazon S3). Airbnb employs Amazon CloudWatch, which enables the organization to quickly supervise all of its Amazon EC2 assets through the AWS Management Console, Command Line Tools, or a Web services API, in order to monitor all of its server resources. (Anon., n.d.)
3. **Booking.com** - The method that people arrange their travels has altered thanks to Booking.com. Being a tech-driven company, it hopes to employ generative artificial intelligence (AI) to enhance consumer recommendations, reduce friction, and provide a customized booking experience. Booking.com is becoming the go-to source for travel inspiration as a result of the company's use of Amazon Bedrock to fine-tune language models that link clients with their ideal trip destinations. (Anon., n.d.)

Industrials

1. **BMW Group** – The business transforms and leverages AWS services like Amazon Kinesis Data Firehose, AWS Lambda, and AWS Glue to handle gigabytes of data from millions of automobiles every day. (Anon., n.d.)
2. **iRobot** – The customer-facing iRobot HOME app and the Internet of Things (IoT) backend for its robots are powered by AWS serverless architecture, which includes AWS RoboMaker, AWS Lambda, and AWS IoT Core. This allows iRobot to easily and securely manage billions of connected devices. (Anon., n.d.)
3. **Siemens** – For data analysis, iemens uses a variety of AWS services, such as Amazon Relational Database Service, Amazon Elastic Load Balancing, Amazon Auto Scaling, Amazon ElastiCache, and AWS CloudTrail. Siemens leverages AWS Support to minimize expenses and optimize its migration. (Anon., n.d.)

Media and Entertainment

1. **Netflix -** Netflix primarily relies on a range of AWS cloud technologies to power its streaming platform and cater to its audience. For storage needs Netflix utilizes Amazon Simple Storage Service (S3) which offers reliable and cost-efficient storage solutions, for housing and delivering amounts of media content like videos, photos and metadata. To handle the processing and distribution of streaming content to millions of viewers Netflix leverages Amazon Elastic Compute Cloud (EC2) for its computing capacity. To ensure experiences with minimal delay Netflix also makes use of Amazon CloudFront for content delivery. This involves storing content at edge sites in proximity to end users. Additionally, Netflix effectively manages user data, preferences, and content information by employing AWS database services such as Amazon DynamoDB and Amazon RDS. (Anon., n.d.)
2. **Epic Games** – Epic Games accelerates rendering workloads, provides remote build pipelines for Unreal Engine creators and itself, and supports millions of daily gamers worldwide by scaling compute capacity at optimal price performance using thousands of Amazon EC2 (Elastic Compute Cloud) instances powered by AWS Graviton processors. (Anon., n.d.)
3. **FOX** – FOX had to move enormous amounts of content from its on-premises MediaCloud technology, which handled distribution of television and theatrical content to multiple video-on-demand and broadcast endpoints, when an acquisition in early 2019 mandated the separation of assets. Utilizing Amazon Simple Storage Service (Amazon S3) and Amazon Elastic Compute Cloud (Amazon EC2), machine learning (ML), automation, and other solutions to streamline the ingestion, transcoding, and delivery of content, FOX turned to AWS for the assistance and resources that allowed them to shift the entire operation to the cloud. (Anon., n.d.)

# How will Amazon (AWS) Rekognition improve/upgrade the current process of KickITVids?

KickITVids' video-enhancing workflow can be greatly enhanced and upgraded by integrating AWS Rekognition. This will replace their labor-intensive and manual approach with one that is automated and simplified. How to do it is as follows:

1. **Faster processing times**: Manual tagging and classification of videos is not necessary because Rekognition can automatically assess scenes, objects, and content in videos. As a result, each video is processed faster, enabling KickITVids to fulfill more orders and grow their business without hiring more staff.
2. **Improved accuracy and consistency**: By removing the possibility of human mistakes and inconsistent results from manual processing, Rekognition's machine learning algorithms guarantee accurate and consistent identification of scenes, objects, and information. Higher-quality outputs and more client satisfaction are the results of this.
3. **User experience and personalization**: Rekognition uses the material itself to inform how it presents and recommends videos to users. Enhancing accessibility and engagement might be achieved, for instance, by automatically creating captions for viewers who are hard of hearing or by emphasizing things of interest within the video.
4. **Compliance and content moderation:** Rekognition can recognize and flag offensive content, such as violence, hate speech, and nudity, automatically. Shielding users from offensive content and assisting KickITVids in adhering to community norms, promotes user safety and confidence.
5. **Innovative revenue streams**: Recognition opens new sources of income. A few examples are data-driven insights for better marketing and service offers, content licensing based on identified value footage, and targeted advertising based on video content.
6. **Competitive advantage**: KickITVids can outperform rivals who continue to use manual procedures by offering quicker, more precise, and customized video improvement services. As a result, they can draw in new clients, hold on to their current clientele, and establish themselves as industry leaders in video improvement.

All things considered; KickITVids' integration of AWS Rekognition is a revolutionary move rather than merely an improvement. Tasks are automated, accuracy and efficiency are increased, new opportunities are unlocked, and eventually, the path to long-term success and growth is cleared.

# Conclusion

KickITVids is at a critical juncture. Even if it is inventive, their current infrastructure is unable to support their grandiose plans. They require a platform like AWS that can grow with them if they are to really succeed.

AWS provides a broad range of constantly changing options. The days of manual workflows and overclocked gaming PCs are long gone. Envision infinite processing capacity, customized virtual computers that are reachable from any location, and creatively liberating automated chores. Amazon Web Services (AWS) provides KickITVids with the adaptability, security, and scalability to reach any height.

Efficiency alone, though, won't be enough in the future. A wealth of video intelligence is made accessible through AWS Rekognition. Imagine situations that are quickly grasped, items that are tracked with precision, and offensive content that is neutralized and detected. Rekognition creates insightful insights, powers targeted advertising, and personalizes recommendations—a symphony of data that enhances every video.

There are difficulties associated with this transition. Teams must be trained, workflows must be modified, and strategies must be improved. But as time goes on, KickITVids presents a more audacious picture of video enhancement—one in which pixels disappear and are replaced by a canvas of tailored experiences and perceptive observations.

Amazon is more than simply a cloud; it's a launching pad. It's an opportunity to push the boundaries of what's conceivable and develop stories using automation, intelligence, and limitless possibilities rather than just pixels. Will you take the leap and use the brilliant colors of the cloud to paint your future, KickITVids? The world is eager to view your masterwork.

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