GRT INSTITUTE OF ENGINEERING AND TECHNOLOGY, TIRUTTANI - 631209

Approved by AICTE, New Delhi Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IMAGE RECOGNITION WITH IBM CLOUD VISUAL RECOGNITION
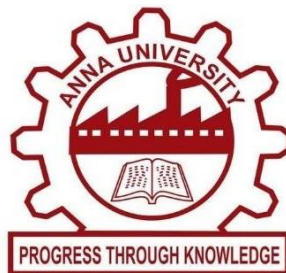
PROJECT REPORT

SUBMITTED BY

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3RD YEAR 5TH SEM

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BONAFIDE CERTIFICATE

Certified that this project report " **IMAGE RECOGNITION WITH IBM CLOUD VISUAL RECOGNITION"** is the bonafide work of **"Harina JM [110321104012]"**

who carried out the project work under my our supervision.

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Held on 01/11/2023

INTERNAL EXAMINER   **EXTERNAL EXAMINER**

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IMAGE RECOGNITION WITH IBM CLOUD

TABLE OF CONTENTS:

Creating an Image Recognition Platform: Bridging the Gap Between Photography and AI-Generated Narratives

Abstract:

In today's digital era, visual content plays a paramount role in communication and storytelling. The ability to capture attention, evoke emotions, and convey complex narratives through images is a skill sought after by photographers, content creators, and marketing professionals alike. As technology continues to advance, image recognition systems powered by artificial intelligence (AI) have emerged as valuable tools for enhancing visual storytelling. This project, titled "Image Recognition," embarks on a journey to leverage the capabilities of IBM Cloud Visual Recognition to create an innovative platform that redefines the way we interact with images. Through this platform, users will be able to upload images and witness the magic of AI as it accurately classifies and describes image contents. AI-generated captions will serve as a crucial element of this platform, empowering users to craft compelling visual narratives that resonate with their audience on a deeper level.

Introduction:

Photographs have always held the power to capture moments, emotions, and stories. With the advent of digital photography and social media, images have become a universal language, transcending cultural barriers and allowing individuals and businesses to communicate and connect visually. However, in a world flooded with images, the challenge lies in standing out and delivering a message effectively.

Image recognition technology, driven by artificial intelligence and machine learning, has emerged as a game-changer in the realm of visual communication. It enables the automatic identification and classification of objects, scenes, and concepts within images, opening up a world of possibilities for photographers, marketers, and content creators. By harnessing the potential of IBM Cloud Visual Recognition, this project aims to create a platform that not only simplifies image recognition but also enriches visual storytelling.

Certainly, here's a detailed project definition for the "Image Recognition" project, presented in a point-wise and easily understandable format:

Project Definition:

1. **Project Overview**

- **Objective**: To create an image recognition system using IBM Cloud Visual Recognition that empowers users to seamlessly upload images, have them accurately classified and described by AI, and utilize AI-generated captions to craft compelling visual narratives.

IMAGE RECOGNITION WITH IBM CLOUD

● **Significance:** In an increasingly visual world, this project bridges the gap between technology and storytelling, enhancing the ability of creators to engage their audience through captivating visuals and narratives.

2. Key Objectives

Image Recognition: Develop an automated system that accurately identifies and categorizes the content within uploaded images, including objects, scenes, concepts, and context. AI-Generated Captions: Integrate natural language generation to automatically generate emotionally resonant and contextually relevant captions for recognized images. User Interface: Design an intuitive and user-friendly interface that simplifies the image upload process and allows users to seamlessly access AI-generated captions.

● **User Engagement:** Implement features that enable users to explore, save, share, and organize their AI-enhanced images and narratives.
● **Technical Implementation:** Set up and integrate IBM Cloud Visual Recognition, optimize image classification models, and create an efficient caption generation pipeline.

3. Design Thinking Process

● **Problem Definition:** The project aims to address the challenge of enhancing visual storytelling through AI-driven image recognition and caption generation.
● **User-Centric** Approach: The design thinking process emphasizes user needs, usability, and engagement throughout the project.
● **Iterative Design**: The design phase includes continuous iteration based on user feedback and usability testing.

4. Technical Implementation

Image Recognition Setup:

● Create IBM Cloud Visual Recognition service instance.
● Obtain API keys and credentials.
● Ensure secure and efficient integration with the system.

User Interface Design:

● Develop wireframes and mockups.
● Implement user guidance and visual cues.
● Prioritize an intuitive, accessible, and aesthetically pleasing design.

Image Classification:

● Choose appropriate pre-trained models.
● Implement image preprocessing for optimal recognition.
● Continuously monitor and optimize model performance metrics.

AI-Generated Captions:

- Select and train language models.
- Implement sentiment analysis and content summarization.
- Ensure context-aware caption generation.

User Engagement Features:

- Enable social media sharing of AI-enhanced images and narratives.
- Create customizable image galleries for users to organize and showcase their work.
- Implement personalized storytelling tools for users to craft compelling narratives.
- Incorporate user interaction analytics to provide insights and improvements.

5. User Engagement and Impact

- Enhanced Storytelling: AI-generated captions add depth and emotion to visual content, enabling creators to convey their message effectively and engage their audience on a profound level.
- Accessibility: The user-friendly interface and intuitive design make advanced AI technology accessible to users of all skill levels, democratizing the creation of impactful visual stories.
- Community Building: Features like social sharing and personalized storytelling foster user interaction, encouraging the growth of a vibrant community of content creators and enthusiasts.
- Art and Technology Fusion: The project embodies the fusion of art and technology, providing a platform where the creative potential of both can be fully realized.

6. Scope and Deliverables

- **Phase 1:** Problem definition, design thinking, and technical setup.
- **Phase 2:** User interface design, image recognition implementation, and initial user engagement features.
- **Phase 3:** Integration of AI-generated captions, advanced user engagement features, and iterative refinement.
- **Deliverables:** A fully functional Image Recognition platform, including documentation, user guides, and a user engagement strategy.

7. Project Risks and Mitigations

Technical Challenges: Regular communication and collaboration among team members and the use of agile development practices to address technical hurdles.

User Adoption: User testing and feedback collection to ensure the platform aligns with user expectations.

Data Security: Implementation of robust security measures to protect user data and maintain compliance with data privacy regulations.

<u>PROJECT DESIGNING AND THINKING</u>

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IMAGE RECOGNITION WITH IBM CLOUD
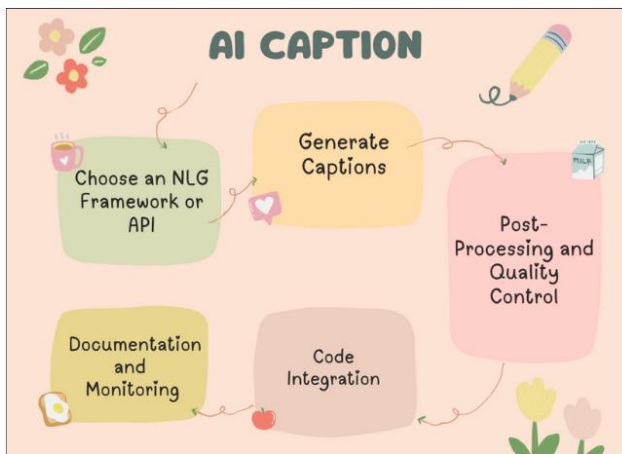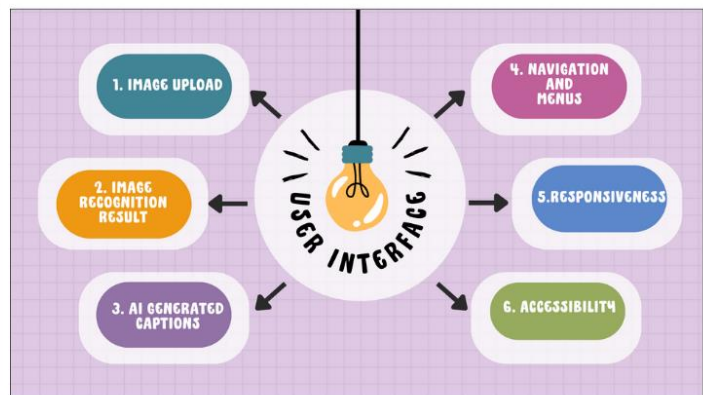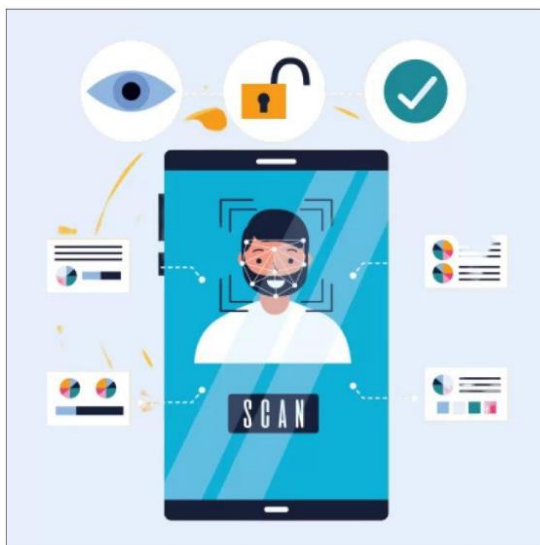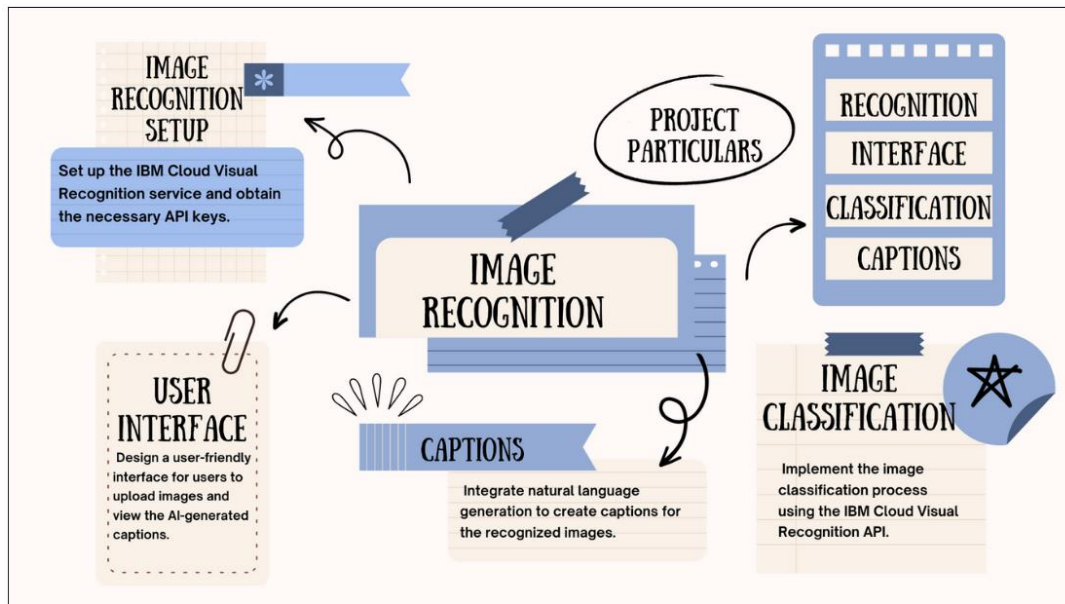
1.Image recognition configuration:

1. **Register for an IBM Cloud account:**
   Sign up for an IBM Cloud account, which serves as a basis for accessing cloud-based services.

2. **Create an instance of the IBM Cloud Image Recognition service:**
   Configure a dedicated instance of the image recognition service, creating a space where image data will be processed.

3. **Get API key and credentials:**
   API keys and secure credentials are provided by IBM Cloud to authenticate and authorize your application to access the Image Recognition service.

4. **Store API keys securely:**
   Secure API keys and credentials to protect against unauthorized access to your services and data.

DATASET:

https://www.kaggle.com/datase ts/msambare/fer2013

https://www.kaggle.com/datase ts/deadskull7/fer2013

https://github.com/microsoft/F ERPlus

https://www.kaggle.com/datase ts/shawon10/ckplus

SUMMARY CODE

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 Code:

DOCKERFILE:

```
FROM node:10-alpine
WORKDIR /usr/src/app
COPY package*.json ./
RUN npm install
RUN npm ci --only=production
COPY . .
EXPOSE 3001
CMD [ "node", "server.js" ]
```
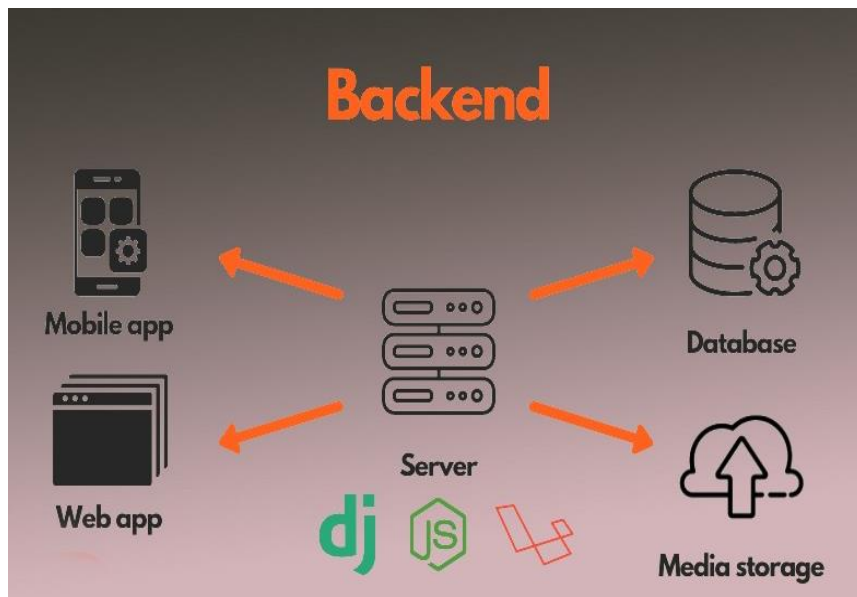

PACKAGE.JSON:

```
{
  "name": "codeengine-image-classification-backend",
  "version": "1.0.0",
  "description": "Backend server for Code Engine Image Classification",
  "main": "server.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "Vidyasagar Machupalli",
  "license": "ISC",
  "dependencies": {
    "cors": "^2.8.5",
```

IMAGE RECOGNITION WITH IBM CLOUD

```
  "dotenv": "^8.2.0",
  "express": "^4.17.1",
  "ibm-cos-sdk": "^1.6.0",
  "multer": "^1.4.2",
  "multer-s3": "^2.9.0"
  }
}
```
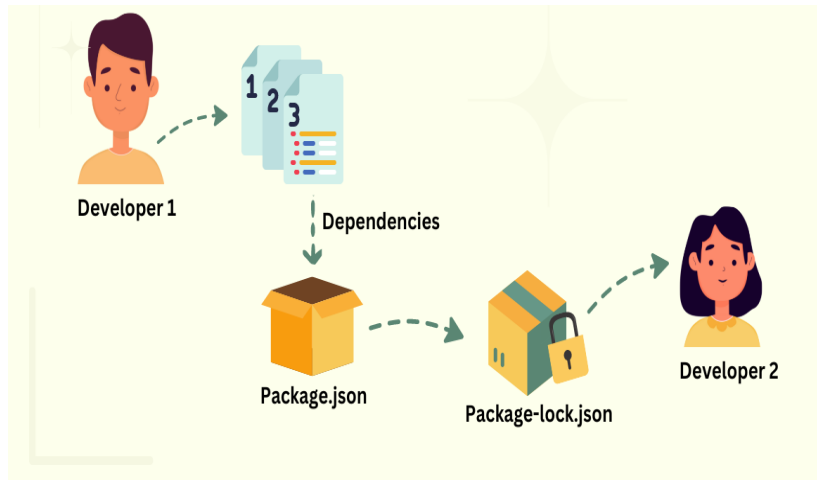

SERVER.JS:

```
"use strict";
const myCOS = require("ibm-cos-sdk");
const multer = require("multer");
const multerS3 = require("multer-s3");
const express = require("express");
const app = express();
const path = require("path");
require("dotenv").config({
  silent: true
});

const cors = require("cors");
app.use(cors());

const port = process.env.PORT || 3001;

function getCosClient() {
  var config = {
    endpoint:
      process.env.COS_ENDPOINT ||
      "s3.us-south.cloud-object-storage.appdomain.cloud",
    apiKeyId: process.env.COS_APIKEY,
```

IMAGE RECOGNITION WITH IBM CLOUD

```
    ibmAuthEndpoint: "https://iam.cloud.ibm.com/identity/token",
    serviceInstanceId: process.env.COS_RESOURCE_INSTANCE_ID,
  };


  var cosClient = new myCOS.S3(config);
  return cosClient;
}

function uploadFilesToCOS(req, res, next) {
  var upload = multer({
    storage: multerS3({
      s3: getCosClient(),
      bucket: process.env.COS_BUCKETNAME + "/images",
      metadata: function (req, file, cb) {
        cb(null, { fieldName: file.fieldname });
      },
      key: function (req, file, cb) {
        cb(null, file.originalname);
      } }),
  }).array("files", 10);

  upload(req, res, function (err) {
    if (err) {
      return next(err);
    }
    if (req.files.length === 0) {
      return res.send("Upload an image...");
    } else if (req.files.length > 1) {
      return res.send(
        "Successfully uploaded " + req.files.length + " images to Object Storage");
    } else {
      return res.send(
        "Successfully uploaded " + req.files.length + " image to Object Storage"};

  } });

}
 async function getBucketContents(req, res, next, prefix) {
  try {
    let cos = getCosClient();
    let bucketName = process.env.COS_BUCKETNAME;
    var resultDict = {};
    var result;
    console.log(`Retrieving bucket contents from: ${bucketName}`);

    const data = await cos
      .listObjects({
```

IMAGE RECOGNITION WITH IBM CLOUD

```
      Bucket: bucketName,
      Prefix: prefix,
    })
    .promise();
   if (data != null && data.Contents != null) {
    for (var i = 0; i < data.Contents.length; i++) {
     var itemKey = data.Contents[i].Key;
     var itemSize = data.Contents[i].Size;
     console.log(`Item: ${itemKey} (${itemSize} bytes).`);
     result = await getItem(bucketName, itemKey, prefix);
     resultDict[itemKey] = result;
    }
    res.send(resultDict);
   }
 } catch (e) {
  console.error(`ERROR: ${e.code} - ${e.message}\n`);
  return next(e.message);
 }
}
 async function getItem(bucketName, itemName, prefix) {
 let cos = getCosClient();
 console.log(`Retrieving item from bucket: ${bucketName}, key: ${itemName}`);
 try {
   const data = await cos
     .getObject({
      Bucket: bucketName,
      Key: itemName,
     })
     .promise();
   if (data != null) {
    if (prefix === "results") {
     return JSON.parse(data.Body);
    } else {
     return Buffer.from(data.Body).toString("base64");
    }}
 } catch (e) {
  console.error(`ERROR: ${e.code} - ${e.message}\n`);
 }}
async function deleteItem(req, res, next, bucketName, itemName, prefix) {
 let cos = getCosClient();
 let bucketname = process.env.COS_BUCKETNAME;
 itemName = prefix + "/" + itemName;
 if (prefix === "results") {
  itemName = itemName + ".json";
 }
 console.log(`Deleting item: ${itemName}`);
 try {
   await cos
```

IMAGE RECOGNITION WITH IBM CLOUD

```
      .deleteObject({
        Bucket: bucketname,
        Key: itemName,
      })
      .promise();
    console.log(`Item: ${itemName} deleted!`);
    res.send(`Item: ${itemName} deleted!`);
  } catch (e) {
    console.error(`ERROR: ${e.code} - ${e.message}\n`);
  }}

 app.get("/", function (req, res, next) {
 res.send("Hello World! from backend");
});

app.get("/items", async (req, res, next) => {
  try {
    var prefix = req.query.prefix;

    await getBucketContents(req, res, next, prefix);
  } catch (error) {

    return next(error);
  }
});

app.post("/images", uploadFilesToCOS, function (req, res, next) {});

app.post("/results", async (req, res, next) => {
  try {
    await getBucketContents(req, res, next, "results");
  } catch (error)
    console.log(error);
    return next(error);
  }
});


app.delete("/item", async (req, res, next) => {
  var itemName = req.query.filename;
  console.log(itemName);
  await deleteItem(req, res, next, null, itemName, "images");
  await deleteItem(req, res, next, null, itemName, "results");
});

app.use((req, res, next) => {
  const error = new Error("Not found");
  error.status = 404;
```

IMAGE RECOGNITION WITH IBM CLOUD

```
 next(error);
});
app.use((error, req, res, next) => {
 console.log(error);
 if (res.headersSent) {
   return next(error);
 }
 res.status(error.status || 500).send({
   error: {
     status: error.status || 500,
     message: error.message || "Internal Server error",
   },
 });
});

app.listen(port, () => console.log(`App listening on port ${port}!`));
```
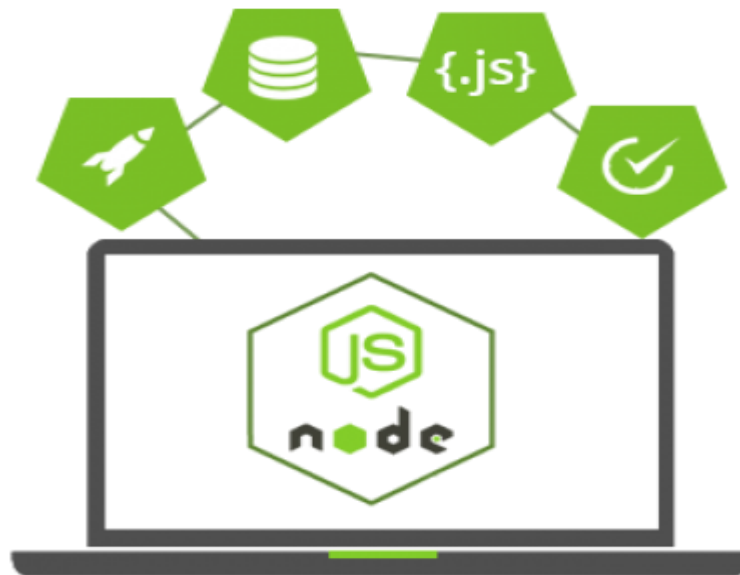

DOCKERFILE:

```
FROM node:10-alpine
WORKDIR /usr/src/app

COPY package*.json ./
RUN npm install
RUN npm ci --only=production
COPY . .
EXPOSE 3000
```

IMAGE RECOGNITION WITH IBM CLOUD

CMD ["node", "app.js"]

APP.JS:

```
"use strict";
const express = require("express");
const app = express();
const request = require("request");
const path = require("path");
require("dotenv").config({
  silent: true
});
const cors = require("cors");
app.use(cors());
app.use(express.static(__dirname + '/public/js'));
app.use(express.static(__dirname + '/public/images'))
app.use(express.static(__dirname + '/public/css'))
const port = process.env.PORT || 3000;

const backendURL = process.env.BACKEND_URL;
console.log("backend URL: " + backendURL);

app.get('/', function(req, res) {
   if (backendURL === undefined || backendURL === ""){
// if user is not logged-in redirect back to login page //
     res.sendFile(__dirname + "/public/501.html");
   }   else{
      res.sendFile(__dirname + "/public/index.html");
   }
});

app.get('/items', async(req, res) => {
 req.pipe(
  await request.get(
    {
     url: backendURL+"/items?prefix=images",
     agentOptions: {
      rejectUnauthorized: false
     }
    },
    function(error, resp, body) {
     if (error) {
      res.status(400).send(error.message);
     }
     else{
     //console.log(body);
     res.send({ data: body });
     }
```

IMAGE RECOGNITION WITH IBM CLOUD

```
        }
      )
    );
  });
app.post("/uploadimage", async(req, res) => {
     req.pipe(
      await request.post(
         {
          url: backendURL+"/images",
          gzip: true,
          agentOptions: {
           rejectUnauthorized: false
          }
         },
        function(error, resp, body) {
         if (error) {
          console.log(error);
          res.status(400).send(error.message);
         }
         else{
         //console.log(body);
         res.send({ data: body });
         }})
     );

  });

app.post("/classifyimage", async(req, res) => {
     req.pipe(
      await request.post(
       {
        url: backendURL+"/results",
        agentOptions: {
         rejectUnauthorized: false
        }
       },
      function(error, resp, body) {
       if (error) {
        console.log(error);
        res.status(400).send(error.message);
       }
       else{
       //console.log(body);
       res.send({ data: body });
       }})
     );
  });
```

IMAGE RECOGNITION WITH IBM CLOUD

```
app.delete("/image", async (req, res) => {
 var itemName = req.query.filename;
 req.pipe(
   await request.delete(
    {
     url: backendURL+"/item?filename="+itemName,
     agentOptions: {
      rejectUnauthorized: false
     }
    },
    function(error, resp, body) {
     if (error) {
      console.log(error);
      res.status(400).send(error.message);
     }
     else{
     //console.log(body);
     res.send({ data: body });
     }}}};

});
app.use(function(error, req, res, next) {
 res.status(500).send(error.message);
});

app.listen(port, () => console.log(`App listening on port ${port}!`));
```
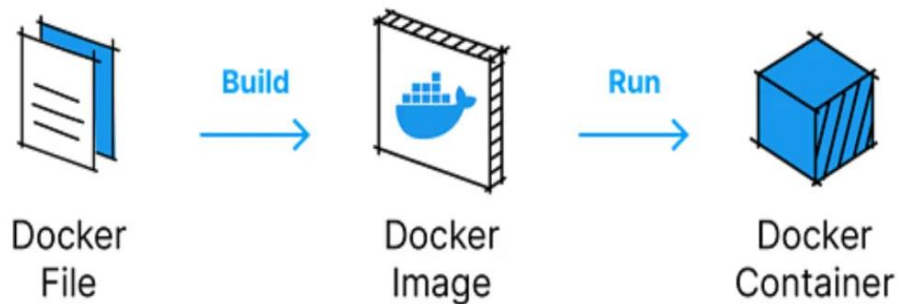

Docker File → Build → Docker Image → Run → Docker Container

CODE (code engine image classification) :

{

IMAGE RECOGNITION WITH IBM CLOUD

```
    "name": "codeengine-image-classification-backend",

   "version": "1.0.0",

  "lockfileVersion": 1,

  "requires": true,

  "dependencies": {

   "accepts": {

     "version": "1.3.7",

     "resolved": "https://registry.npmjs.org/accepts/-/accepts-1.3.7.tgz",

     "integrity": "sha512-
Il80Qs2WjYlJIBNzNkK6KYqlVMTbZLXgHx2oT0pU/fjRHyEp+PEfEPY0R3WCwAGVOtauxh1hOx
NgIf5bv7dQpA==",

      "requires": {

       "mime-types": "~2.1.24",

       "negotiator": "0.6.2"

      }

    },

    "append-field": {

     "version": "1.0.0",

     "resolved": "https://registry.npmjs.org/append-field/-/append-field-1.0.0.tgz",

     "integrity": "sha1-HjRA6RXwsSA9I3SOeO3XubW0PlY="

    },

    "array-flatten": {

     "version": "1.1.1",

     "resolved": "https://registry.npmjs.org/array-flatten/-/array-flatten-1.1.1.tgz",

     "integrity": "sha1-ml9pkFGx5wczKPKgCJaLZOopVdI="

    },

    "asn1.js": {

     "version": "4.10.1",

     "resolved": "https://registry.npmjs.org/asn1.js/-/asn1.js-4.10.1.tgz",

     "integrity": "sha512-
p32cOF5q0Zqs9uBiONKYLm6BClCoBCM5O9JfeUSlnQLBTxYdTK+pW+nXflm8UkKd2UYlEbYz5q
Ei0JuZR9ckSw==",
```

IMAGE RECOGNITION WITH IBM CLOUD

```
    "requires": {

     "bn.js": "^4.0.0",

     "inherits": "^2.0.1",

     "minimalistic-assert": "^1.0.0"

    }

   },

   "base64-js": {

    "version": "1.3.1",

    "resolved": "https://registry.npmjs.org/base64-js/-/base64-js-1.3.1.tgz",

    "integrity": "sha512-
mLQ4i2QO1ytvGWFWmcngKO//JXAQueZvwEKtjgQFM4jIK0kU+ytMfplL8j+n5mspOfjHwoAg+9yh
b7BwAHm36g=="

   },

   "bn.js": {

    "version": "4.11.8",

    "resolved": "https://registry.npmjs.org/bn.js/-/bn.js-4.11.8.tgz",

    "integrity": "sha512-
ItfYfPLkWHUjckQCk8xC+LwxgK8NYcXywGigJgSwOP8Y2iyWT4f2vsZnoOXTTbo+o5yXmIUJ4gn
5538SO5S3gA=="

   },

   "body-parser": {

    "version": "1.19.0",

    "resolved": "https://registry.npmjs.org/body-parser/-/body-parser-1.19.0.tgz",

    "integrity": "sha512-
dhEPs72UPbDnAQJ9ZKMNTP6ptJaionhP5cBb541nXPlW60Jepo9RV/a4fX4XWW9CuFNK22krhrj1+r
gzifNCsw==",

    "requires": {

     "bytes": "3.1.0",

     "content-type": "~1.0.4",

     "debug": "2.6.9",

     "depd": "~1.1.2",

     "http-errors": "1.7.2",

     "iconv-lite": "0.4.24",
```

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IMAGE RECOGNITION WITH IBM CLOUD

```json
      "on-finished": "~2.3.0",

      "qs": "6.7.0",

      "raw-body": "2.4.0",

      "type-is": "~1.6.17"

     }

    },

    "brorand": {

     "version": "1.1.0",

     "resolved": "https://registry.npmjs.org/brorand/-/brorand-1.1.0.tgz",

     "integrity": "sha1-EsJe/kCkXjwyPrhnWgoM5XsiNx8="

    },

    "browserify-aes": {

     "version": "1.2.0",

     "resolved": "https://registry.npmjs.org/browserify-aes/-/browserify-aes-1.2.0.tgz",

     "integrity": "sha512-
+7CHXqGuspUn/Sl5aO7Ea0xWGAtETPXNSAjHo48JfLdPWcMng33Xe4znFvQweqc/uzk5zSOI3H52
CYnjCfb5hA==",

     "requires": {

      "buffer-xor": "^1.0.3",

      "cipher-base": "^1.0.0",

      "create-hash": "^1.1.0",

      "evp_bytestokey": "^1.0.3",

      "inherits": "^2.0.1",

      "safe-buffer": "^5.0.1"

     }

    },

    "browserify-cipher": {

     "version": "1.0.1",

     "resolved": "https://registry.npmjs.org/browserify-cipher/-/browserify-cipher-1.0.1.tgz",

     "integrity": "sha512-
sPhkz0ARKbf4rRQt2hTpAHqn47X3llLkUGn+xEJzLjwY8LRs2p0v7ljvI5EyoRO/mexrNunNECisZs+g
w2zz1w==",
```

```
    "requires": {

     "browserify-aes": "^1.0.4",

     "browserify-des": "^1.0.0",

     "evp_bytestokey": "^1.0.0"

    }

   },

   "browserify-des": {

    "version": "1.0.2",

    "resolved": "https://registry.npmjs.org/browserify-des/-/browserify-des-1.0.2.tgz",

    "integrity": "sha512-
BioO1xf3hFwz4kc6iBhI3ieDFompMhrMlnDFC4/0/vd5MokpuAc3R+LYbwTA9A5Yc9pq9UYPqffKp
W2ObuwX5A==",

    "requires": {

     "cipher-base": "^1.0.1",

     "des.js": "^1.0.0",

     "inherits": "^2.0.1",

     "safe-buffer": "^5.1.2"

    }

   },

   "browserify-rsa": {

    "version": "4.0.1",

    "resolved": "https://registry.npmjs.org/browserify-rsa/-/browserify-rsa-4.0.1.tgz",

    "integrity": "sha1-IeCr+vbyApzy+vsTNWenAdQTVSQ=",

    "requires": {

     "bn.js": "^4.1.0",

     "randombytes": "^2.0.1"

    }

   },

   "browserify-sign": {

    "version": "4.0.4",

    "resolved": "https://registry.npmjs.org/browserify-sign/-/browserify-sign-4.0.4.tgz",
```

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IMAGE RECOGNITION WITH IBM CLOUD

```json
      "integrity": "sha1-qk62jl17ZYuqa/alfmMMvXqT0pg=",
      "requires": {
        "bn.js": "^4.1.1",
        "browserify-rsa": "^4.0.0",
        "create-hash": "^1.1.0",
        "create-hmac": "^1.1.2",
        "elliptic": "^6.0.0",
        "inherits": "^2.0.1",
        "parse-asn1": "^5.0.0"
      }
    },
    "buffer": {
      "version": "4.9.2",
      "resolved": "https://registry.npmjs.org/buffer/-/buffer-4.9.2.tgz",
      "integrity": "sha512-
xq+q3SRMOxGivLhBNaUdC64hDTQwejJ+H0T/NB1XMtTVEwNTrfFF3gAxiyW0Bu/xWEGhjVKgU
cMhCrUy2+uCWg==",
      "requires": {
        "base64-js": "^1.0.2",
        "ieee754": "^1.1.4",
        "isarray": "^1.0.0"
      },
      "dependencies": {
        "isarray": {
          "version": "1.0.0",
          "resolved": "https://registry.npmjs.org/isarray/-/isarray-1.0.0.tgz",
          "integrity": "sha1-u5NdSFgsuhaMBoNJV6VKPgcSTxE="
        }
      }
    },
    "buffer-from": {
```

    "version": "1.1.1",

    "resolved": "https://registry.npmjs.org/buffer-from/-/buffer-from-1.1.1.tgz",

    "integrity": "sha512-
MQcXEUbCKtEo7bhqEs6560Hyd4XaovZlO/k9V3hjVUF/zwW7KBVdSK4gIt/bzwS9MbR5qob+F5jus
Zsb0YQK2A=="

   },

   "buffer-xor": {

    "version": "1.0.3",

    "resolved": "https://registry.npmjs.org/buffer-xor/-/buffer-xor-1.0.3.tgz",

    "integrity": "sha1-JuYe0UIvtw3ULm42cp7VHYVf6Nk="

   },

   "busboy": {

    "version": "0.2.14",

    "resolved": "https://registry.npmjs.org/busboy/-/busboy-0.2.14.tgz",

    "integrity": "sha1-bCpiLvz0fFe7vh4qnDetNseSVFM=",

    "requires": {

     "dicer": "0.2.5",

     "readable-stream": "1.1.x"

    }

   },

   "bytes": {

    "version": "3.1.0",

    "resolved": "https://registry.npmjs.org/bytes/-/bytes-3.1.0.tgz",

    "integrity": "sha512-
zauLjrfCG+xvoyaqLoV8bLVXXNGC4JqlxFCutSDWA6fJrTo2ZuvLYTqZ7aHBLZSMOopbzwv8f+wZ
cVzfVTI2Dg=="

   },

   "cipher-base": {

    "version": "1.0.4",

    "resolved": "https://registry.npmjs.org/cipher-base/-/cipher-base-1.0.4.tgz",

    "integrity": "sha512-
Kkht5ye6ZGmwv40uUDZztayT2ThLQGfnj/T71N/XzeZeo3nf8foyW7zGTsPYkEya3m5f3cAypH+qe7
YOrM1U2Q==",

IMAGE RECOGNITION WITH IBM CLOUD

```
    "requires": {

     "inherits": "^2.0.1",

     "safe-buffer": "^5.0.1"

    }

   },

   "concat-stream": {

    "version": "1.6.2",

    "resolved": "https://registry.npmjs.org/concat-stream/-/concat-stream-1.6.2.tgz",

    "integrity": "sha512-
27HBghJxjiZtIk3Ycvn/4kbJk/1uZuJFfuPEns6LaEvpvG1f0hTea8lilrouyo9mVc2GWdcEZ8OLoGmSAD
lrCw==",

    "requires": {

     "buffer-from": "^1.0.0",

     "inherits": "^2.0.3",

     "readable-stream": "^2.2.2",

     "typedarray": "^0.0.6"

    },

    "dependencies": {

     "isarray": {

      "version": "1.0.0",

      "resolved": "https://registry.npmjs.org/isarray/-/isarray-1.0.0.tgz",

      "integrity": "sha1-u5NdSFgsuhaMBoNJV6VKPgcSTxE="

     },

     "readable-stream": {

      "version": "2.3.7",

      "resolved": "https://registry.npmjs.org/readable-stream/-/readable-stream-2.3.7.tgz",

      "integrity": "sha512-
Ebho8K4jIbHAxnuxi7o42OrZgF/ZTNcsZj6nRKyUmkhLFq8CHItp/fy6hQZuZmP/n3yZ9VBUbp4zz/m
X8hmYPw==",

      "requires": {

       "core-util-is": "~1.0.0",

       "inherits": "~2.0.3",
```

IMAGE RECOGNITION WITH IBM CLOUD

```
          "isarray": "~1.0.0",

          "process-nextick-args": "~2.0.0",

          "safe-buffer": "~5.1.1",

          "string_decoder": "~1.1.1",

          "util-deprecate": "~1.0.1"

        }

      },

     "string_decoder": {

       "version": "1.1.1",

       "resolved": "https://registry.npmjs.org/string_decoder/-/string_decoder-1.1.1.tgz",

       "integrity": "sha512-
n/ShnvDi6FHbbVfviro+WojiFzv+s8MPMHBczVePfUpDJLwoLT0ht1l4YwBCbi8pJAveEEdnkHyPyTP
/mzRfwg==",

        "requires": {

         "safe-buffer": "~5.1.0"

        }

      }

     }

    },

    "content-disposition": {

     "version": "0.5.3",

     "resolved": "https://registry.npmjs.org/content-disposition/-/content-disposition-0.5.3.tgz",

     "integrity": "sha512-
ExO0774ikEObIAEV9kDo50o+79VCUdEB6n6lzKgGwupcVeRlhrj3qGAfwq8G6uBJjkqLrhT0qEYFc
Wng8z1z0g==",

     "requires": {

      "safe-buffer": "5.1.2"

     }

    },

    "content-type": {

     "version": "1.0.4",

     "resolved": "https://registry.npmjs.org/content-type/-/content-type-1.0.4.tgz",
```

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IMAGE RECOGNITION WITH IBM CLOUD

    "integrity": "sha512-
hIP3EEPs8tB9AT1L+NUqtwOAps4mk2Zob89MWXMHjHWg9milF/j4osnnQLXBCBFBk/tvIG/tUc9m
OUJiPBhPXA=="
    },
    "cookie": {
     "version": "0.4.0",
     "resolved": "https://registry.npmjs.org/cookie/-/cookie-0.4.0.tgz",
     "integrity": "sha512-
+Hp8fLp57wnUSt0tY0tHEXh4voZRDnoIrZPqlo3DPiI4y9lwg/jqx+1Om94/W6ZaPDOUbnjOt/99w66zk
+l1Xg=="
    },
    "cookie-signature": {
     "version": "1.0.6",
     "resolved": "https://registry.npmjs.org/cookie-signature/-/cookie-signature-1.0.6.tgz",
     "integrity": "sha1-4wOogrNCzD7oylE6eZmXNNqzriw="
    },
    "core-util-is": {
     "version": "1.0.2",
     "resolved": "https://registry.npmjs.org/core-util-is/-/core-util-is-1.0.2.tgz",
     "integrity": "sha1-tf1UIgqivFq1eqtxQMlAdUUDwac="
    },
    "cors": {
     "version": "2.8.5",
     "resolved": "https://registry.npmjs.org/cors/-/cors-2.8.5.tgz",
     "integrity": "sha512-
KIHbLJqu73RGr/hnbrO9uBeixNGuvSQjul/jdFvS/KFSIH1hWVd1ng7zOHx+YrEfInLG7q4n6GHQ9cDt
xv/P6g==",
     "requires": {
      "object-assign": "^4",
      "vary": "^1"
     }
    },
    "create-ecdh": {

IMAGE RECOGNITION WITH IBM CLOUD

    "version": "4.0.3",

    "resolved": "https://registry.npmjs.org/create-ecdh/-/create-ecdh-4.0.3.tgz",

    "integrity": "sha512-
GbEHQPMOswGpKXM9kCWVrremUcBmjteUaQ01T9rkKCPDXfUHX0IoP9LpHYo2NPFampa4e+/p
FDc3jQdxrxQLaw==",

      "requires": {

       "bn.js": "^4.1.0",

       "elliptic": "^6.0.0"

      }

    },

    "create-hash": {

      "version": "1.2.0",

      "resolved": "https://registry.npmjs.org/create-hash/-/create-hash-1.2.0.tgz",

      "integrity": "sha512-
z00bCGNHDG8mHAkP7CtT1qVu+bFQUPjYq/4Iv3C3kWjTFV10zIjfSoeqXo9Asws8gwSHDGj/hl2u4
OGIjapeCg==",

      "requires": {

       "cipher-base": "^1.0.1",

       "inherits": "^2.0.1",

       "md5.js": "^1.3.4",

       "ripemd160": "^2.0.1",

       "sha.js": "^2.4.0"

      }

    },

    "create-hmac": {

      "version": "1.1.7",

      "resolved": "https://registry.npmjs.org/create-hmac/-/create-hmac-1.1.7.tgz",

      "integrity": "sha512-
MJG9liiZ+ogc4TzUwuvbER1JRdgvUFSB5+VR/g5h82fGaIRWMWddtKBHi7/sVhfjQZ6SehlyhvQYrc
YkaUIpLg==",

      "requires": {

       "cipher-base": "^1.0.3",

       "create-hash": "^1.1.0",

IMAGE RECOGNITION WITH IBM CLOUD

```
        "inherits": "^2.0.1",

        "ripemd160": "^2.0.0",

        "safe-buffer": "^5.0.1",

        "sha.js": "^2.4.8"

      }

    },

    "crypto-browserify": {

     "version": "3.12.0",

     "resolved": "https://registry.npmjs.org/crypto-browserify/-/crypto-browserify-3.12.0.tgz",

     "integrity": "sha512-
fz4spIh+znjO2VjL+IdhEpRJ3YN6sMzITSBijk6FK2UvTqruSQW+/cCZTSNsMiZNvUeq0CqurF+dAby
iGOY6Wg==",

      "requires": {

       "browserify-cipher": "^1.0.0",

       "browserify-sign": "^4.0.0",

       "create-ecdh": "^4.0.0",

       "create-hash": "^1.1.0",

       "create-hmac": "^1.1.0",

       "diffie-hellman": "^5.0.0",

       "inherits": "^2.0.1",

       "pbkdf2": "^3.0.3",

       "public-encrypt": "^4.0.0",

       "randombytes": "^2.0.0",

       "randomfill": "^1.0.3"

      }

    },

    "debug": {

     "version": "2.6.9",

     "resolved": "https://registry.npmjs.org/debug/-/debug-2.6.9.tgz",

     "integrity": "sha512-
bC7ElrdJaJnPbAP+1EotYvqZsb3ecl5wi6Bfi6BJTUcNowp6cvspg0jXznRTKDjm/E7AdgFBVeAPVMN
cKGsHMA==",
```

```
   "requires": {
    "ms": "2.0.0"
    }
  },
  "depd": {
   "version": "1.1.2",
   "resolved": "https://registry.npmjs.org/depd/-/depd-1.1.2.tgz",
   "integrity": "sha1-m81S4UwJd2PnSbJ0xDRu0uVgtak="
  },
  "des.js": {
   "version": "1.0.1",
   "resolved": "https://registry.npmjs.org/des.js/-/des.js-1.0.1.tgz",
   "integrity": "sha512-
Q0I4pfFrv2VPd34/vfLrFOoRmlYj3OV50i7fskps1jZWK1kApMWWT9G6RRUeYedLcBDIhnSDaUvJ
Mb3AhUlaEA==",
    "requires": {
     "inherits": "^2.0.1",
     "minimalistic-assert": "^1.0.0"
    }
  },
  "destroy": {
   "version": "1.0.4",
   "resolved": "https://registry.npmjs.org/destroy/-/destroy-1.0.4.tgz",
   "integrity": "sha1-l4hXRCxEdJ5CBmE+N5RiBYJqvYA="
  },
  "dicer": {
   "version": "0.2.5",
   "resolved": "https://registry.npmjs.org/dicer/-/dicer-0.2.5.tgz",
   "integrity": "sha1-WZbAhrszIYyBLAkL3cCc0S+stw8=",
   "requires": {
     "readable-stream": "1.1.x",
```

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IMAGE RECOGNITION WITH IBM CLOUD

```
      "streamsearch": "0.1.2"

     }

   },

   "diffie-hellman": {

     "version": "5.0.3",

     "resolved": "https://registry.npmjs.org/diffie-hellman/-/diffie-hellman-5.0.3.tgz",

     "integrity": "sha512-
kqag/Nl+f3GwyK25fhUMYj81BUOrZ9IuJsjIcDE5icNM9FJHAVm3VcUDxdLPoQtTuUylWm6ZIknYJ
wwaPxsUzg==",

       "requires": {

         "bn.js": "^4.1.0",

         "miller-rabin": "^4.0.0",

         "randombytes": "^2.0.0"

       }

   },

   "dotenv": {

     "version": "8.2.0",

     "resolved": "https://registry.npmjs.org/dotenv/-/dotenv-8.2.0.tgz",

     "integrity": "sha512-
8sJ78ElpbDJBHNeBzUbUVLsqKdccaa/BXF1uPTw3GrvQTBgrQrtObr2mUrE38vzYd8cEv+m/JBfDLi
oYcfXoaw=="

   },

   "ee-first": {

     "version": "1.1.1",

     "resolved": "https://registry.npmjs.org/ee-first/-/ee-first-1.1.1.tgz",

     "integrity": "sha1-WQxhFWsK4vTwJVcyoViyZrxWsh0="

   },

   "elliptic": {

     "version": "6.5.2",

     "resolved": "https://registry.npmjs.org/elliptic/-/elliptic-6.5.2.tgz",

     "integrity": "sha512-
f4x70okzZbIQl/NSRLkI/+tteV/9WqL98zx+SQ69KbXxmVrmjwsNUPn/gYJJ0sHvEak24cZgHIPegReP
AtA/xw==",
```

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IMAGE RECOGNITION WITH IBM CLOUD

```
      "requires": {

        "bn.js": "^4.4.0",

        "brorand": "^1.0.1",

        "hash.js": "^1.0.0",

        "hmac-drbg": "^1.0.0",

        "inherits": "^2.0.1",

        "minimalistic-assert": "^1.0.0",

        "minimalistic-crypto-utils": "^1.0.0"

      }

    },

    "encodeurl": {

      "version": "1.0.2",

      "resolved": "https://registry.npmjs.org/encodeurl/-/encodeurl-1.0.2.tgz",

      "integrity": "sha1-rT/0yG7C0CkyL1oCw6mmBslbP1k="

    },

    "escape-html": {

      "version": "1.0.3",

      "resolved": "https://registry.npmjs.org/escape-html/-/escape-html-1.0.3.tgz",

      "integrity": "sha1-Aljq5NPQwJdN4cFpGI7wBR0dGYg="

    },

    "etag": {

      "version": "1.8.1",

      "resolved": "https://registry.npmjs.org/etag/-/etag-1.8.1.tgz",

      "integrity": "sha1-Qa4u62XvpiJorr/qg6x9eSmbCIc="

    },

    "evp_bytestokey": {

      "version": "1.0.3",

      "resolved": "https://registry.npmjs.org/evp_bytestokey/-/evp_bytestokey-1.0.3.tgz",

      "integrity": "sha512-
/f2Go4TognH/KvCISP7OUsHn85hT9nUkxxA9BEWxFn+Oj9o8ZNLm/40hdlgSLyuOimsrTKLUMEor
Qexp/aPQeA==",
```

IMAGE RECOGNITION WITH IBM CLOUD

```
      "requires": {

        "md5.js": "^1.3.4",

        "safe-buffer": "^5.1.1"

      }

    },

    "express": {

      "version": "4.17.1",

      "resolved": "https://registry.npmjs.org/express/-/express-4.17.1.tgz",

      "integrity": "sha512-
mHJ9O79RqluphRrcw2X/GTh3k9tVv8YcoyY4Kkh4WDMUYKRZUq0h1o0w2rrrxBqM7VoeUVqgb2
7xlEMXTnYt4g==",

      "requires": {

        "accepts": "~1.3.7",

        "array-flatten": "1.1.1",

        "body-parser": "1.19.0",

        "content-disposition": "0.5.3",

        "content-type": "~1.0.4",

        "cookie": "0.4.0",

        "cookie-signature": "1.0.6",

        "debug": "2.6.9",

        "depd": "~1.1.2",

        "encodeurl": "~1.0.2",

        "escape-html": "~1.0.3",

        "etag": "~1.8.1",

        "finalhandler": "~1.1.2",

        "fresh": "0.5.2",

        "merge-descriptors": "1.0.1",

        "methods": "~1.1.2",

        "on-finished": "~2.3.0",

        "parseurl": "~1.3.3",

        "path-to-regexp": "0.1.7",
```

```
      "proxy-addr": "~2.0.5",

      "qs": "6.7.0",

      "range-parser": "~1.2.1",

      "safe-buffer": "5.1.2",

      "send": "0.17.1",

      "serve-static": "1.14.1",

      "setprototypeof": "1.1.1",

      "statuses": "~1.5.0",

      "type-is": "~1.6.18",

      "utils-merge": "1.0.1",

      "vary": "~1.1.2"

     }

    },

   "file-type": {

    "version": "3.9.0",

    "resolved": "https://registry.npmjs.org/file-type/-/file-type-3.9.0.tgz",

    "integrity": "sha1-JXoHg4TR24CHvESdEH1SpSZyuek="

   },

   "finalhandler": {

    "version": "1.1.2",

    "resolved": "https://registry.npmjs.org/finalhandler/-/finalhandler-1.1.2.tgz",

    "integrity": "sha512-
aAWcW57uxVNrQZqFXjlTpW3sIUQmHGG3qSb9mUah9MgMC4NeWhNOlNjXEYq3HjRAvL6arUv
iZGGJsBg6z0zsWA==",

      "requires": {

      "debug": "2.6.9",

      "encodeurl": "~1.0.2",

      "escape-html": "~1.0.3",

      "on-finished": "~2.3.0",

      "parseurl": "~1.3.3",

      "statuses": "~1.5.0",
```

IMAGE RECOGNITION WITH IBM CLOUD

```
      "unpipe": "~1.0.0"

     }

    },

    "forwarded": {

     "version": "0.1.2",

     "resolved": "https://registry.npmjs.org/forwarded/-/forwarded-0.1.2.tgz",

     "integrity": "sha1-mMI9qxF1ZXuMBXPozszZGw/xjIQ="

    },

    "fresh": {

     "version": "0.5.2",

     "resolved": "https://registry.npmjs.org/fresh/-/fresh-0.5.2.tgz",

     "integrity": "sha1-PYyt2Q2XZWn6g1qx+OSyOhBWBac="

    },

    "hash-base": {

     "version": "3.0.4",

     "resolved": "https://registry.npmjs.org/hash-base/-/hash-base-3.0.4.tgz",

     "integrity": "sha1-X8hoaEfs1zSZQDMZprCj8/auSRg=",

     "requires": {

      "inherits": "^2.0.1",

      "safe-buffer": "^5.0.1"

     }

    },

    "hash.js": {

     "version": "1.1.7",

     "resolved": "https://registry.npmjs.org/hash.js/-/hash.js-1.1.7.tgz",

     "integrity": "sha512-
taOaskGt4z4SOANNseOviYDvjEJinIkRgmp7LbKP2YTTmVxWBl87s/uzK9r+44BclBSp2X7K1hqeNfz
9JbBeXA==",

     "requires": {

      "inherits": "^2.0.3",

      "minimalistic-assert": "^1.0.1"
```

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```
      }
    },
    "hmac-drbg": {
      "version": "1.0.1",
      "resolved": "https://registry.npmjs.org/hmac-drbg/-/hmac-drbg-1.0.1.tgz",
      "integrity": "sha1-0nRXAQJabHdabFRXk+1QL8DGSaE=",
      "requires": {
        "hash.js": "^1.0.3",
        "minimalistic-assert": "^1.0.0",
        "minimalistic-crypto-utils": "^1.0.1"
      }
    },
    "html-comment-regex": {
      "version": "1.1.2",
      "resolved": "https://registry.npmjs.org/html-comment-regex/-/html-comment-regex-1.1.2.tgz",
      "integrity": "sha512-
P+M65QY2JQ5Y0G9KKdlDpo0zK+/OHptU5AaBwUfAIDJZk1MYf32Frm84EcOytfJE0t5JvkAnKlmjs
XDnWzCJmQ=="
    },
    "http-errors": {
      "version": "1.7.2",
      "resolved": "https://registry.npmjs.org/http-errors/-/http-errors-1.7.2.tgz",
      "integrity": "sha512-
uUQBt3H/cSIVfch6i1EuPNy/YsRSOUBXTVfZ+yR7Zjez3qjBz6i9+i4zjNaoqcoFVI4lQJ5plg63TvGfRS
DCRg==",
      "requires": {
        "depd": "~1.1.2",
        "inherits": "2.0.3",
        "setprototypeof": "1.1.1",
        "statuses": ">= 1.5.0 < 2",
        "toidentifier": "1.0.0"
      },
```

IMAGE RECOGNITION WITH IBM CLOUD

```
    "dependencies": {
     "inherits": {
       "version": "2.0.3",
       "resolved": "https://registry.npmjs.org/inherits/-/inherits-2.0.3.tgz",
       "integrity": "sha1-Yzwsg+PaQqUC9SRmAiSA9CCCYd4="
     }
    }
   },
   "ibm-cos-sdk": {
    "version": "1.6.0",
    "resolved": "https://registry.npmjs.org/ibm-cos-sdk/-/ibm-cos-sdk-1.6.0.tgz",
    "integrity": "sha512-
uOJAj9ErjrIt5mb1tvUErDaOKV7n5s/og/m6Kku2tXfOYYg5Ru2bU32UMBDy554scUBNbNu+4/PjEny
LfNzEPQ==",
    "requires": {
      "buffer": "^4.9.1",
      "crypto-browserify": "^3.12.0",
      "jmespath": "^0.15.0",
      "lodash": "^4.17.15",
      "url": "^0.10.3",
      "uuid": "^3.3.2",
      "xml2js": "^0.4.19",
      "xmlbuilder": "^10.1.1"
    }
   },
   "iconv-lite": {
    "version": "0.4.24",
    "resolved": "https://registry.npmjs.org/iconv-lite/-/iconv-lite-0.4.24.tgz",
    "integrity": "sha512-
v3MXnZAcvnywkTUEZomIActle7RXXeedOR31wwl7VlyoXO4Qi9arvSenNQWne1TcRwhCL1HwLI2
1bEqdpj8/rA==",
    "requires": {
```

```
      "safer-buffer": ">= 2.1.2 < 3"

     }

    },

   "ieee754": {

    "version": "1.1.13",

    "resolved": "https://registry.npmjs.org/ieee754/-/ieee754-1.1.13.tgz",

    "integrity": "sha512-
4vf7I2LYV/HaWerSo3XmlMkp5eZ83i+/CDluXi/IGTs/O1sejBNhTtnxzmRZfvOUqj7lZjqHkeTvpgSFD
lWZTg=="

    },

   "inherits": {

    "version": "2.0.4",

    "resolved": "https://registry.npmjs.org/inherits/-/inherits-2.0.4.tgz",

    "integrity": "sha512-
k/vGaX4/Yla3WzyMCvTQOXYeIHvqOKtnqBduzTHpzpQZzAskKMhZ2K+EnBiSM9zGSoIFeMpXKx
a4dYeZIQqewQ=="

    },

   "ipaddr.js": {

    "version": "1.9.1",

    "resolved": "https://registry.npmjs.org/ipaddr.js/-/ipaddr.js-1.9.1.tgz",

    "integrity": "sha512-
0KI/607xoxSToH7GjN1FfSbLoU0+btTicjsQSWQlh/hZykN8KpmMf7uYwPW3R+akZ6R/w18ZlXSHB
YXiYUPO3g=="

    },

   "is-svg": {

    "version": "2.1.0",

    "resolved": "https://registry.npmjs.org/is-svg/-/is-svg-2.1.0.tgz",

    "integrity": "sha1-z2EJDaDZ77yrhyLeum8DIgjbsOk=",

    "requires": {

     "html-comment-regex": "^1.1.0"

    }

    },

   "isarray": {
```

IMAGE RECOGNITION WITH IBM CLOUD

   "version": "0.0.1",

   "resolved": "https://registry.npmjs.org/isarray/-/isarray-0.0.1.tgz",

   "integrity": "sha1-ihis/Kmo9Bd+Cav8YDiTmwXR7t8="

  },

  "jmespath": {

   "version": "0.15.0",

   "resolved": "https://registry.npmjs.org/jmespath/-/jmespath-0.15.0.tgz",

   "integrity": "sha1-o/Iiqarp+Wb10nx5ZRDigJF2Qhc="

  },

  "lodash": {

   "version": "4.17.15",

   "resolved": "https://registry.npmjs.org/lodash/-/lodash-4.17.15.tgz",

   "integrity": "sha512-
8xOcRHvCjnocdS5cpwXQXVzmmh5e5+saE2QGoeQmbKmRS6J3VQppPOIt0MnmE+4xlZoumy0GP
G0D0MVIQbNA1A=="

  },

  "md5.js": {

   "version": "1.3.5",

   "resolved": "https://registry.npmjs.org/md5.js/-/md5.js-1.3.5.tgz",

   "integrity": "sha512-
xitP+WxNPcTTOgnTJcrhM0xvdPepipPSf3I8EIpGKeFLjt3PlJLIDG3u8EX53ZIubkb+5U2+3rELYpEh
Hhzdkg==",

   "requires": {

    "hash-base": "^3.0.0",

    "inherits": "^2.0.1",

    "safe-buffer": "^5.1.2"

   }

  },

  "media-typer": {

   "version": "0.3.0",

   "resolved": "https://registry.npmjs.org/media-typer/-/media-typer-0.3.0.tgz",

   "integrity": "sha1-hxDXrwqmJvj/+hzgAWhUUmMlV0g="

    },

    "merge-descriptors": {

     "version": "1.0.1",

     "resolved": "https://registry.npmjs.org/merge-descriptors/-/merge-descriptors-1.0.1.tgz",

     "integrity": "sha1-sAqqVW3YtEVoFQ7J0blT8/kMu2E="

    },

    "methods": {

     "version": "1.1.2",

     "resolved": "https://registry.npmjs.org/methods/-/methods-1.1.2.tgz",

     "integrity": "sha1-VSmk1nZUE07cxSZmVoNbD4Ua/O4="

    },

    "miller-rabin": {

     "version": "4.0.1",

     "resolved": "https://registry.npmjs.org/miller-rabin/-/miller-rabin-4.0.1.tgz",

     "integrity": "sha512-
115fLhvZVqWwHPbClyntxEVfVDfl9DLLTuJvq3g2O/Oxi8AiNouAHvDSzHS0viUJc+V5vm3eq91Xw
qn9dp4jRA==",

     "requires": {

      "bn.js": "^4.0.0",

      "brorand": "^1.0.1"

     }

    },

    "mime": {

     "version": "1.6.0",

     "resolved": "https://registry.npmjs.org/mime/-/mime-1.6.0.tgz",

     "integrity": "sha512-
x0Vn8spI+wuJ1O6S7gnbaQg8Pxh4NNHb7KSINmEWKiPE4RKOplvijn+NkmYmmRgP68mc70j2Ebe
TFRsrswaQeg=="

    },

    "mime-db": {

     "version": "1.43.0",

     "resolved": "https://registry.npmjs.org/mime-db/-/mime-db-1.43.0.tgz",

40

    "integrity": "sha512-
+5dsGEEovYbT8UY9yD7eE4XTc4UwJ1jBYlgaQQF38ENsKR3wj/8q8RFZrF9WIZpB2V1ArTVFUva
8sAul1NzRzQ=="

  },

  "mime-types": {

   "version": "2.1.26",

   "resolved": "https://registry.npmjs.org/mime-types/-/mime-types-2.1.26.tgz",

   "integrity": "sha512-
01paPWYgLrkqAyrlDorC1uDwl2p3qZT7yl806vW7DvDoxwXi46jsjFbg+WdwotBIk6/MbEhO/dh5aZ5s
Nj/dWQ==",

   "requires": {

    "mime-db": "1.43.0"

   }

  },

  "minimalistic-assert": {

   "version": "1.0.1",

   "resolved": "https://registry.npmjs.org/minimalistic-assert/-/minimalistic-assert-1.0.1.tgz",

   "integrity": "sha512-
UtJcAD4yEaGtjPezWuO9wC4nwUnVH/8/Im3yEHQP4b67cXlD/Qr9hdITCU1xDbSEXg2XKNaP8jsRe
V7vQd00/A=="

  },

  "minimalistic-crypto-utils": {

   "version": "1.0.1",

   "resolved": "https://registry.npmjs.org/minimalistic-crypto-utils/-/minimalistic-crypto-utils-
1.0.1.tgz",

   "integrity": "sha1-9sAMHAsIIkblxNmd+4x8CDsrWCo="

  },

  "minimist": {

   "version": "1.2.5",

   "resolved": "https://registry.npmjs.org/minimist/-/minimist-1.2.5.tgz",

   "integrity": "sha512-
FM9nNUYrRBAELZQT3xeZQ7fmMOBg6nWNmJKTcgsJeaLstP/UODVpGsr5OhXhhXg6f+qtJ8uiZ+
PUxkDWcgIXLw=="

  },

IMAGE RECOGNITION WITH IBM CLOUD

```
    "mkdirp": {

      "version": "0.5.4",

      "resolved": "https://registry.npmjs.org/mkdirp/-/mkdirp-0.5.4.tgz",

      "integrity": "sha512-
iG9AK/dJLtJ0XNgTuDbSyNS3zECqDlAhnQW4CsNxBG3LQJBbHmRX1egw39DmtOdCAqY+dKXV
+sgPgilNWUKMVw==",

      "requires": {

        "minimist": "^1.2.5"

      }

    },

    "ms": {

      "version": "2.0.0",

      "resolved": "https://registry.npmjs.org/ms/-/ms-2.0.0.tgz",

      "integrity": "sha1-VgiurfwAvmwpAd9fmGF4jeDVl8g="

    },

    "multer": {

      "version": "1.4.2",

      "resolved": "https://registry.npmjs.org/multer/-/multer-1.4.2.tgz",

      "integrity": "sha512-
xY8pX7V+ybyUpbYMxtjM9KAiD9ixtg5/JkeKUTD6xilfDv0vzzOFcCp4Ljb1UU3tSOM3VTZtKo63O
mzOrGi3Cg==",

      "requires": {

        "append-field": "^1.0.0",

        "busboy": "^0.2.11",

        "concat-stream": "^1.5.2",

        "mkdirp": "^0.5.1",

        "object-assign": "^4.1.1",

        "on-finished": "^2.3.0",

        "type-is": "^1.6.4",

        "xtend": "^4.0.0"

      }

    },
```

IMAGE RECOGNITION WITH IBM CLOUD

```
    "multer-s3": {

      "version": "2.9.0",

      "resolved": "https://registry.npmjs.org/multer-s3/-/multer-s3-2.9.0.tgz",

      "integrity": "sha512-
qLF8pCD5HhXLLd954q49B63x3bk6Fe0jqD3eM0FVcGtqhiSVuTrchEDAo0mnO5pc34cMuX/CVCCb
PkGTjX2xUA==",

      "requires": {

        "file-type": "^3.3.0",

        "is-svg": "^2.1.0",

        "run-parallel": "^1.1.6"

      }

    },

    "negotiator": {

      "version": "0.6.2",

      "resolved": "https://registry.npmjs.org/negotiator/-/negotiator-0.6.2.tgz",

      "integrity": "sha512-
hZXc7K2e+PgeI1eDBe/10Ard4ekbfrrqG8Ep+8Jmf4JID2bNg7NvCPOZN+kfF574pFQI7mum2AUqDid
oKqcTOw=="

    },

    "object-assign": {

      "version": "4.1.1",

      "resolved": "https://registry.npmjs.org/object-assign/-/object-assign-4.1.1.tgz",

      "integrity": "sha1-IQmtx5ZYh8/AXLvUQsrIv7s2CGM="

    },

    "on-finished": {

      "version": "2.3.0",

      "resolved": "https://registry.npmjs.org/on-finished/-/on-finished-2.3.0.tgz",

      "integrity": "sha1-IPEzZIGwg811M3mSoWlxqi2QaUc=",

      "requires": {

        "ee-first": "1.1.1"

      }

    },
```

IMAGE RECOGNITION WITH IBM CLOUD

```
  "parse-asn1": {
   "version": "5.1.5",
   "resolved": "https://registry.npmjs.org/parse-asn1/-/parse-asn1-5.1.5.tgz",
   "integrity": "sha512-
jkMYn1dcJqF6d5CpU689bq7w/b5ALS9ROVSpQDPrZsqqesUJii9qutvoT5ltGedNXMO2e16YUWIghG
9KxaViTQ==",
    "requires": {
     "asn1.js": "^4.0.0",
     "browserify-aes": "^1.0.0",
     "create-hash": "^1.1.0",
     "evp_bytestokey": "^1.0.0",
     "pbkdf2": "^3.0.3",
     "safe-buffer": "^5.1.1"
    }
   },
   "parseurl": {
    "version": "1.3.3",
    "resolved": "https://registry.npmjs.org/parseurl/-/parseurl-1.3.3.tgz",
    "integrity": "sha512-
CiyeOxFT/JZyN5m0z9PfXw4SCBJ6Sygz1Dpl0wqjlhDEGGBP1GnsUVEL0p63hoG1fcj3fHynXi9NYO
4nWOL+qQ=="
   },
   "path-to-regexp": {
    "version": "0.1.7",
    "resolved": "https://registry.npmjs.org/path-to-regexp/-/path-to-regexp-0.1.7.tgz",
    "integrity": "sha1-32BBeABfUi8V60SQ5yR6G/qmf4w="
   },
   "pbkdf2": {
    "version": "3.0.17",
    "resolved": "https://registry.npmjs.org/pbkdf2/-/pbkdf2-3.0.17.tgz",
    "integrity": "sha512-
U/il5MsrZp7mGg3mSQfn742na2T+1/vHDCG5/iTI3X9MKUuYUZVLQhyRsg06mCgDBTd57TxzgZt7
P+fYfjRLtA==",
```

IMAGE RECOGNITION WITH IBM CLOUD

      "requires": {

       "create-hash": "^1.1.2",

       "create-hmac": "^1.1.4",

       "ripemd160": "^2.0.1",

       "safe-buffer": "^5.0.1",

       "sha.js": "^2.4.8"

      }

     },

     "process-nextick-args": {

      "version": "2.0.1",

      "resolved": "https://registry.npmjs.org/process-nextick-args/-/process-nextick-args-2.0.1.tgz",

      "integrity": "sha512-
3ouUOpQhtgrbOa17J7+uxOTpITYWaGP7/AhoR3+A+/1e9skrzelGi/dXzEYyvbxubEF6Wn2ypscTKiKJ
FFn1ag=="

     },

     "proxy-addr": {

      "version": "2.0.6",

      "resolved": "https://registry.npmjs.org/proxy-addr/-/proxy-addr-2.0.6.tgz",

      "integrity": "sha512-
dh/frvCBVmSsDYzw6n926jv974gddhkFPfiN8hPOi30Wax25QZyZEGveluCgliBnqmuM+UJmBErbAU
FIoDbjOw==",

      "requires": {

       "forwarded": "~0.1.2",

       "ipaddr.js": "1.9.1"

      }

     },

     "public-encrypt": {

      "version": "4.0.3",

      "resolved": "https://registry.npmjs.org/public-encrypt/-/public-encrypt-4.0.3.tgz",

      "integrity": "sha512-
zVpa8oKZSz5bTMTFClc1fQOnyyEzpl5ozpi1B5YcvBrdohMjH2rfsBtyXcuNuwjsDIXmBYlF2N5FlJY
hR29t8Q==",

      "requires": {

```
      "bn.js": "^4.1.0",

      "browserify-rsa": "^4.0.0",

      "create-hash": "^1.1.0",

      "parse-asn1": "^5.0.0",

      "randombytes": "^2.0.1",

      "safe-buffer": "^5.1.2"

     }

    },

   "punycode": {

    "version": "1.3.2",

    "resolved": "https://registry.npmjs.org/punycode/-/punycode-1.3.2.tgz",

    "integrity": "sha1-llOgNvt8HuQjQvIyXM7v6jkmxI0="

   },

   "qs": {

    "version": "6.7.0",

    "resolved": "https://registry.npmjs.org/qs/-/qs-6.7.0.tgz",

    "integrity": "sha512-
VCdBRNFTX1fyE7Nb6FYoURo/SPe62QCaAyzJvUjwRaIsc+NePBEniHlvxFmmX56+HZphIGtV0Xe
CirBtpDrTyQ=="

   },

   "querystring": {

    "version": "0.2.0",

    "resolved": "https://registry.npmjs.org/querystring/-/querystring-0.2.0.tgz",

    "integrity": "sha1-sgmEkgO7Jd+CDadW50cAWHhSFiA="

   },

   "randombytes": {

    "version": "2.1.0",

    "resolved": "https://registry.npmjs.org/randombytes/-/randombytes-2.1.0.tgz",

    "integrity": "sha512-
vYl3iOX+4CKUWuxGi9Ukhie6fsqXqS9FE2Zaic4tNFD2N2QQaXOMFbuKK4QmDHC0JO6B1Zp41J
0LpT0oR68amQ==",

    "requires": {
```

IMAGE RECOGNITION WITH IBM CLOUD

```
      "safe-buffer": "^5.1.0"
     }
    },
    "randomfill": {
     "version": "1.0.4",
     "resolved": "https://registry.npmjs.org/randomfill/-/randomfill-1.0.4.tgz",
     "integrity": "sha512-
87lcbR8+MhcWcUiQ+9e+Rwx8MyR2P7qnt15ynUlbm3TU/fjbgz4GsvfSUDTemtCCtVCqb4ZcEFlyPN
Th9bBTLw==",
     "requires": {
      "randombytes": "^2.0.5",
      "safe-buffer": "^5.1.0"
     }
    },
    "range-parser": {
     "version": "1.2.1",
     "resolved": "https://registry.npmjs.org/range-parser/-/range-parser-1.2.1.tgz",
     "integrity": "sha512-
Hrgsx+orqoygnmhFbKaHE6c296J+HTAQXoxEF6gNupROmmGJRoyzfG3ccAveqCBrwr/2yxQ5BVd/
GTl5agOwSg=="
    },
    "raw-body": {
     "version": "2.4.0",
     "resolved": "https://registry.npmjs.org/raw-body/-/raw-body-2.4.0.tgz",
     "integrity": "sha512-
4Oz8DUIwdvoa5qMJelxipzi/iJIi40O5cGV1wNYp5hvZP8ZN0T+jiNkL0QepXs+EsQ9XJ8ipEDoiH70y
SUJP3Q==",
     "requires": {
      "bytes": "3.1.0",
      "http-errors": "1.7.2",
      "iconv-lite": "0.4.24",
      "unpipe": "1.0.0"
     }
```

IMAGE RECOGNITION WITH IBM CLOUD

    },

    "readable-stream": {

     "version": "1.1.14",

     "resolved": "https://registry.npmjs.org/readable-stream/-/readable-stream-1.1.14.tgz",

     "integrity": "sha1-fPTFTvZI44EwhMY23SB54WbAgdk=",

     "requires": {

      "core-util-is": "~1.0.0",

      "inherits": "~2.0.1",

      "isarray": "0.0.1",

      "string_decoder": "~0.10.x"

     }

    },

    "ripemd160": {

     "version": "2.0.2",

     "resolved": "https://registry.npmjs.org/ripemd160/-/ripemd160-2.0.2.tgz",

     "integrity": "sha512-
ii4iagi25WusVoiC4B4lq7pbXfAp3D9v5CwfkY33vffw2+pkDjY1D8GaN7spsxvCSx8dkPqOZCEZyfxc
mJG2IA==",

     "requires": {

      "hash-base": "^3.0.0",

      "inherits": "^2.0.1"

     }

    },

    "run-parallel": {

     "version": "1.1.9",

     "resolved": "https://registry.npmjs.org/run-parallel/-/run-parallel-1.1.9.tgz",

     "integrity": "sha512-
DEqnSRTDw/Tc3FXf49zedI638Z9onwUotBMiUFKmrO2sdFKIbXamXGQ3Axd4qgphxKB4kw/qP1w
5kTxnfU1B9Q=="

    },

    "safe-buffer": {

     "version": "5.1.2",

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      "resolved": "https://registry.npmjs.org/safe-buffer/-/safe-buffer-5.1.2.tgz",

      "integrity": "sha512-
Gd2UZBJDkXlY7GbJxfsE8/nvKkUEU1G38c1siN6QP6a9PT9MmHB8GnpscSmMJSoF8LOIrt8ud/wPt
ojys4G6+g=="

    },

    "safer-buffer": {

      "version": "2.1.2",

      "resolved": "https://registry.npmjs.org/safer-buffer/-/safer-buffer-2.1.2.tgz",

      "integrity": "sha512-
YZo3K82SD7Riyi0E1EQPojLz7kpepnSQI9IyPbHHg1XXXevb5dJI7tpyN2ADxGcQbHG7vcyRHk0cb
wqcQriUtg=="

    },

    "sax": {

      "version": "1.2.4",

      "resolved": "https://registry.npmjs.org/sax/-/sax-1.2.4.tgz",

      "integrity": "sha512-
NqVDv9TpANUjFm0N8uM5GxL36UgKi9/atZw+x7YFnQ8ckwFGKrl4xX4yWtrey3UJm5nP1kUbnYg
LopqWNSRhWw=="

    },

    "send": {

      "version": "0.17.1",

      "resolved": "https://registry.npmjs.org/send/-/send-0.17.1.tgz",

      "integrity": "sha512-
BsVKsiGcQMFwT8UxypobUKyv7irCNRHk1T0G680vk88yf6LBByGcZJOTJCrTP2xVN6yI+XjPJcNu
E3V4fT9sAg==",

      "requires": {

        "debug": "2.6.9",

        "depd": "~1.1.2",

        "destroy": "~1.0.4",

        "encodeurl": "~1.0.2",

        "escape-html": "~1.0.3",

        "etag": "~1.8.1",

        "fresh": "0.5.2",

IMAGE RECOGNITION WITH IBM CLOUD

          "http-errors": "~1.7.2",

          "mime": "1.6.0",

          "ms": "2.1.1",

          "on-finished": "~2.3.0",

          "range-parser": "~1.2.1",

          "statuses": "~1.5.0"

        },

        "dependencies": {

          "ms": {

            "version": "2.1.1",

            "resolved": "https://registry.npmjs.org/ms/-/ms-2.1.1.tgz",

            "integrity": "sha512-
tgp+dl5cGk28utYktBsrFqA7HKgrhgPsg6Z/EfhWI4gl1Hwq8B/GmY/0oXZ6nF8hDVesS/FpnYaD/kOW
hYQvyg=="

          }

        }

      },

      "serve-static": {

        "version": "1.14.1",

        "resolved": "https://registry.npmjs.org/serve-static/-/serve-static-1.14.1.tgz",

        "integrity": "sha512-
JMrvUwE54emCYWlTI+hGrGv5I8dEwmco/00EvkzIIsR7MqrHonbD9pO2MOfFnpFntl7ecpZs+3mW+
XbQZu9QCg==",

        "requires": {

          "encodeurl": "~1.0.2",

          "escape-html": "~1.0.3",

          "parseurl": "~1.3.3",

          "send": "0.17.1"

        }

      },

      "setprototypeof": {

        "version": "1.1.1",

IMAGE RECOGNITION WITH IBM CLOUD

      "resolved": "https://registry.npmjs.org/setprototypeof/-/setprototypeof-1.1.1.tgz",

      "integrity": "sha512-
JvdAWfbXeIGaZ9cILp38HntZSFSo3mWg6xGcJJsd+d4aRMOqauag1C63dJfDw7OaMYwEbHMOxEZ
1lqVRYP2OAw=="

    },

    "sha.js": {

      "version": "2.4.11",

      "resolved": "https://registry.npmjs.org/sha.js/-/sha.js-2.4.11.tgz",

      "integrity": "sha512-
QMEp5B7cftE7APOjk5Y6xgrbWu+WkLVQwk8JNjZ8nKRciZaByEW6MubieAiToS7+dwvrjGhH8jR
Xz3MVd0AYqQ==",

      "requires": {

        "inherits": "^2.0.1",

        "safe-buffer": "^5.0.1"

      }

    },

    "statuses": {

      "version": "1.5.0",

      "resolved": "https://registry.npmjs.org/statuses/-/statuses-1.5.0.tgz",

      "integrity": "sha1-Fhx9rBd2Wf2YEfQ3cfqZOBR4Yow="

    },

    "streamsearch": {

      "version": "0.1.2",

      "resolved": "https://registry.npmjs.org/streamsearch/-/streamsearch-0.1.2.tgz",

      "integrity": "sha1-gIudDlb8Jz2Am6VzOOkpkZoanxo="

    },

    "string_decoder": {

      "version": "0.10.31",

      "resolved": "https://registry.npmjs.org/string_decoder/-/string_decoder-0.10.31.tgz",

      "integrity": "sha1-YuIDvEF2bGwoyfyEMB2rHFMQ+pQ="

    },

    "toidentifier": {

      "version": "1.0.0",

      "resolved": "https://registry.npmjs.org/toidentifier/-/toidentifier-1.0.0.tgz",

      "integrity": "sha512-
yaOH/Pk/VEhBWWTlhI+qXxDFXlejDGcQipMlyxda9nthulaxLZUNcUqFxokp0vcYnvteJln5FNQDRrx
j3YcbVw=="

    },

    "type-is": {

      "version": "1.6.18",

      "resolved": "https://registry.npmjs.org/type-is/-/type-is-1.6.18.tgz",

      "integrity": "sha512-
TkRKr9sUTxEH8MdfuCSP7VizJyzRNMjj2J2do2Jr3Kym598JVdEksuzPQCnlFPW4ky9Q+iA+ma9BG
m06XQBy8g==",

      "requires": {

        "media-typer": "0.3.0",

        "mime-types": "~2.1.24"

      }

    },

    "typedarray": {

      "version": "0.0.6",

      "resolved": "https://registry.npmjs.org/typedarray/-/typedarray-0.0.6.tgz",

      "integrity": "sha1-hnrHTjhkGHsdPUfZlqeOxciDB3c="

    },

    "unpipe": {

      "version": "1.0.0",

      "resolved": "https://registry.npmjs.org/unpipe/-/unpipe-1.0.0.tgz",

      "integrity": "sha1-sr9O6FFKrmFltIF4KdIbLvSZBOw="

    },

    "url": {

      "version": "0.10.3",

      "resolved": "https://registry.npmjs.org/url/-/url-0.10.3.tgz",

      "integrity": "sha1-Ah5NnHcF8hu/N9A861h2dAJ3TGQ=",

      "requires": {

IMAGE RECOGNITION WITH IBM CLOUD

      "punycode": "1.3.2",

      "querystring": "0.2.0"

     }

    },

    "util-deprecate": {

     "version": "1.0.2",

     "resolved": "https://registry.npmjs.org/util-deprecate/-/util-deprecate-1.0.2.tgz",

     "integrity": "sha1-RQ1Nyfpw3nMnYvvS1KKJgUGaDM8="

    },

    "utils-merge": {

     "version": "1.0.1",

     "resolved": "https://registry.npmjs.org/utils-merge/-/utils-merge-1.0.1.tgz",

     "integrity": "sha1-n5VxD1CiZ5R7LMwSR0HBAoQn5xM="

    },

    "uuid": {

     "version": "3.4.0",

     "resolved": "https://registry.npmjs.org/uuid/-/uuid-3.4.0.tgz",

     "integrity": "sha512-
HjSDRw6gZE5JMggctHBcjVak08+KEVhSIiDzFnT9S9aegmp85S/bReBVTb4QTFaRNptJ9kuYaNhnb
NEOkbKb/A=="

    },

    "vary": {

     "version": "1.1.2",

     "resolved": "https://registry.npmjs.org/vary/-/vary-1.1.2.tgz",

     "integrity": "sha1-IpnwLG3tMNSllhsLn3RSShj2NPw="

    },

    "xml2js": {

     "version": "0.4.23",

     "resolved": "https://registry.npmjs.org/xml2js/-/xml2js-0.4.23.tgz",

     "integrity": "sha512-
ySPiMjM0+pLDftHgXY4By0uswI3SPKLDw/i3UXbnO8M/p28zqexCUoPmQFrYD+/1BzhGJSs2i1ER
WKJAtiLrug==",

IMAGE RECOGNITION WITH IBM CLOUD

```
    "requires": {

     "sax": ">=0.6.0",

     "xmlbuilder": "~11.0.0"

    },

    "dependencies": {

     "xmlbuilder": {

      "version": "11.0.1",

      "resolved": "https://registry.npmjs.org/xmlbuilder/-/xmlbuilder-11.0.1.tgz",

      "integrity": "sha512-
fDlsI/kFEx7gLvbecc0/ohLG50fugQp8ryHzMTuW9vSa1GJ0XYWKnhsUx7oie3G98+r56aTQIUB4kht4
2R3JvA=="

     }

    }

   },

   "xmlbuilder": {

    "version": "10.1.1",

    "resolved": "https://registry.npmjs.org/xmlbuilder/-/xmlbuilder-10.1.1.tgz",

    "integrity": "sha512-
OyzrcFLL/nb6fMGHbiRDuPup9ljBycsdCypwuyg5AAHvyWzGfChJpCXMG88AGTIMFhGZ9RccFN1
e6lhg3hkwKg=="

   },

   "xtend": {

    "version": "4.0.2",

    "resolved": "https://registry.npmjs.org/xtend/-/xtend-4.0.2.tgz",

    "integrity": "sha512-
LKYU1iAXJXUgAXn9URjiu+MWhyUXHsvfp7mcuYm9dSUKK0/CjtrUwFAxD82/mCWbtLsGjFIad0
wIsod4zrTAEQ=="

   }

  }
```

SAMPLE OUTPUT:

IMAGE RECOGNITION WITH IBM CLOUD
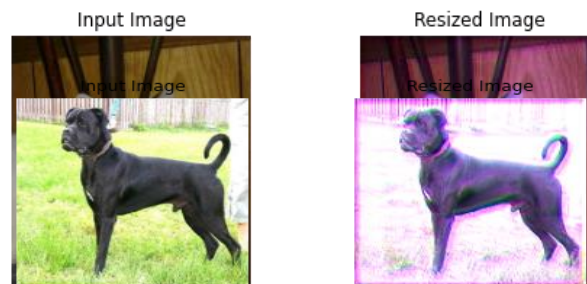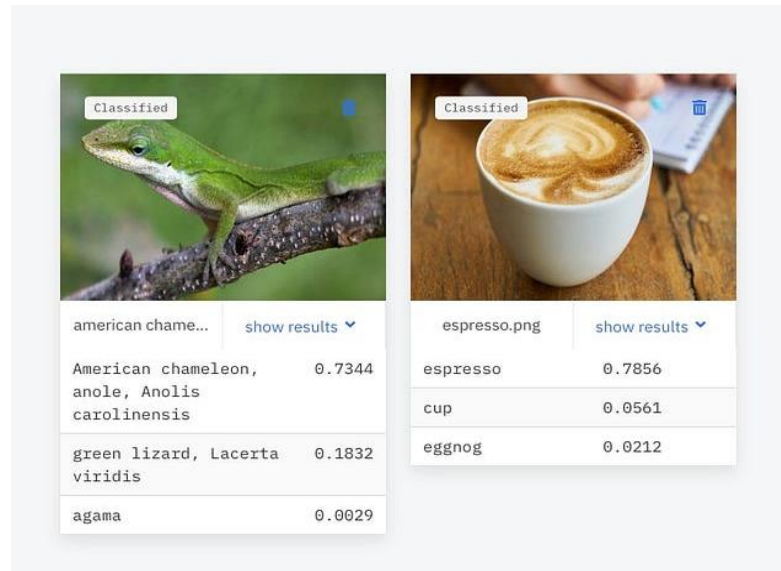
CONCLUSION:

In conclusion, the journey of implementing image recognition using IBM Cloud has been both challenging and rewarding. Through leveraging the power of IBM's advanced cloud-based technologies, we have successfully developed a robust image recognition system that demonstrates the potential of artificial intelligence in visual analysis.

Our project showcases the effectiveness of IBM Cloud services, particularly in the realms of machine learning and computer vision. The seamless integration of Watson Visual Recognition API has empowered our system to accurately classify and identify objects within images, opening up possibilities for various applications in diverse industries.

As we wrap up this project, it's essential to acknowledge the continuous evolution of technology and the dynamic nature of the field. While we celebrate our achievements, we also recognize the need for ongoing improvements and updates to stay at the forefront of innovation.

In the future, further enhancements could be explored, such as fine-tuning the model for specific use cases, optimizing computational resources for cost efficiency, and integrating additional features to enhance the overall user experience. Additionally, staying abreast of advancements in image recognition and cloud computing will be crucial for maintaining the project's relevance and effectiveness.

In conclusion, the "Image Recognition" project represents a bold step into the future of visual storytelling. Through the seamless integration of IBM Cloud Visual Recognition, user-friendly interfaces, image classification, AI-generated captions, and user engagement features, we've created a platform that transcends the ordinary.

At its core, this project is about empowering individuals and businesses to forge deeper connections with their audience through the compelling art of visual narratives. We've harnessed the power of AI to not only recognize what's in an image but to breathe life into it with emotionally resonant captions. It's a journey that marries the artistry of photography with the limitless possibilities of technology.

Our dedication to meticulous problem definition, design thinking, and technical implementation has laid the foundation for an accessible and enriching user experience. This project isn't just about technology; it's about human expression, creativity, and communication.

As we move forward, we invite you to explore this fusion of art and AI, to witness the birth of captivating narratives from images, and to connect with your audience on a deeper level. This is the future of visual storytelling, and it's just the beginning.

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