

## **Project Scope:**

The project tries to create a model based on data provided by the World Health Organization (WHO) to evaluate the life expectancy for different countries in years. The data offers a timeframe from 2000 to 2015.

The data originates from here:

<https://www.kaggle.com/kumarajarshi/life-expectancy-who/data>

The output algorithms have been used to test if they can maintain their accuracy in predicting the life expectancy for data they haven't been trained. Four algorithms have been used:

Linear Regression

Linear Regression with Polynomic features

Decision Tree Regression

Random Forest Regression

## **Schedule:**

### **Team:**

**Name:** Prem Vinod Bansod

### **Deliverables:**

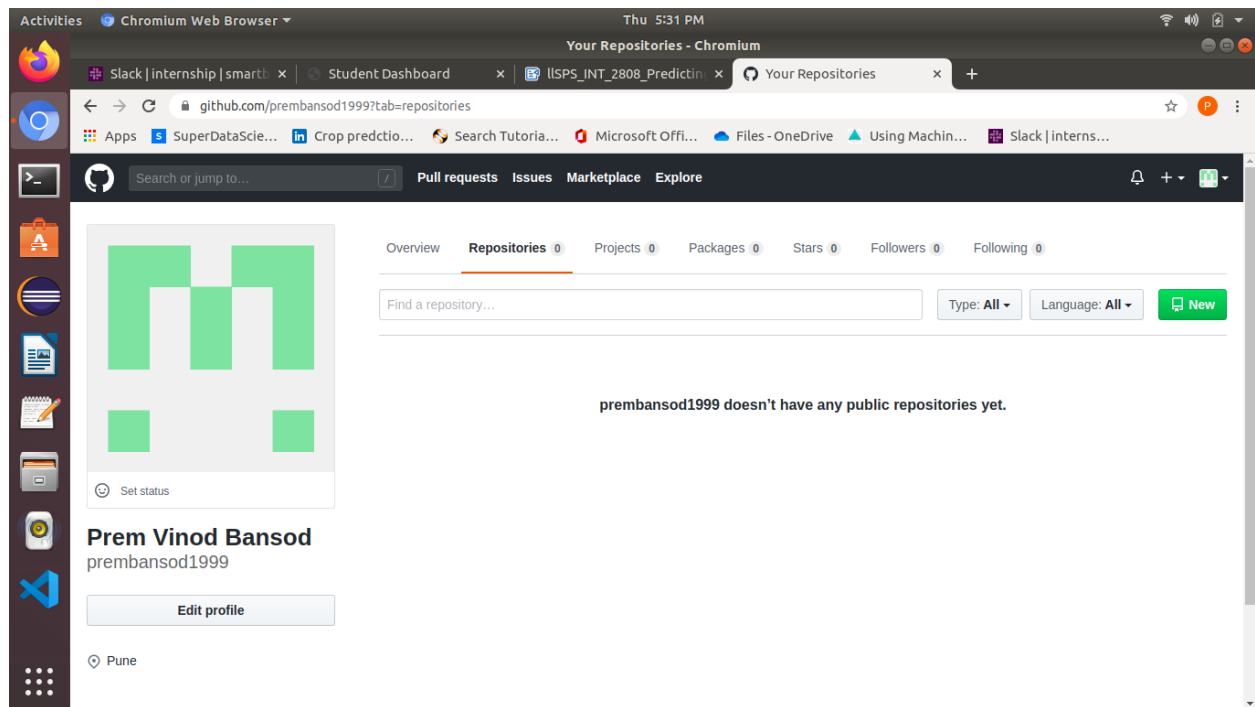
**None.**

## **Setup The Development Environment:**

### **Github:**

GitHub is a for-profit company that offers a cloud-based Git repository hosting service. Essentially, it makes it a lot easier for individuals and teams to use Git for version control and collaboration.

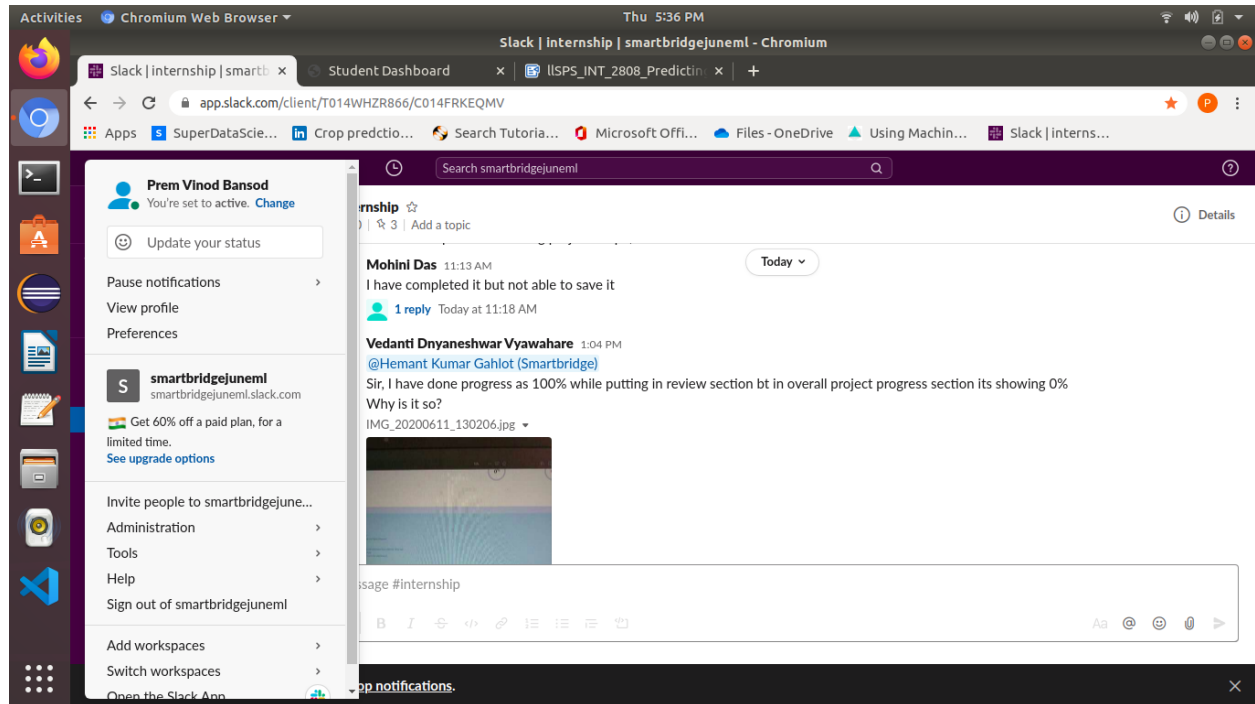
## Github Account created:



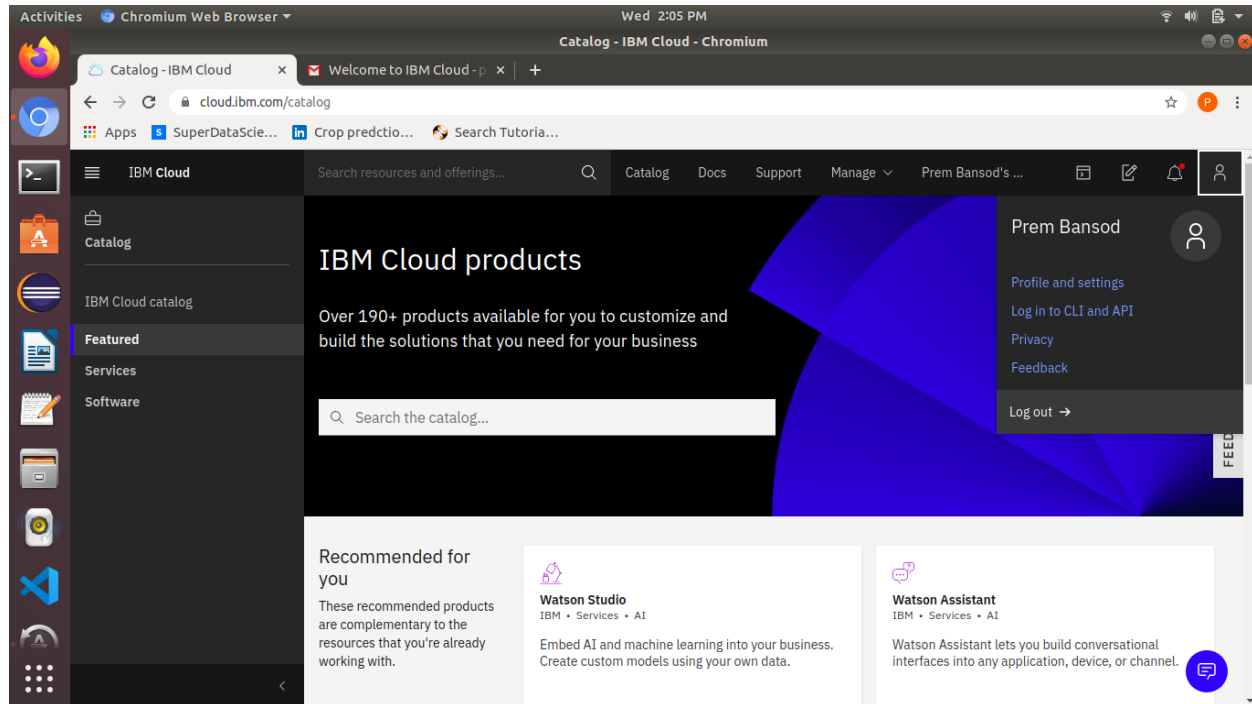
## Slack:

Slack is essentially a chat room for your whole company, designed to replace email as your primary method of communication and sharing. Its workspaces allow you to organize communications by channels for group discussions and allows for private messages to share information, files, and more all in one place.

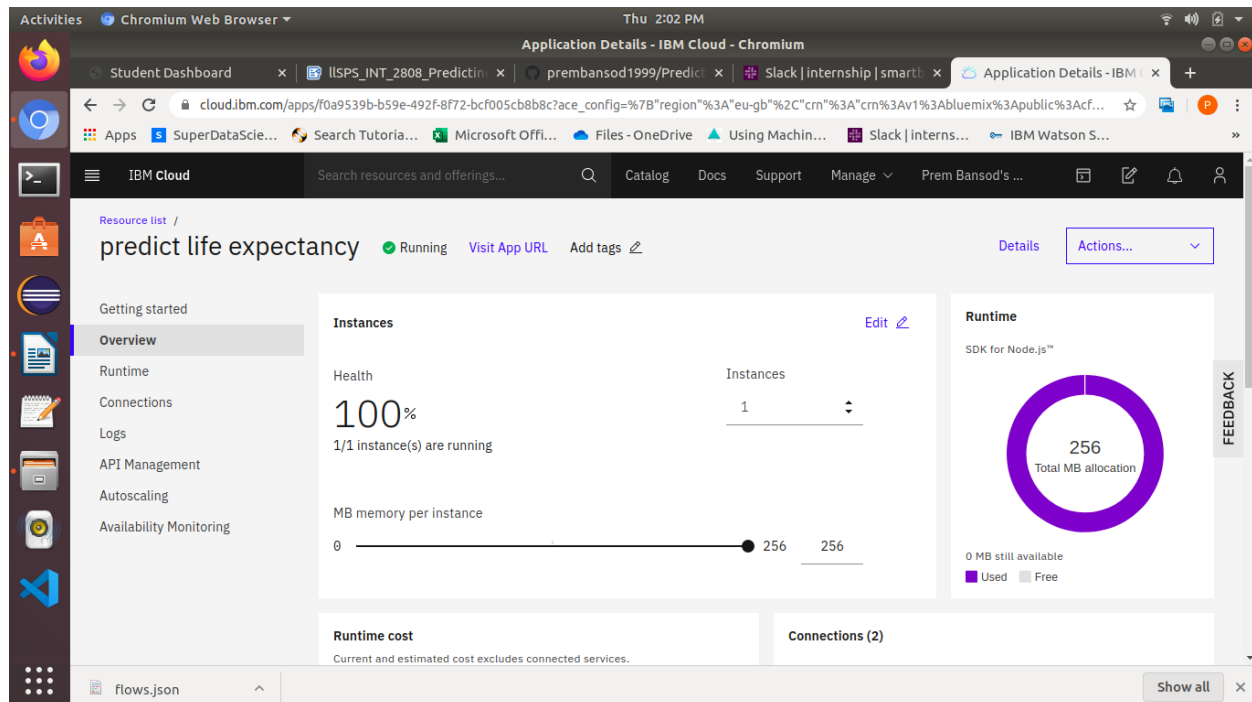
## Slack account created:



## IBM cloud account created:



## Node-red Starter application:



## IBM Watson Machine Learning:

The screenshot shows the IBM Cloud console interface. The top navigation bar includes 'Activities', 'Chromium Web Browser', and the time 'Thu 2:08 PM'. The main header displays 'Service Details - IBM Cloud - Chromium'. The left sidebar shows the 'Resource list' with 'WatsonMachineLearning' selected, which is marked as 'Active'. The 'Service credentials' section is highlighted in the sidebar. The main content area shows the 'Service credentials' page, which includes a search bar, a 'New credential' button, and a table of existing credentials. One credential is listed with the key name 'wdp-writer' and a creation date of '26 JUN 2020 - 06:43:42 PM'. Below the table, a JSON snippet shows the details of the credential, including the API key, IAM API key description, IAM API key name, IAM role, and service ID.

Resource list / WatsonMachineLearning Active Add tags Details Actions...

Manage Service credentials Plan Connections

Service credentials

You can generate a new set of credentials for cases where you want to manually connect an app or external consumer to an IBM Cloud™ service. [Learn more](#)

Search credentials...

New credential +

Key name	Date created
wdp-writer	26 JUN 2020 - 06:43:42 PM

```
{
  "apikey": "mkmPBpGt-10B8qmAAnyWskQWlWthWDINpRt1Fq3_lakj",
  "iam_apikey_description": "Auto-generated for key e0f02c03-8571-49fe-899f-cb5b6e496635",
  "iam_apikey_name": "wdp-writer",
  "iam_role_crn": "crn:v1:bluemix:public:iam:::serviceRole:Writer",
  "iam_serviceid_crn": "crn:v1:bluemix:public:iam-identity::a/47a76962507446d690ccc06b1aab5b94::servi
ceid:ServiceId-796d3077-ed5f-4a1e-bd64-2b7601d2f246",
  "instance_id": "0040c2ch-707A-A70e-a782-had5e4c0d9f2"
}
```

Show all

## IBM Watson Studio:

The screenshot shows the IBM Watson Studio interface. The top navigation bar includes 'Activities', 'Chromium Web Browser', and the time 'Thu 2:16 PM'. The main header displays 'predict life expectancy - P3 sdk notebook - IBM Watson Studio - Chromium'. The left sidebar shows the 'My projects' section with 'Predict life Expectancy' selected. The main content area shows a Jupyter notebook with a cell titled 'AutoAI experiment metadata'. The cell contains a code snippet that defines COS credentials required to retrieve AutoAI pipeline. The code includes imports for 'DataConnection', 'S3Connection', and 'S3Location' from 'watson\_machine\_learning\_client.helpers'. It then defines 'training\_data\_reference' and 'training\_result\_reference' using these classes, specifying API keys, endpoints, and bucket information.

predict life expectancy - P3 sdk notebook - IBM Watson Studio - Chromium

My projects / Predict life Expectancy / predict life expectancy - P3 sdk ...

In [ ]: !pip install -U autoai-libs

AutoAI experiment metadata

This cell defines COS credentials required to retrieve AutoAI pipeline.

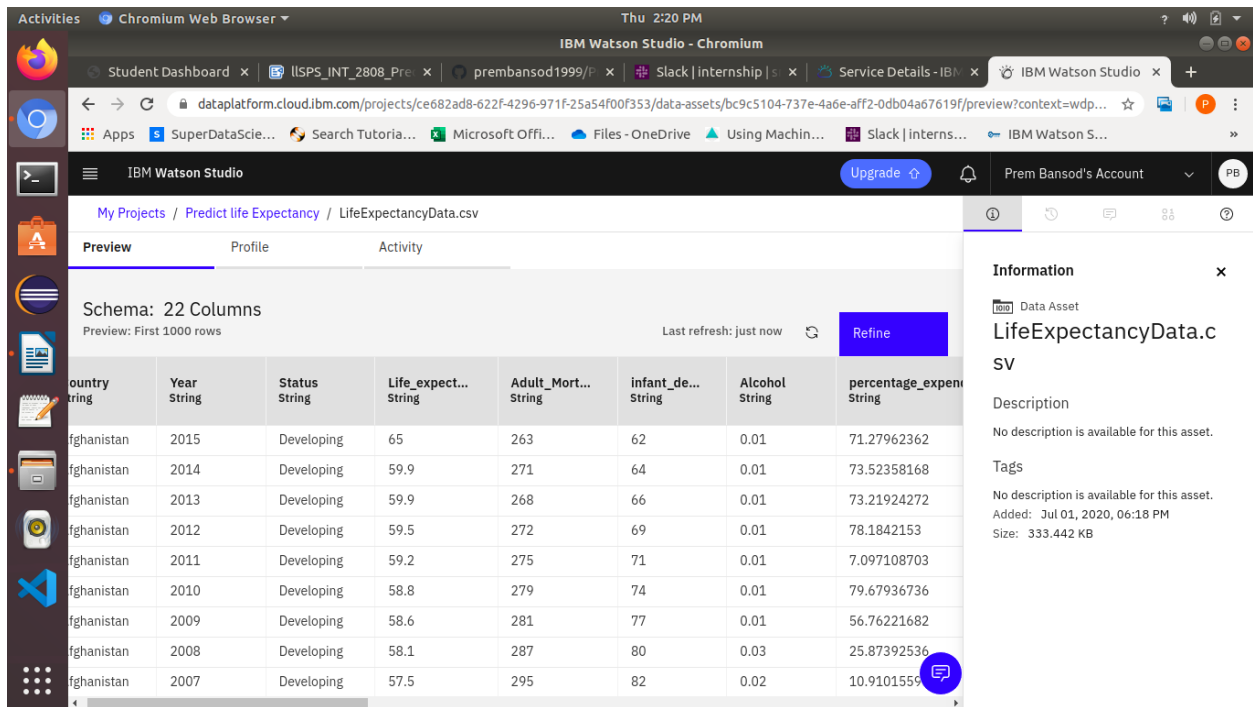
```
In [ ]: # @hidden_cell
from watson_machine_learning_client.helpers import DataConnection, S3Connection, S3Location

training_data_reference = [DataConnection(
    connection=S3Connection(
        api_key='zEfuNHVaEqs4J1CP4GMzq_urervTVx8B7YDRNejRC6dZ',
        auth_endpoint='https://iam.bluemix.net/oidc/token/',
        endpoint_url='https://s3-api.us-gio.objectstorage.softlayer.net'
    ),
    location=S3Location(
        bucket='predictlifeexpectancy-donotdelete-pr-yse8gzfq3qqlu',
        path='LifeExpectancyData.csv'
    )
)]

training_result_reference = DataConnection(
    connection=S3Connection(
        api_key='zEfuNHVaEqs4J1CP4GMzq_urervTVx8B7YDRNejRC6dZ',
        auth_endpoint='https://iam.bluemix.net/oidc/token/',
        endpoint_url='https://s3-api.us-gio.objectstorage.softlayer.net'
    ),
    location=S3Location(
        bucket='predictlifeexpectancy-donotdelete-pr-yse8gzfq3qqlu',
```

# Predict Life Expectancy without python:

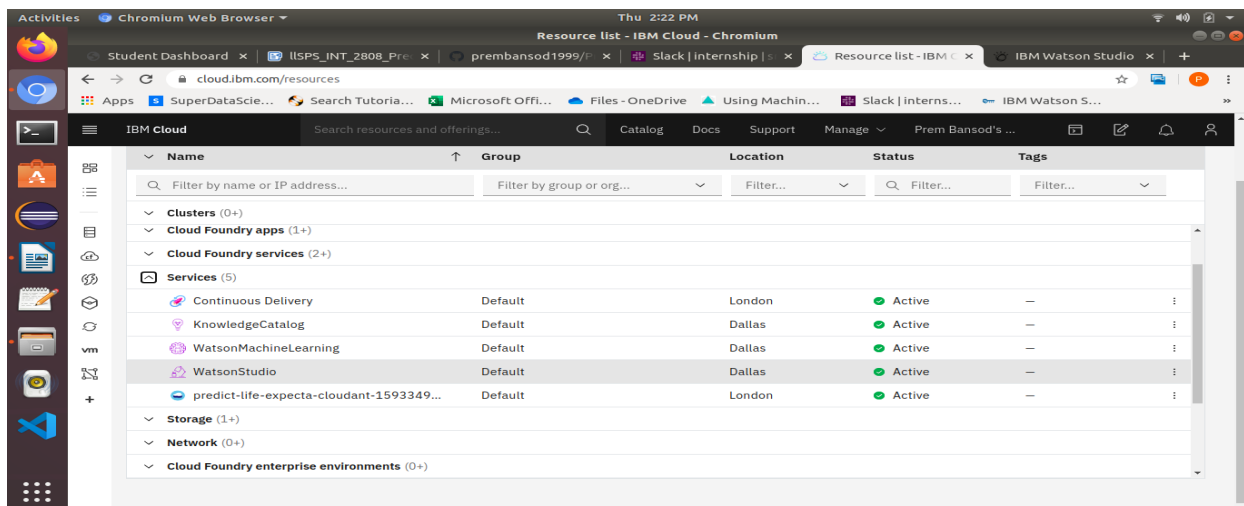
## Dataset:



The screenshot shows the IBM Watson Studio interface in a Chromium browser. The main view displays a dataset named 'LifeExpectancyData.csv' with a schema of 22 columns. The 'Preview' tab is active, showing the first 1000 rows. The data includes columns for country, year, status, life expectancy, adult mortality, infant mortality, alcohol consumption, and percentage of expenditure on health. An 'Information' sidebar on the right provides details about the data asset, including its name, description, tags, and size (333.442 KB).

country String	Year String	Status String	Life_expect... String	Adult_Mort... String	infant_de... String	Alcohol String	percentage_exp... String
afghanistan	2015	Developing	65	263	62	0.01	71.27962362
afghanistan	2014	Developing	59.9	271	64	0.01	73.52358168
afghanistan	2013	Developing	59.9	268	66	0.01	73.21924272
afghanistan	2012	Developing	59.5	272	69	0.01	78.1842153
afghanistan	2011	Developing	59.2	275	71	0.01	7.097108703
afghanistan	2010	Developing	58.8	279	74	0.01	79.67936736
afghanistan	2009	Developing	58.6	281	77	0.01	56.76221682
afghanistan	2008	Developing	58.1	287	80	0.03	25.87392536
afghanistan	2007	Developing	57.5	295	82	0.02	10.9101559

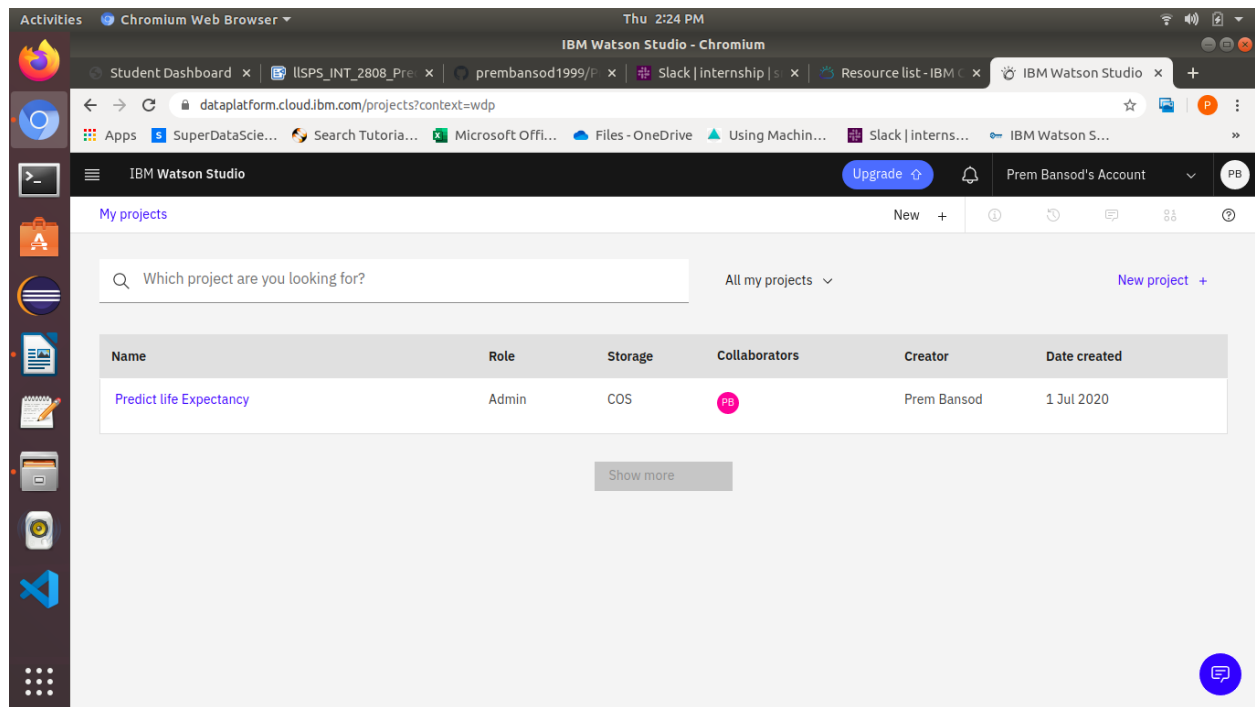
## IBM Cloud Services:



The screenshot shows the IBM Cloud Resource List interface. It displays a list of resources categorized by groups such as Clusters, Cloud Foundry apps, Cloud Foundry services, and Services. The 'Services' group is expanded, showing a list of services including Continuous Delivery, KnowledgeCatalog, WatsonMachineLearning, WatsonStudio, and predict-life-expecta-cloudant-1593349... Each service entry includes details like Group, Location, Status, and Tags.

Name	Group	Location	Status	Tags
Continuous Delivery	Default	London	Active	—
KnowledgeCatalog	Default	Dallas	Active	—
WatsonMachineLearning	Default	Dallas	Active	—
WatsonStudio	Default	Dallas	Active	—
predict-life-expecta-cloudant-1593349...	Default	London	Active	—

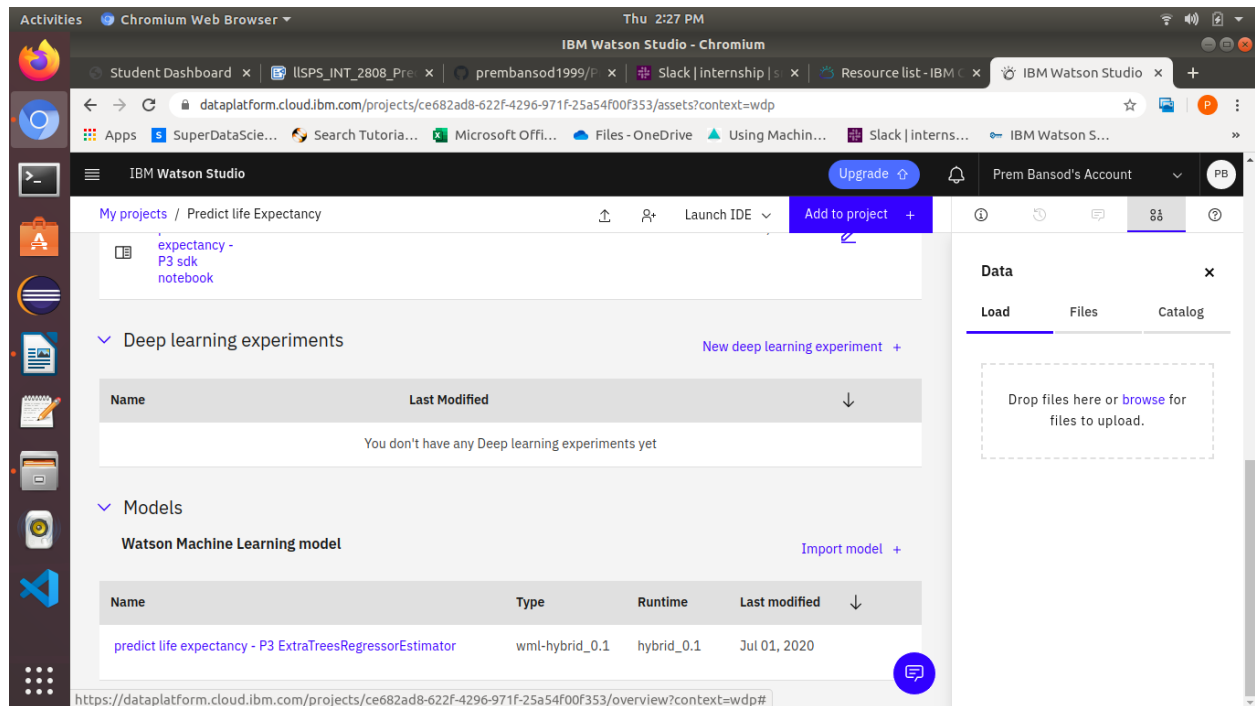
## Create Watson Project:



The screenshot shows the IBM Watson Studio interface in a Chromium web browser. The browser's address bar displays the URL `dataplatfom.cloud.ibm.com/projects?context=wdp`. The page header includes the IBM Watson Studio logo, an 'Upgrade' button, and the user's account information, 'Prem Bansod's Account'. The main content area is titled 'My projects' and features a search bar with the placeholder text 'Which project are you looking for?'. Below the search bar, there is a table listing projects. The table has columns for Name, Role, Storage, Collaborators, Creator, and Date created. A single project is listed: 'Predict life Expectancy' with the role 'Admin', storage 'COS', and created on '1 Jul 2020'. A 'Show more' button is located below the table. On the right side of the page, there is a 'New project +' link.

Name	Role	Storage	Collaborators	Creator	Date created
Predict life Expectancy	Admin	COS		Prem Bansod	1 Jul 2020

## Create Machine Learning Service:



The screenshot shows the IBM Watson Studio interface in a Chromium web browser, displaying the details of a project named 'Predict life Expectancy'. The browser's address bar shows the URL `dataplatfom.cloud.ibm.com/projects/ce682ad8-622f-4296-971f-25a54f00f353/assets?context=wdp`. The page header includes the IBM Watson Studio logo, an 'Upgrade' button, and the user's account information, 'Prem Bansod's Account'. The main content area is titled 'My projects / Predict life Expectancy' and features a 'Launch IDE' button and an 'Add to project +' button. Below this, there is a section for 'Deep learning experiments' with a 'New deep learning experiment +' link. A table lists the experiments, but it is currently empty, showing the message 'You don't have any Deep learning experiments yet'. Below the experiments section, there is a section for 'Models' with a 'Watson Machine Learning model' and an 'Import model +' link. A table lists the models, with one model shown: 'predict life expectancy - P3 ExtraTreesRegressorEstimator' with type 'wml-hybrid\_0.1', runtime 'hybrid\_0.1', and last modified 'Jul 01, 2020'. On the right side of the page, there is a 'Data' panel with tabs for 'Load', 'Files', and 'Catalog'. The 'Load' tab is active, showing a message: 'Drop files here or browse for files to upload.'

Name	Type	Runtime	Last modified
predict life expectancy - P3 ExtraTreesRegressorEstimator	wml-hybrid_0.1	hybrid_0.1	Jul 01, 2020

**Activities** | Chromium Web Browser | Thu 2:32 PM

**IBM Watson Studio - Chromium**

Student Dashboard x ILPS\_INT\_2808\_Pre x prembansod1999/P x Slack | Internship | s x Resource list - IBM C x IBM Watson Studio x +

← → ↻ dataplatform.cloud.ibm.com/ml/auto-ml/497dd15f-5d88-4a26-af27-73feacac909/train?projectId=ce682ad8-622f-4296-971f-25a54f0f353&mlInstanceGuid... ☆ 📄 ⓘ P ⋮

Apps SuperDataScie... Search Tutoria... Microsoft Offi... Files - OneDrive Using Machin... Slack | Interns... IBM Watson S...

> \_

☰ IBM Watson Studio Upgrade Prem Bansod's Account PB

My projects / Predict life Expectancy / predict life expectancy

Experiment summary Pipeline comparison Rank by: Root mean squared err... Score: Cross validation Holdout

**Relationship map** ⓘ  
Prediction column: Life\_expectancy

FEATURE TRANSFORMERS  
PIPELINES  
TOP ALGORITHMS  
LifeExpectancyDat...

**Progress map**  
Swap view ⇌

Experiment completed ✓  
8 PIPELINES GENERATED  
8 pipelines generated from algorithms. See pipeline leaderboard below for more detail.  
Time elapsed: 4 minutes



Activities Chromium Web Browser Thu 2:37 PM

Node-RED Dashboard - Chromium

Student Das x llSPS\_INT\_2 x prembanso x Slack | Intern x Application x Node-RED x Node-RED x IBM Watson x

predict-life-expectancy.eu-gb.mybluemix.net/ui/#!/0?socketId=RZ1xJLamy95FFaciAAAU

Apps SuperDataScie... Search Tutoria... Microsoft Offi... Files - OneDrive Using Machin... Slack | interns... IBM Watson S...

Home

Default

Life Expectancy **59.88000144958496**

Country \*  
Afghanistan

Year \*  
2014

Status \*  
Developing

Adult Mortality \*  
271

Infant deaths \*  
64

Alcohol \*  
0.01

percentage expenditure \*  
73.52358168

Hepatitis\_B \*  
62

Measles \*  
492