PROJECT DOCUMENTATION

Students Performance In Exam (Grade Analysis)

Using Watson Auto AI

BY

LAKSHMI PRIYA .N

RSIP Career Basic ML 074

Index

INTRODUCTION

a.Overview

The project "Student performance in exam (grade analysis)" predicts the grade of student which help to improve performance and atention to their different courses. The project is based on IBM provided features. It consist of Watson studio Auto AI experiment which uses different pipelines and uses the best one. The prediction is shown using Node Red App dashboard.

The grade of student depends on many different parameters such as marks in different courses or subjects. An Auto AI Experiment consider these parameters and apply best machine learning algorithm to get result (grade of student). Process of geting predicted grade consist of authentication which uses service credentials. After the whole process the student can improve his/her performance. Thus, machine learning algorithms provide atention to different courses to students and easily implementable application.

b.Purpose

In educational institutes, schools ,colleges students have to face a lot of difficulties and have to struggle hard to pass in exams and improve their performance since they have no mental, dedicated support which provide improvement and attention to different subjects and courses. Students have no prediction about their future grades and results.

The problem can be solved using machine learning which provide us a lot of brilliant algorithms which can predict result using input data. In this project , the past result and grades are used and grades are predicted, which lead to attention , improvement to different courses.

The project machine learning algorithms can be implemented Watson studio and result are get by Node Red App which is another important Auto AI feature provided by IBM Cloud.

LITERATURE SURVEY

a.Existing Problem

With the wide usage of computers and internet, there has recently been a huge increase in publicly available data that can be analysed. Be it online sales information, website traffic, or user habits, data is generated every day. Such a large amount of data presents both a problem and an opportunity. The problem is that it is difficult for humans to analyse such large data. The opportunity is that this type of data is ideal for computers to process, because it is stored digitally in a well-formatted way, and computers can process data much faster than humans.

In schools and higher educational institutes, many students have to struggle hard to pass exams since there is no dedicated support offered to students who need special attention in the relevant courses.

This thesis examines the application of machine learning algorithms to predict whether a student will be successful or not. Machine learning techniques can be utilized for students' grades prediction in different courses.

Such techniques would help students to improve their performance based on predicted grades and would enable instructors to identify such individuals who might need assistance in the courses. This is best suited for online courses.
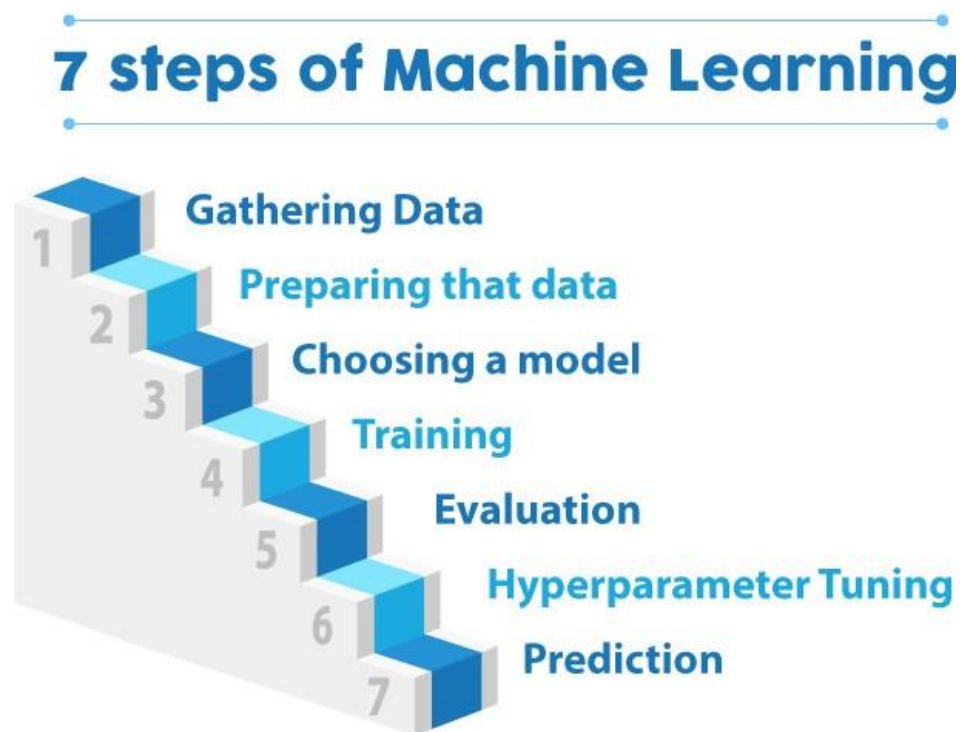
b.Proposed Solution

Student Performance in Exam (Grade Analysis) project consist a Machine Learning model to predict the material using IBM Watson Auto AI Machine Learning Service. The model is deployed on IBM cloud to get scoring end point which can be used as API in mobile app or web app building. We are developing a web application which is built using node red service.

We make use of the scoring end point to give user input values to the deployed model. The model prediction is then showcased on User Interface. This model is to predict the performance of students in exam in grade distribution based by using different input parameters.

THEORETICAL ANALYSIS

a.Block diagram

The **block diagram** of machine learning :

7 steps of Machine Learning

1 Gathering Data
2 Preparing that data
3 Choosing a model
4 Training
5 Evaluation
6 Hyperparameter Tuning
7 Prediction

In Machine Learning according to these steps machine can predict the result also one more benefit is that when a large data is present, it's not possible for a human to analysis the huge data. So, its preferable that a machine uses algorithms to analysis these data and predict the future data which can help in different ways.

The project uses Watson Auto AI Experiment Service.

The project used XGB Classifier Algorithm to predict grades and have built time 00:00:04 . Watson Studio Auto AI Experiment implements 8 different pipeline and uses the best one. Also, a cloud object storage service needed to store the dataset and machine learning service instance. Node Red App service is required to get authentication easily and get predicted grade on Node Red Dashboard or building UI Application.

b.Hardware / Software Designing

This project can be implemented using IBM Cloud Services on a PC. A machine learning service have to create and also a Watson studio, cloud storage service instance to store dataset. A Jupyter notebook can be added to project & we have to write code to get authenticated which include geting API key , instance ID, pre token etc.

EXPERIMENTAL INVESTIGATION

There are six steps in experimental investigation of a general project:

1. Choose a Project Idea
2. Conduct Background Research
3. Compose a Hypothesis
4. Design your Experiment

5. Collect Data
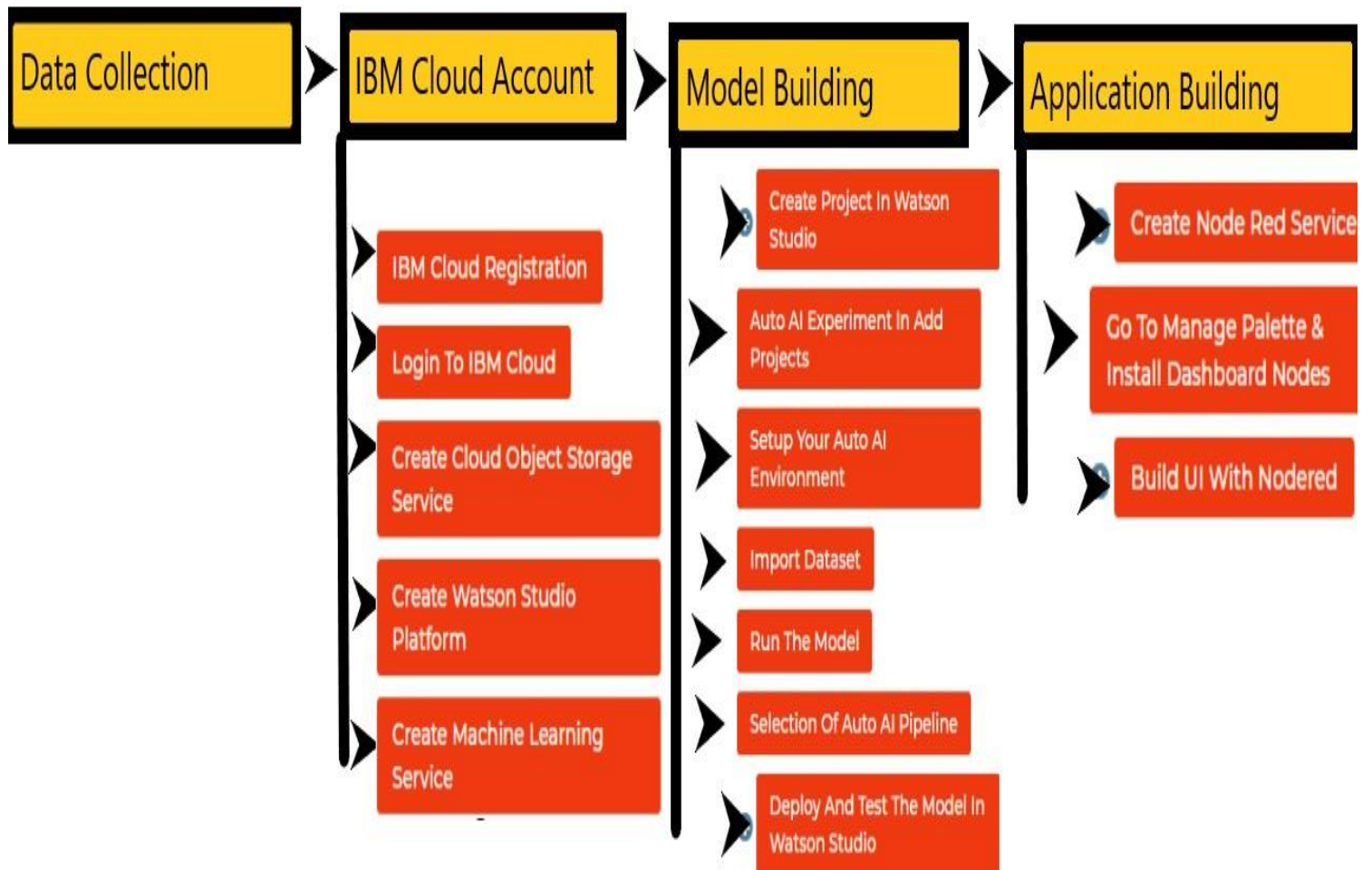6. Analyse Data and Draw Conclusions

The project considered that a student grade depends on its race/ethnicity, parental level of education, test preparation course, marks in different subjects, total marks, percentage etc.

Thus, the above data is collected and formated in a proper format. After that when it is ready for Watson Studio Auto AI Experiment, it is uploaded to cloud object storage service and implemented.

Based on these implementation, the grade of a student can be predicted using his/her old data. This prediction lead to atention to different courses and improvement in subject.

FLOW CHART

Student Performance in Exam (Grade Analysis) Flow Chart

Data Collection	→	IBM Cloud Account	→	Model Building	→	Application Building

IBM Cloud Account:
- IBM Cloud Registration
- Login To IBM Cloud
- Create Cloud Object Storage Service
- Create Watson Studio Platform
- Create Machine Learning Service

Model Building:
- Create Project In Watson Studio
- Auto AI Experiment In Add Projects
- Setup Your Auto AI Environment
- Import Dataset
- Run The Model
- Selection Of Auto AI Pipeline
- Deploy And Test The Model In Watson Studio

Application Building:
- Create Node Red Service
- Go To Manage Palette & Install Dashboard Nodes
- Build UI With Nodered

The whole project can be implemented in four steps.

1. The first step include collection of dataset.

2. The second step is about IBM Cloud. It includes IBM cloud registration. Login to account and create cloud object service to store collected data, create Watson studio platform and machine learning service.

3. The third step is model building. It consist of create the project in Watson studio, set up Auto AI Environment. Import dataset and run the model. Select and save the best Auto AI pipeline. Deploy and test model in Watson studio.

4. The fourth step is application building. In this step we have to create Node Red service. After that go to 'Manage Palette' and install required nodes. Build UI with Node Red.

Note that if old IBM cloud services is available then project can be deployed with old services. No need to create the new one.

RESULT

After the implementation, deployment of project the result i.e. predicted grade of student can be seen in Node Red UI. This grade depend on many different parameters. These parameters are race/ethnicity, parental level of education, test preparation course, marks in different subjects, total marks, percentage etc.

The Node Red UI provide us simple way to get the result of Auto AI Experiment. The Node Red User Interface can be a web application which helps students to improve performance and get atention to different subjects.

Here is the Node Red UI which predicts grade of a student.

Students Performance In Exam (Grade Analysis)

Grade   **A**

form

gender *
female

race/ethnicity *
group b

parental level of education *
standard

lunch *
bachelors degree

test preparation course *
none

math score *
87

reading score *
65

writing score *
87

Math_PassStatus *
p

Reading_PassStatus *
p

Writing_PassStatus *
p

OverAll_PassStatus *
p

Total_Marks *
250

Percentage *
70

SUBMIT	CANCEL

ADVANTAGES AND DISADVANTAGES

The main advantages of "student performance in exam (grade analysis)" project and also of Auto AI Experiments are mentioned below :

1. Available 24x7
2. Can be implemented repeatedly.
3. Faster Decision
4. Easily identifies trends and patterns.
5. No human intervention needed (automation)
6. Continuous Improvement
7. Handling multi-dimensional and multi-variety data
8. Wide application

As every bright side has a darker version in it. Auto AI Experiment also has some disadvantages. Let's see some of them.

1. Data Acquisition
2. Time and Resources
3. Interpretation of results
4. High error susceptibility.

APPLICATION

Using The Auto AI Experiment, you can build and deploy a machine learning model with sophisticated training features and no coding. The tool does most of the work for you. In this project , the UI model building can help students a lot.

A student can focus in different subjects and courses by predicting his/her grade with many different input parameters. But mostly depend on marks in different subjects.

The Node Red service provide us a better user interface with the help of anyone can deploy machine learning model and get predicted results.

CONCLUSION

Auto AI comes as standard with Cloud Pak for Data to be used and scaled across hybrid multi-cloud environments. There are a number of benefits for Auto AI, particularly in support of humans working to better understand and make predictions about their particular business or specialty. The benefits include:

- Building models faster because Auto AI prepares data, identifies features, performs optimizations, and generates models much faster than humans doing the work by themselves.

- Overcoming the skills gap, making it possible for industry domain experts who are new to data science to incorporate data science methods into their daily work.

- Uncovering more use cases because exploring models is quicker, giving more time for data scientists to experiment.

- Identifying key predictors that make a difference by using the auto-feature engineering option, which makes it simpler to extract predictions from a data set.

- Ranking and exploring models by comparing candidate pipelines to determine the best model for the particular task.

- Deploying models easily through Auto AI-generated pipelines. The deployed models can then be accessed and predictions made through REST APIs.

FUTURE SCOPE

As the confinuous growth of Auto AI and machine learning algorithms which make them a great source of informafion and predicted results, the Models can be used to improve our performance in different fields and will reduce human efforts. The Auto AI Experiments also have a big job opportunity.

The "Student Performance in Exam (Grade Analysis)" project can lead to dedicated support who need special atenfion to different courses. Students can be atenfive and predict future grades.

BIBLIOGRAPHY

The whole project uses different services which are listed below :

1. IBM Cloud
2. Watson Studio Auto AI
3. Node Red Application
4. Cloud Storage Service

The results are shown on Node Red user interface.

APPENDIX

Source Code

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In Exam (Grade
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Other AI Online Platorms :

- Google AI Platform
- TensorFlow
- Microsoft Azure
- Rainbird
- Infosys Nia
- Wipro HOLMES
- Dialogflow
- Premonition
- Ayasdi
- MindMeld
- Meya
- KAI
- Vital A.I
- Wit
- Receptiviti
- Lumiata
- Infrrd