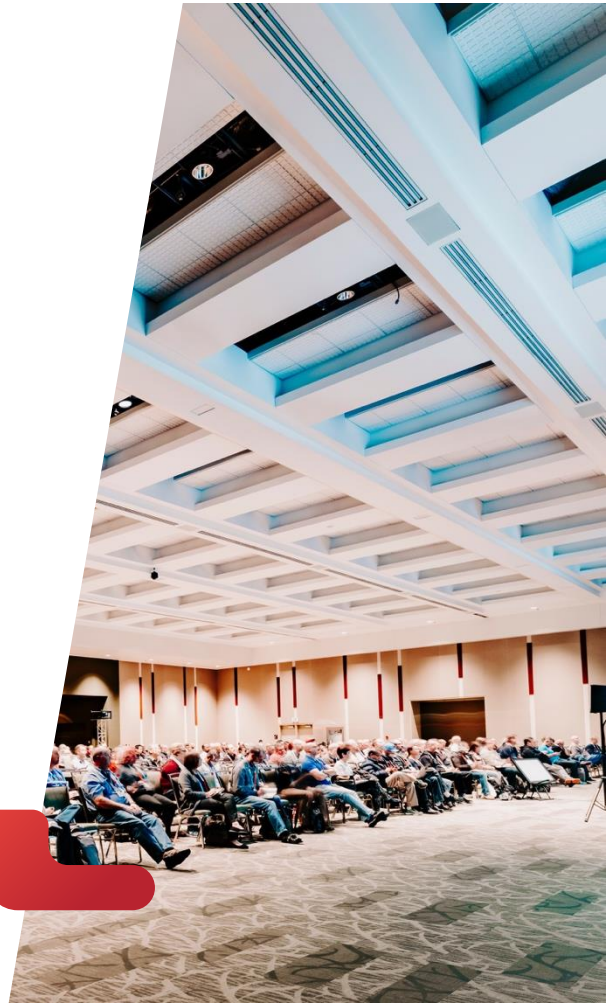
PASS SUMMIT2019

# Sentiment Prediction

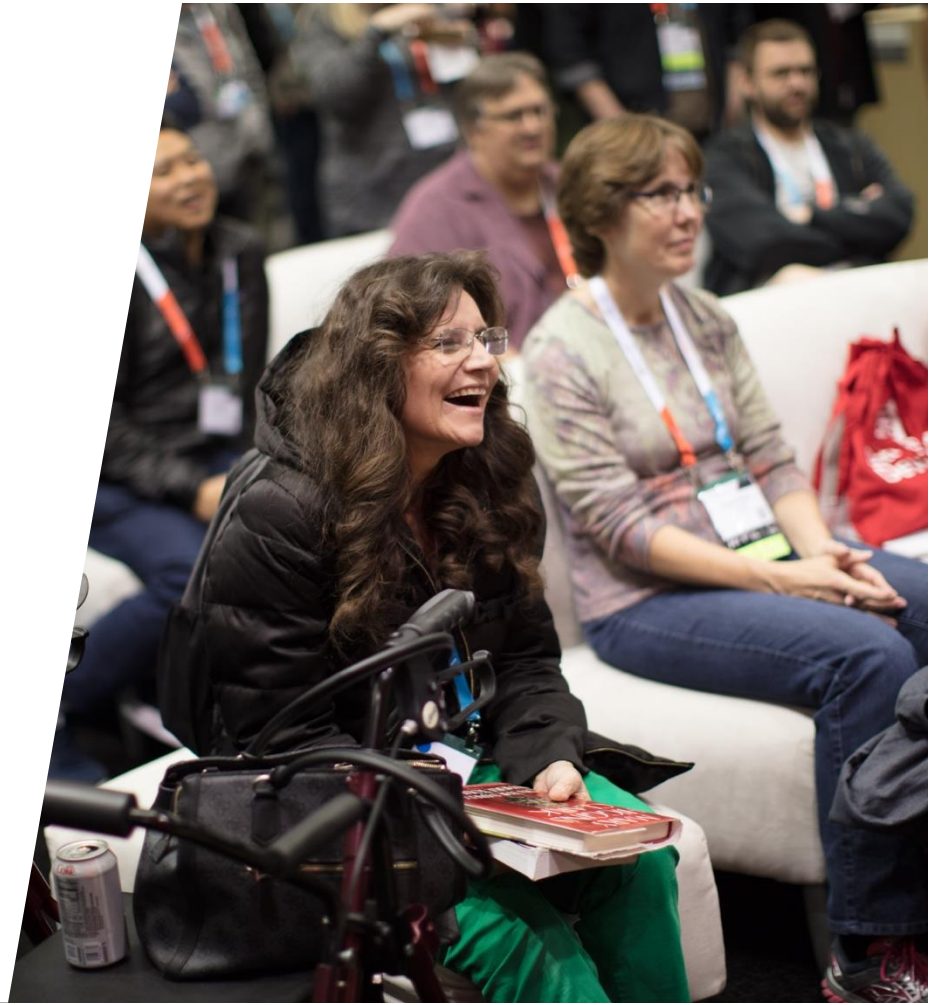
## Real-time in SQL Server



Hiram Fleitas

**Download:** github.com/hfleitas/seattle19

# Please silence cell phones



# Explore
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Free 1-day local training events


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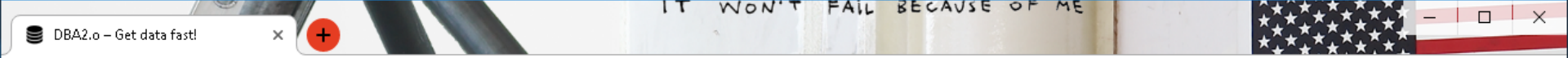
Get involved




DBA2.o – Get data fast!

https://dba2o.wordpress.com

My Sites Reader Write

# DBA2.o

*Get data fast!*

Let's Work Together Contact About Training AI (Demo) PBI (Demo)

## Giving 3 Sessions in 1 Day

*05/28/2019*

*Hiram*

*Leave a comment*

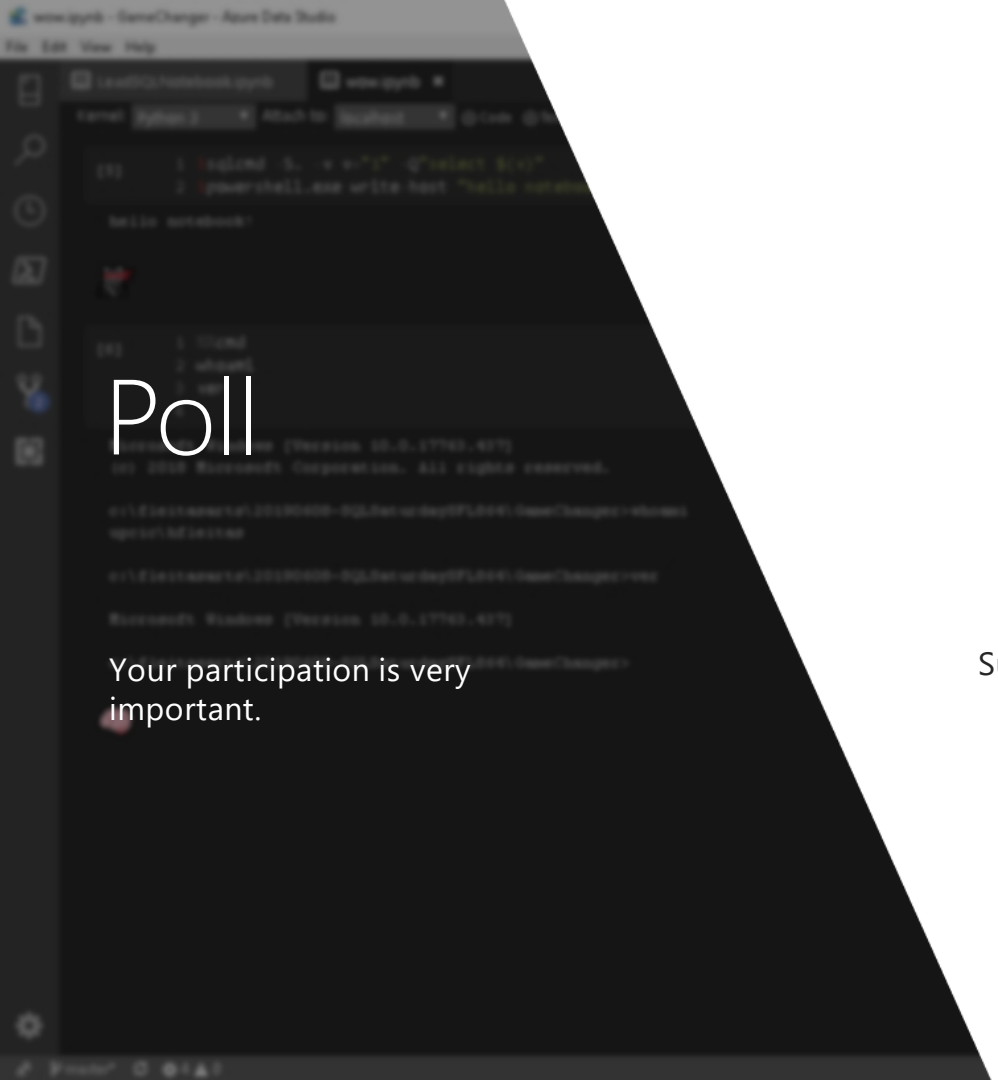
*Edit*

SQL Saturday 864 - South Florida, United States is less than 2 weeks away. June 8, 2019 @NSUFlorida. This is a whole day, free event open to the public. You can register here. I am giving 3 sessions that day and may be raffling 2x $50 gift cards per session. You should come to my session(s)... *Continue reading →*

## Video: Real-time Sentiment Prediction in SQL Server

This is candid recording of the live presentation I gave at Nova University on the morning of March 2nd, 2019 with South Florida Code Camp 2019. You can see the event info in my previous post. I am made this recording for the attendees that were interested to play it back at their own pace.... *Continue reading →*

Customize



# Poll

Your participation is very important.

This is the link:

# bit.ly/passml19

Submit your feedback by the end of this presentation.

PASS

# Hiram Fleitas

## Principal Database Architect, Universal Property

/hiramfleitas

@hiramfleitas

hiramfleitas

Father of 2
Developer since 1995
SQL Server since 1999

---

USCG Auxiliary Flotilla
Staff Officer

# Session Evaluations

**Submit by 5pm Friday, November 15th to win prizes.**

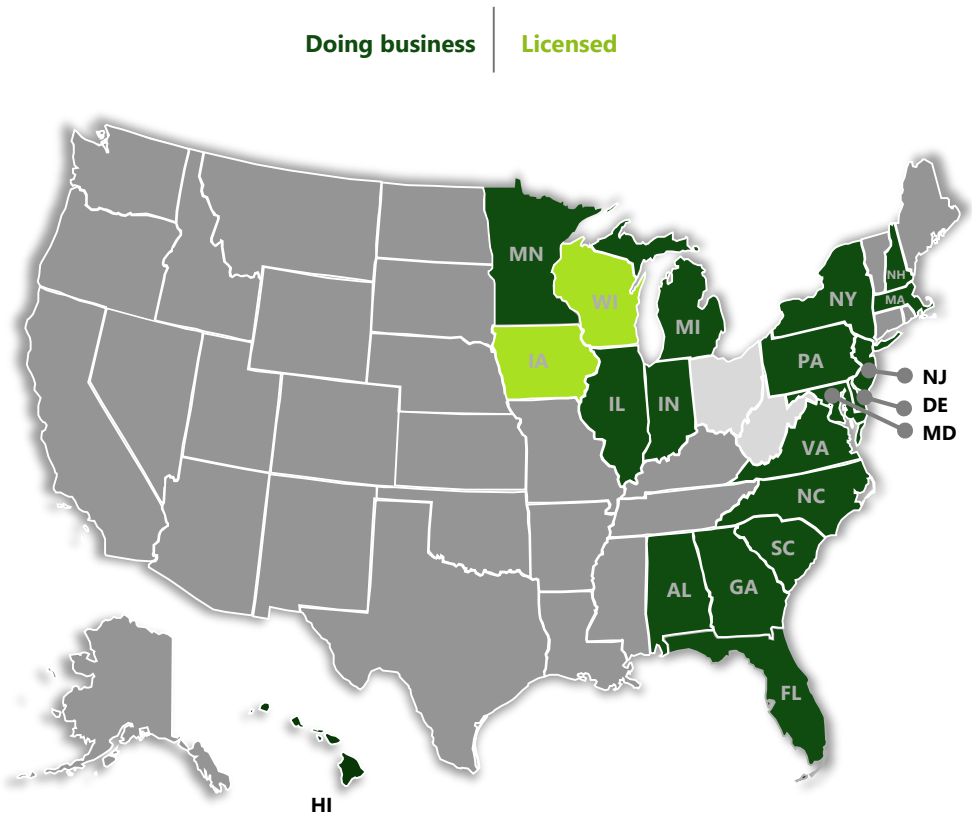
**3 WAYS TO ACCESS**

Go to PASSsummit.com

Download the GuideBook App and search: PASS Summit 2019

Follow the QR code link on session signage

# Universal Insurance Holdings (UVE): Growth Story




**Leading holding company of personal residential homeowners insurance and services**

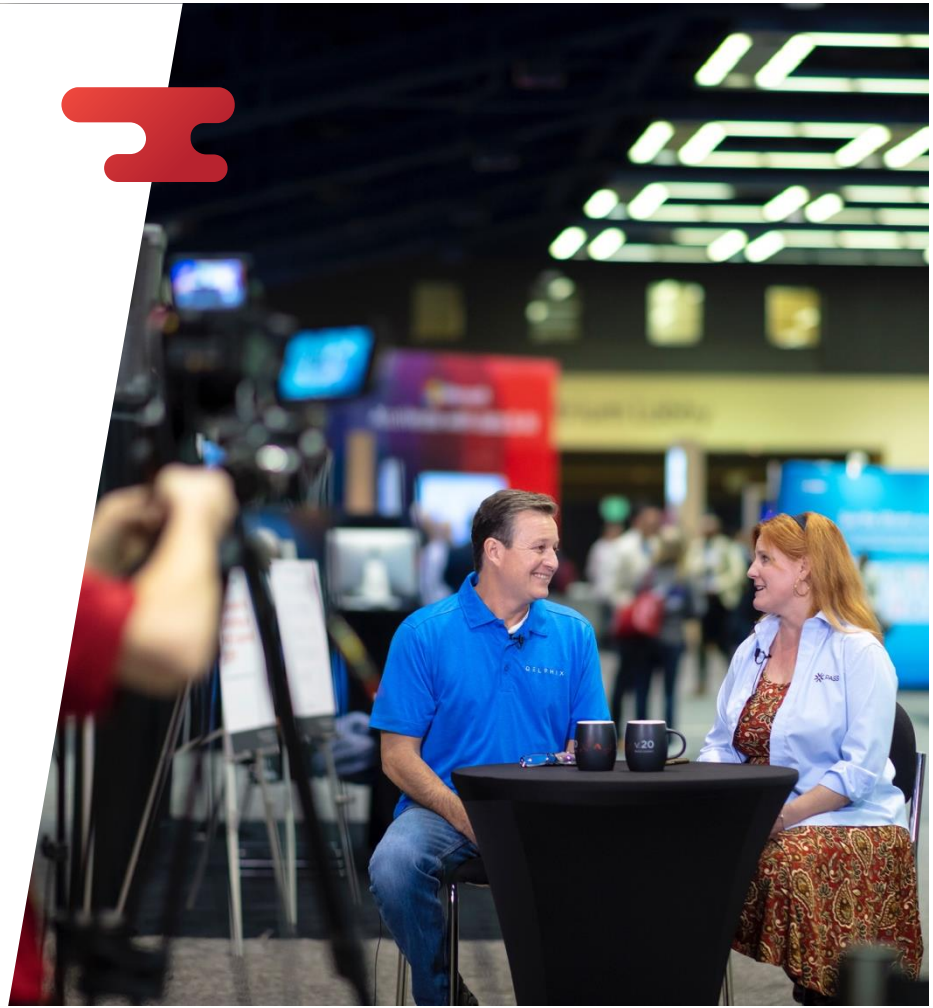
| | |
|---|---|
| **$1B+**<br>FY18 Direct Premium Written | **#1**<br>Best-in-class Return on Equity (5-yr Average) |
| **18**<br>States actively doing business | **>800K**<br>Customer policies managed |
| **800+**<br>Full time equivalent employees | **9,000+**<br>Independent agents in the distribution channel |
| **Ft. Lauderdale, FL**<br>Headquarters | **A**<br>**Exceptional**<br>Demotech financial stability rating |

PASS

# Demos

DEMO

# Setup + Config (DEMO 1)



Text Analytics API | Micro

Secure | https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics/

Why Azure | Solutions | Products | Documentation | Pricing | Training | Marketplace | Partners | Support | More | Portal | Free account >

# Extract information from your text

Use the demo below to experiment with the Text Analytics API. Pick one of our examples or provide your own.
Identify the language, sentiment, key phrases, and entities (Preview) of your text by clicking "Analyze".

See it in action

Destiny is a gift. Some go their entire lives, living existence as a quiet desperation. Never learning the truth that what feels as though a burden pushing down upon our shoulders, is actually, a sense of purpose that lifts us to greater heights. Never forget that fear is but the precursor to valor, that to strive and triumph in the face of fear, is what it means to be a hero. Don't think, Master Jim. Become!


Analyze

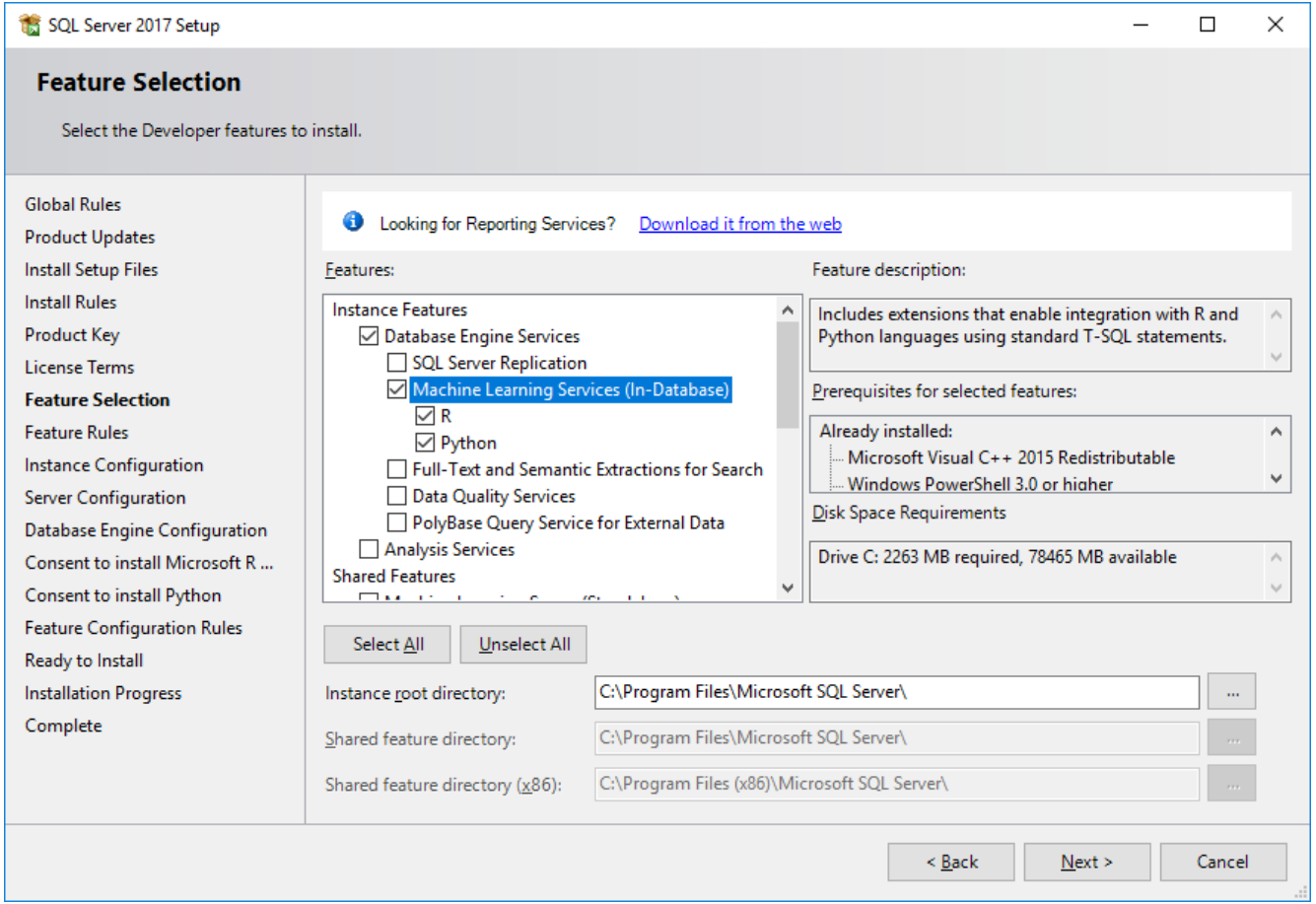
Analyzed text | JSON

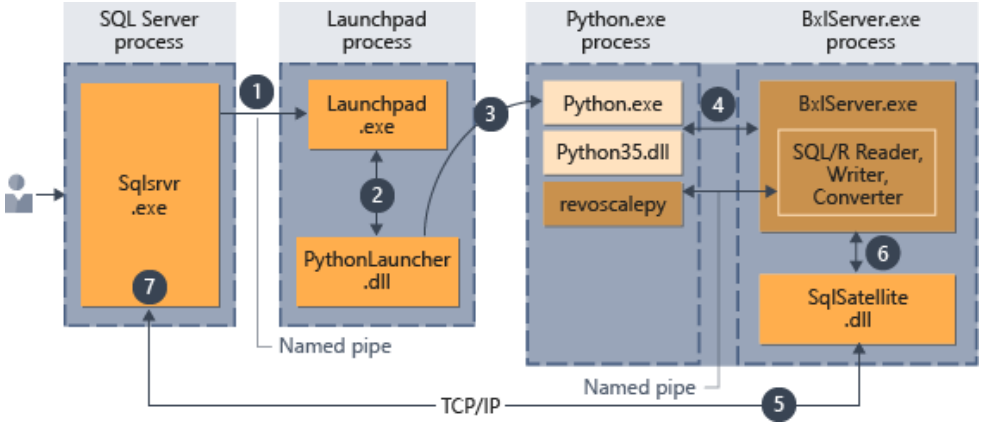
**LANGUAGES:** English (confidence: 100 %)

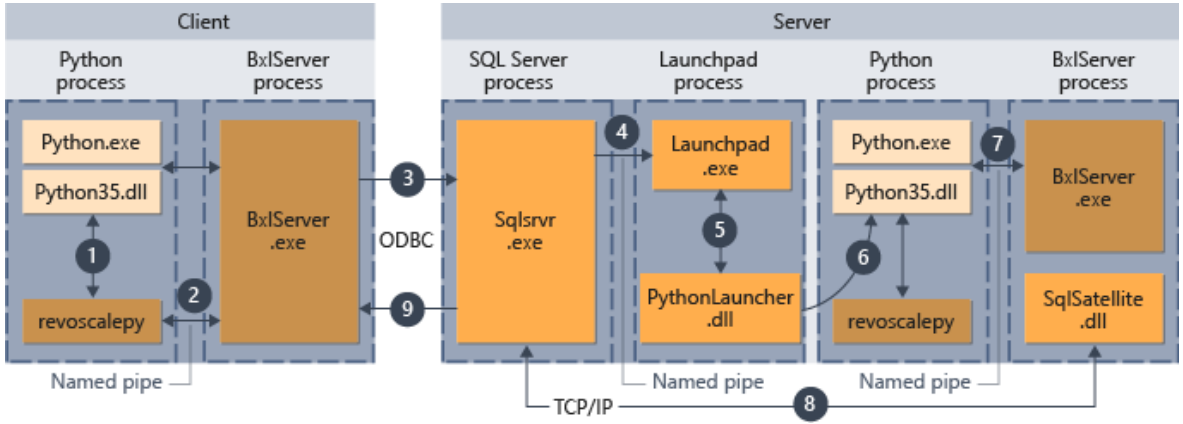
**KEY PHRASES:** face of fear, existence, triumph, valor, sense of purpose, entire lives, quiet desperation, shoulders, greater heights, precursor, Destiny, gift, Master Jim, burden, truth, hero

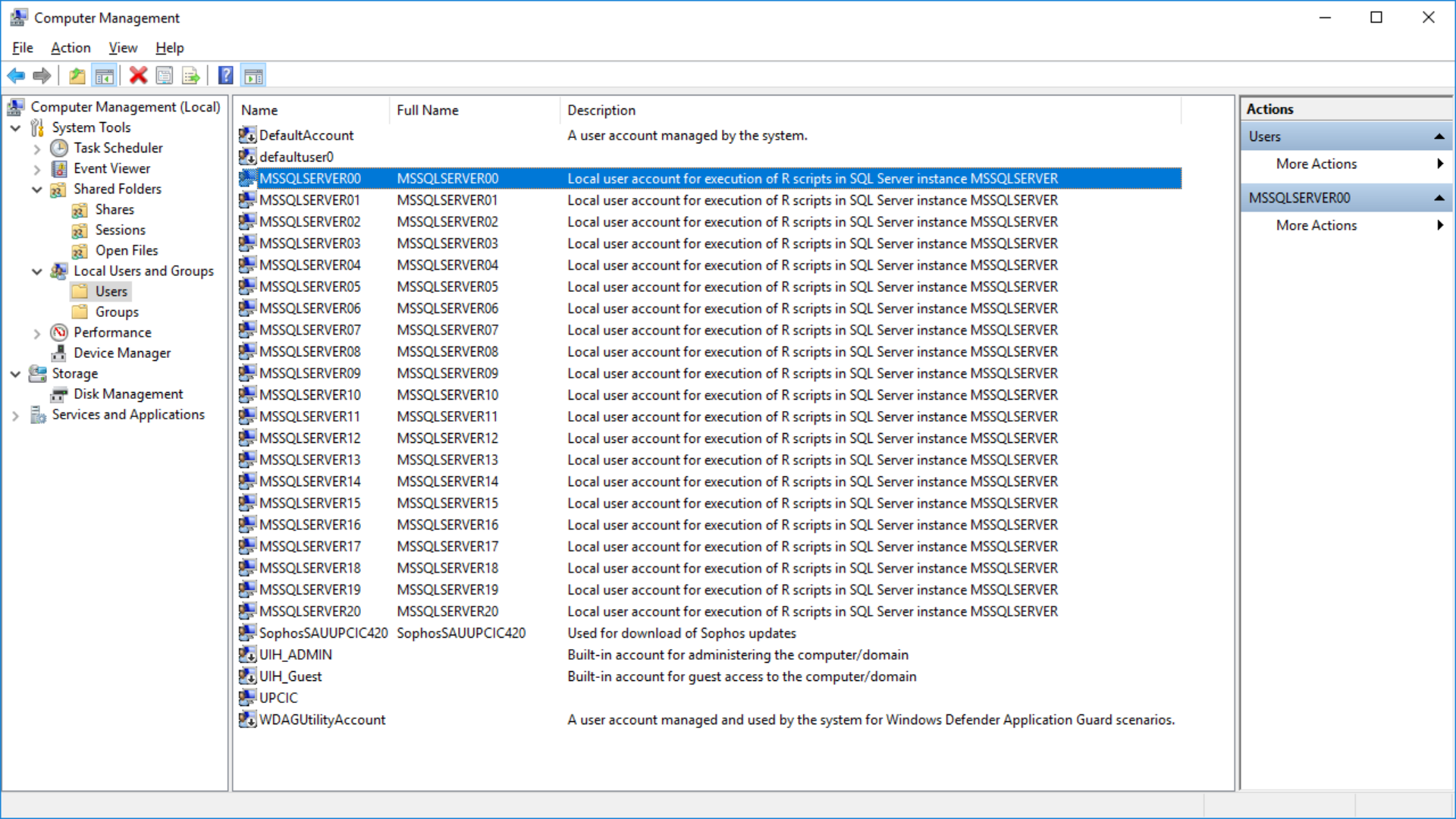
**SENTIMENT:** 78 %

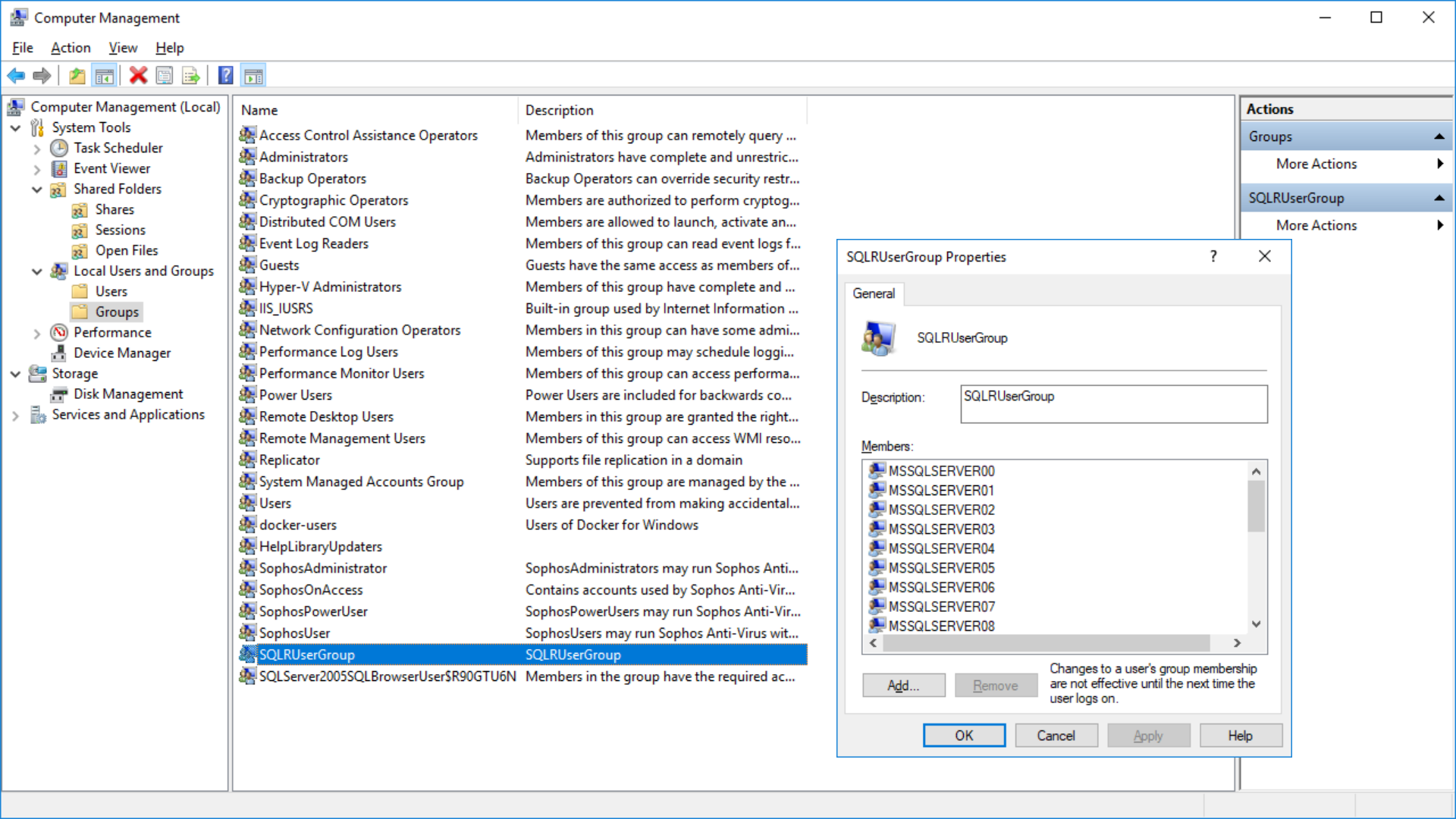
**LINKED ENTITIES (PREVIEW):** Destiny is a gift. Some go their entire lives, living existence as a quiet desperation. Never learning the truth that what feels as though a burden pushing down upon our shoulders, is actually, a sense of purpose that lifts us to greater heights.


SQL Server 2017 Setup
Feature Selection
Select the Developer features to install.
Global Rules
Product Updates
Install Setup Files
Install Rules
Product Key
License Terms
Feature Selection
Feature Rules
Instance Configuration
Server Configuration
Database Engine Configuration
Consent to install Microsoft R ...
Consent to install Python
Feature Configuration Rules
Ready to Install
Installation Progress
Complete
Looking for Reporting Services?
Download it from the web
Features:
Instance Features
Database Engine Services
SQL Server Replication
Machine Learning Services (In-Database)
R
Python
Full-Text and Semantic Extractions for Search
Data Quality Services
PolyBase Query Service for External Data
Analysis Services
Shared Features
Feature description:
Includes extensions that enable integration with R and Python languages using standard T-SQL statements.
Prerequisites for selected features:
Already installed:
Microsoft Visual C++ 2015 Redistributable
Windows PowerShell 3.0 or higher
Disk Space Requirements
Drive C: 2263 MB required, 78465 MB available
Select All
Unselect All
Instance root directory:
C:\Program Files\Microsoft SQL Server\
Shared feature directory:
C:\Program Files\Microsoft SQL Server\
Shared feature directory (x86):
C:\Program Files (x86)\Microsoft SQL Server\
< Back
Next >
Cancel

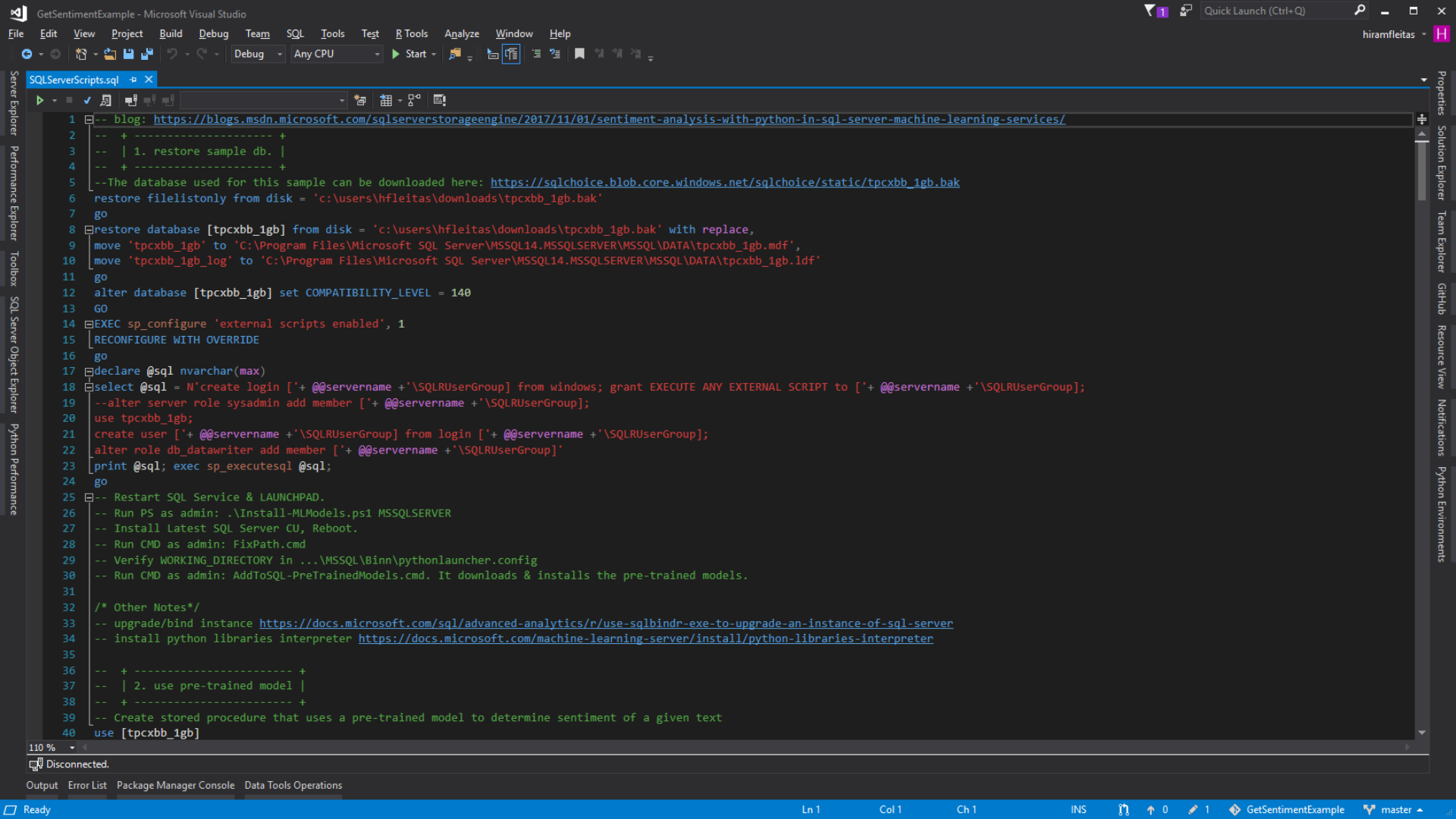

SQL Server process
Launchpad process
Python.exe process
BxlServer.exe process
Sqlsrvr .exe
Launchpad .exe
PythonLauncher .dll
Python.exe
Python35.dll
revoscalepy
BxlServer.exe
SQL/R Reader, Writer, Converter
SqlSatellite .dll
1
2
3
4
5
6
7
Named pipe
Named pipe
TCP/IP

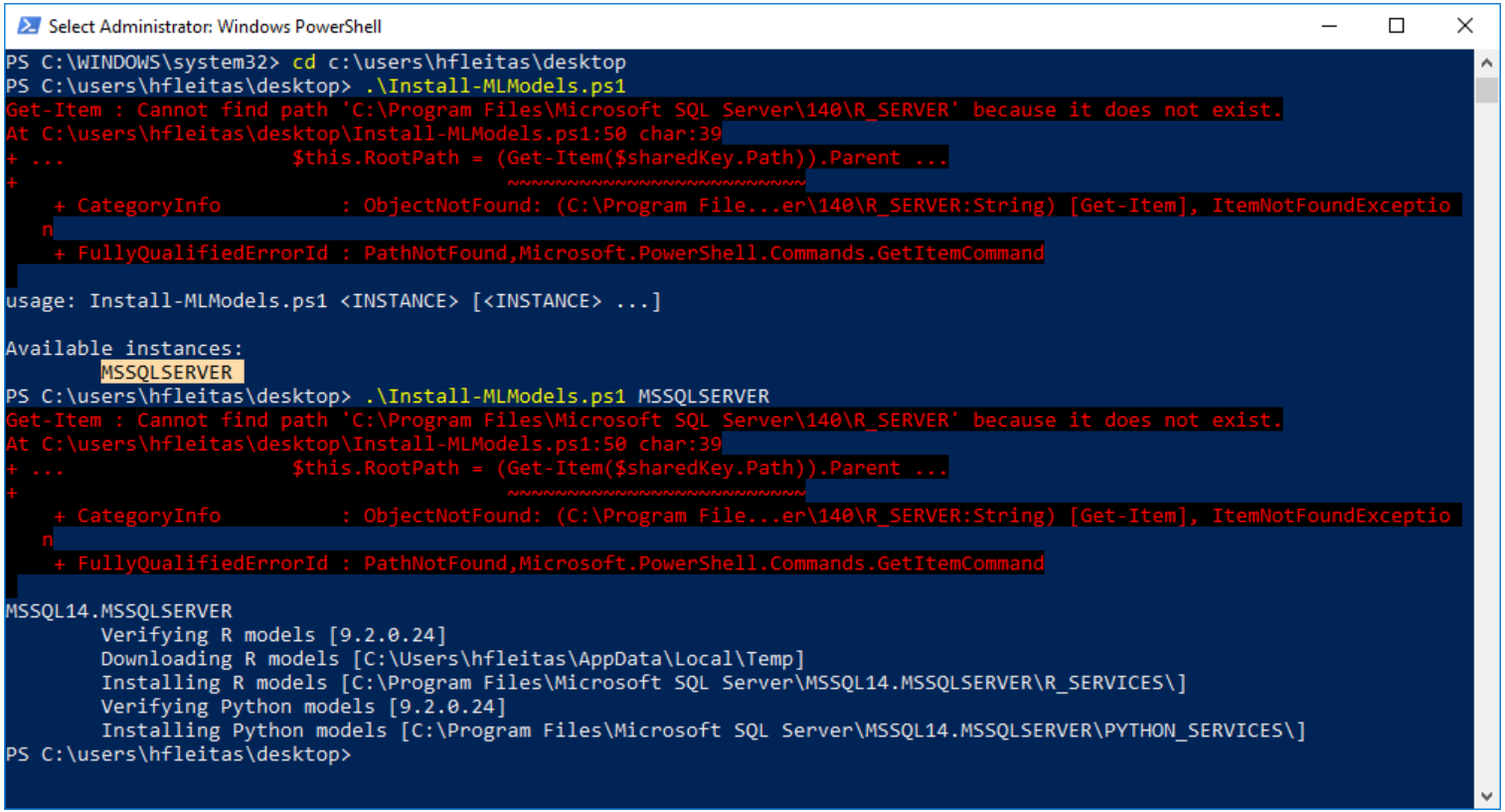

Client
Server
Python process
BxlServer process
SQL Server process
Launchpad process
Python process
BxlServer process
Python.exe
Python35.dll
revoscalepy
BxlServer .exe
ODBC
Sqlsrvr .exe
Launchpad .exe
PythonLauncher .dll
Python.exe
Python35.dll
revoscalepy
BxlServer .exe
SqlSatellite .dll
1
2
3
4
5
6
7
8
9
Named pipe
Named pipe
Named pipe
TCP/IP

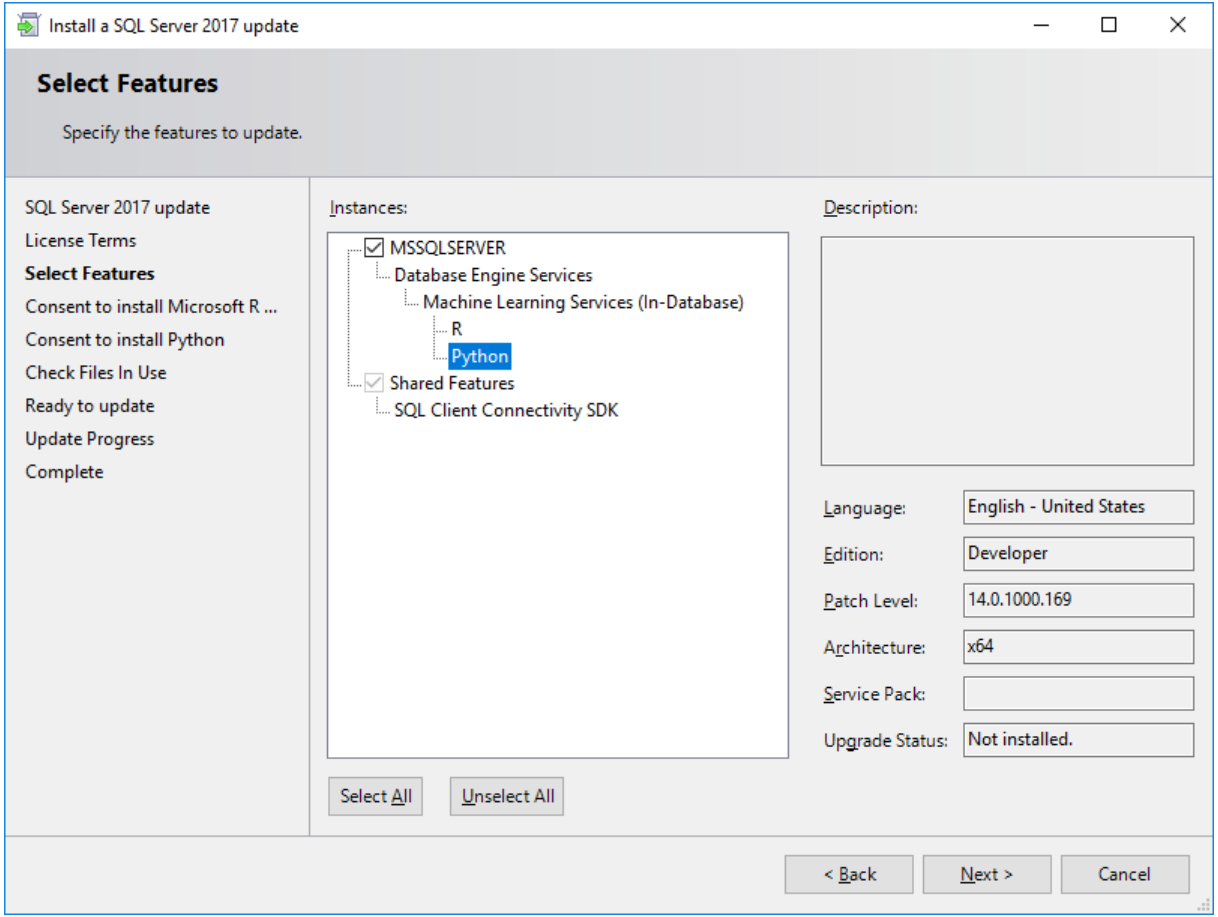

Computer Management
File Action View Help
Computer Management (Local)
System Tools
Task Scheduler
Event Viewer
Shared Folders
Shares
Sessions
Open Files
Local Users and Groups
Users
Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
Name Full Name Description
DefaultAccount A user account managed by the system.
defaultuser0
MSSQLSERVER00 MSSQLSERVER00 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER01 MSSQLSERVER01 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER02 MSSQLSERVER02 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER03 MSSQLSERVER03 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER04 MSSQLSERVER04 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER05 MSSQLSERVER05 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER06 MSSQLSERVER06 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER07 MSSQLSERVER07 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER08 MSSQLSERVER08 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER09 MSSQLSERVER09 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER10 MSSQLSERVER10 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER11 MSSQLSERVER11 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER12 MSSQLSERVER12 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER13 MSSQLSERVER13 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER14 MSSQLSERVER14 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER15 MSSQLSERVER15 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER16 MSSQLSERVER16 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER17 MSSQLSERVER17 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER18 MSSQLSERVER18 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER19 MSSQLSERVER19 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
MSSQLSERVER20 MSSQLSERVER20 Local user account for execution of R scripts in SQL Server instance MSSQLSERVER
SophosSAUUPCIC420 SophosSAUUPCIC420 Used for download of Sophos updates
UIH_ADMIN Built-in account for administering the computer/domain
UIH_Guest Built-in account for guest access to the computer/domain
UPCIC
WDAGUtilityAccount A user account managed and used by the system for Windows Defender Application Guard scenarios.
Actions
Users
More Actions
MSSQLSERVER00
More Actions

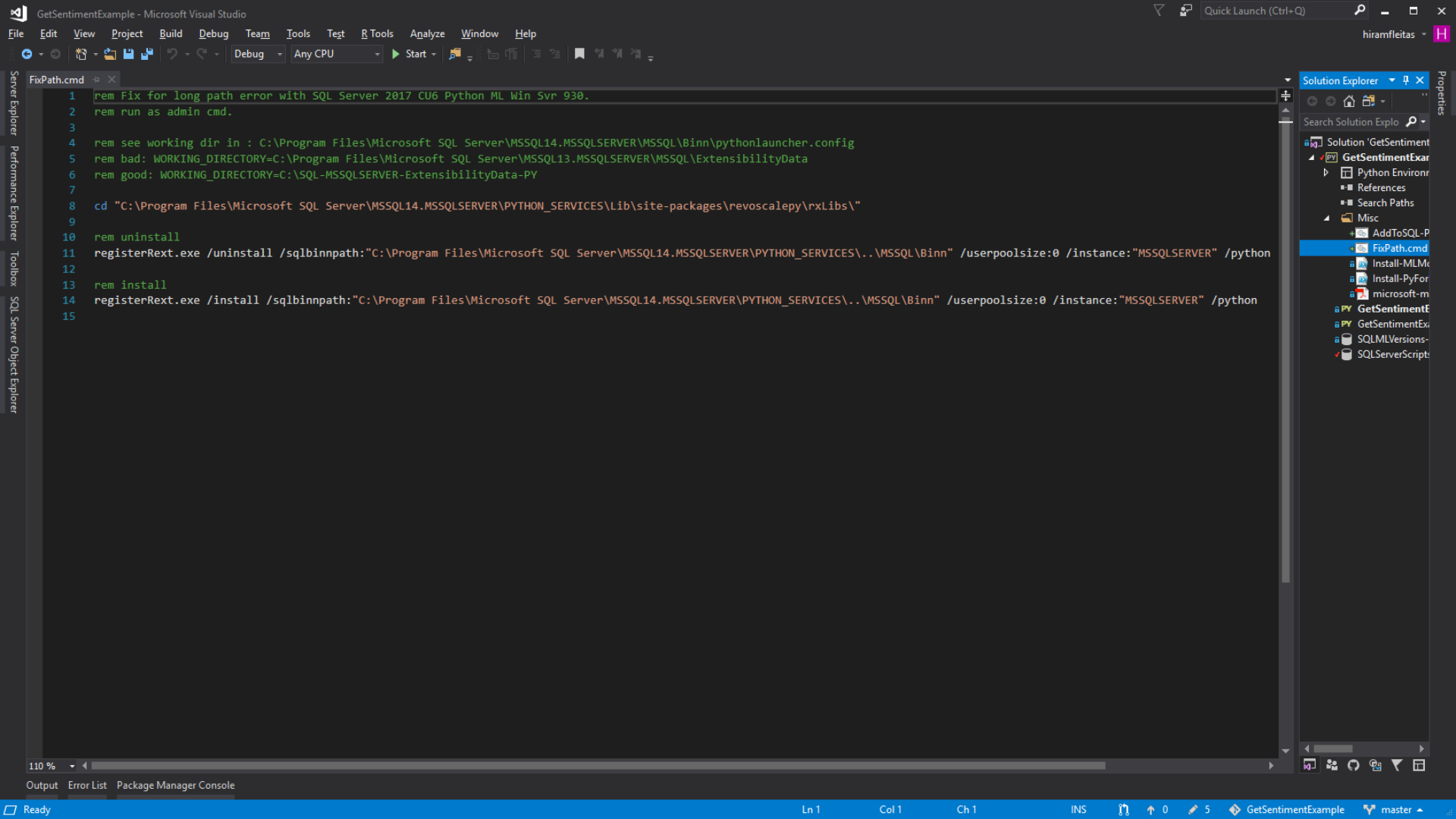

Computer Management
File Action View Help
Computer Management (Local)
System Tools
Task Scheduler
Event Viewer
Shared Folders
Shares
Sessions
Open Files
Local Users and Groups
Users
Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
Name
Description
Access Control Assistance Operators
Members of this group can remotely query ...
Administrators
Administrators have complete and unrestric...
Backup Operators
Backup Operators can override security restr...
Cryptographic Operators
Members are authorized to perform cryptog...
Distributed COM Users
Members are allowed to launch, activate an...
Event Log Readers
Members of this group can read event logs f...
Guests
Guests have the same access as members of...
Hyper-V Administrators
Members of this group have complete and ...
IIS_IUSRS
Built-in group used by Internet Information ...
Network Configuration Operators
Members in this group can have some admi...
Performance Log Users
Members of this group may schedule loggi...
Performance Monitor Users
Members of this group can access performa...
Power Users
Power Users are included for backwards co...
Remote Desktop Users
Members in this group are granted the right...
Remote Management Users
Members of this group can access WMI reso...
Replicator
Supports file replication in a domain
System Managed Accounts Group
Members of this group are managed by the ...
Users
Users are prevented from making accidental...
docker-users
Users of Docker for Windows
HelpLibraryUpdaters
SophosAdministrator
SophosAdministrators may run Sophos Anti...
SophosOnAccess
Contains accounts used by Sophos Anti-Vir...
SophosPowerUser
SophosPowerUsers may run Sophos Anti-Vir...
SophosUser
SophosUsers may run Sophos Anti-Virus wit...
SQLRUserGroup
SQLRUserGroup
SQLServer2005SQLBrowserUser$R90GTU6N
Members in the group have the required ac...
Actions
Groups
More Actions
SQLRUserGroup
More Actions
SQLRUserGroup Properties
General
SQLRUserGroup
Description:
SQLRUserGroup
Members:
MSSQLSERVER00
MSSQLSERVER01
MSSQLSERVER02
MSSQLSERVER03
MSSQLSERVER04
MSSQLSERVER05
MSSQLSERVER06
MSSQLSERVER07
MSSQLSERVER08
Add...
Remove
Changes to a user's group membership are not effective until the next time the user logs on.
OK
Cancel
Apply
Help

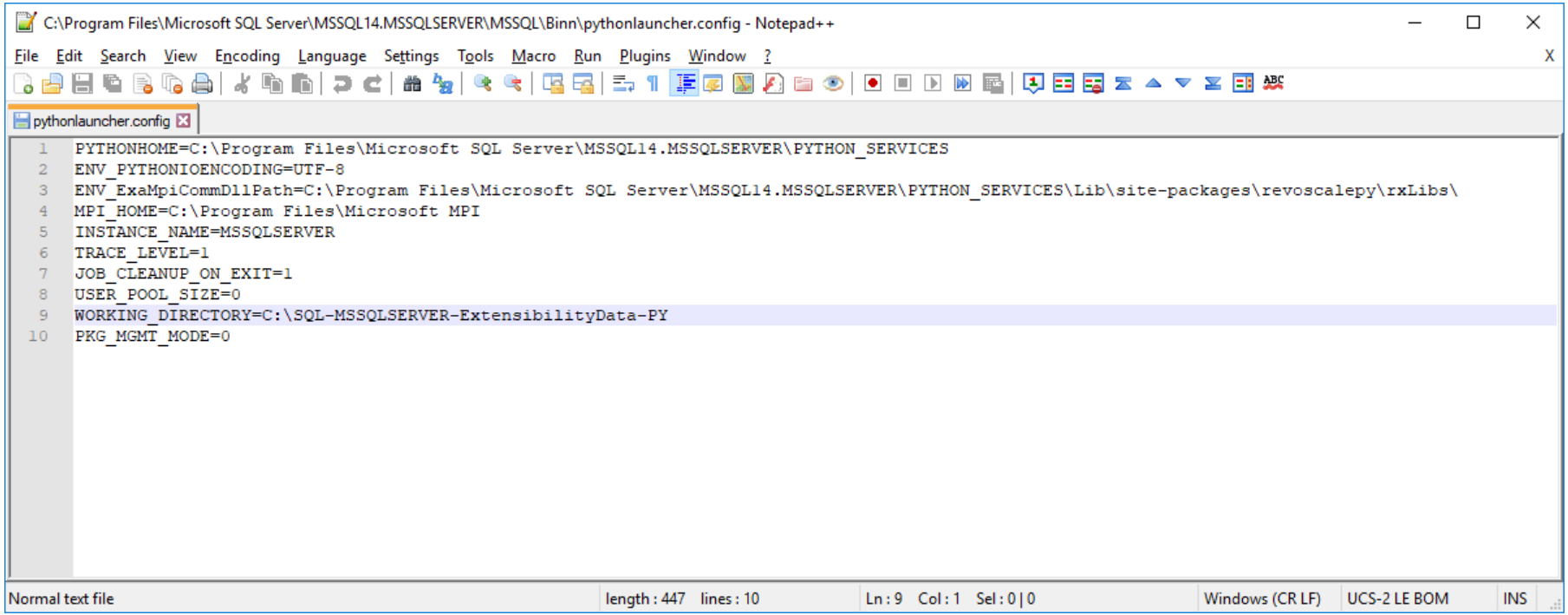
```
exec sp_configure 'external scripts enabled', 1
reconfigure with override
go

declare @sql nvarchar(max);
-- only need to grant connect permissions!
select @sql = N'if not exists (select 1 from syslogins where name ='''+ @@servername +'\SQLRUserGroup'')
begin
    create login ['+ @@servername +'\SQLRUserGroup] from windows
end'
print @sql; exec sp_executesql @sql;
go
-- Restart SQL Service & LAUNCHPAD.
-- Run PS as admin: .\Install-MLModels.ps1 MSSQLSERVER
-- Install Latest SQL Server CU, Reboot.
-- Run CMD as admin: FixPath.cmd
-- Verify WORKING_DIRECTORY in ...\MSSQL\Binn\pythonlauncher.config
-- Run CMD as admin: AddToSQL-PreTrainedModels.cmd. It downloads & installs the pre-trained models.
```

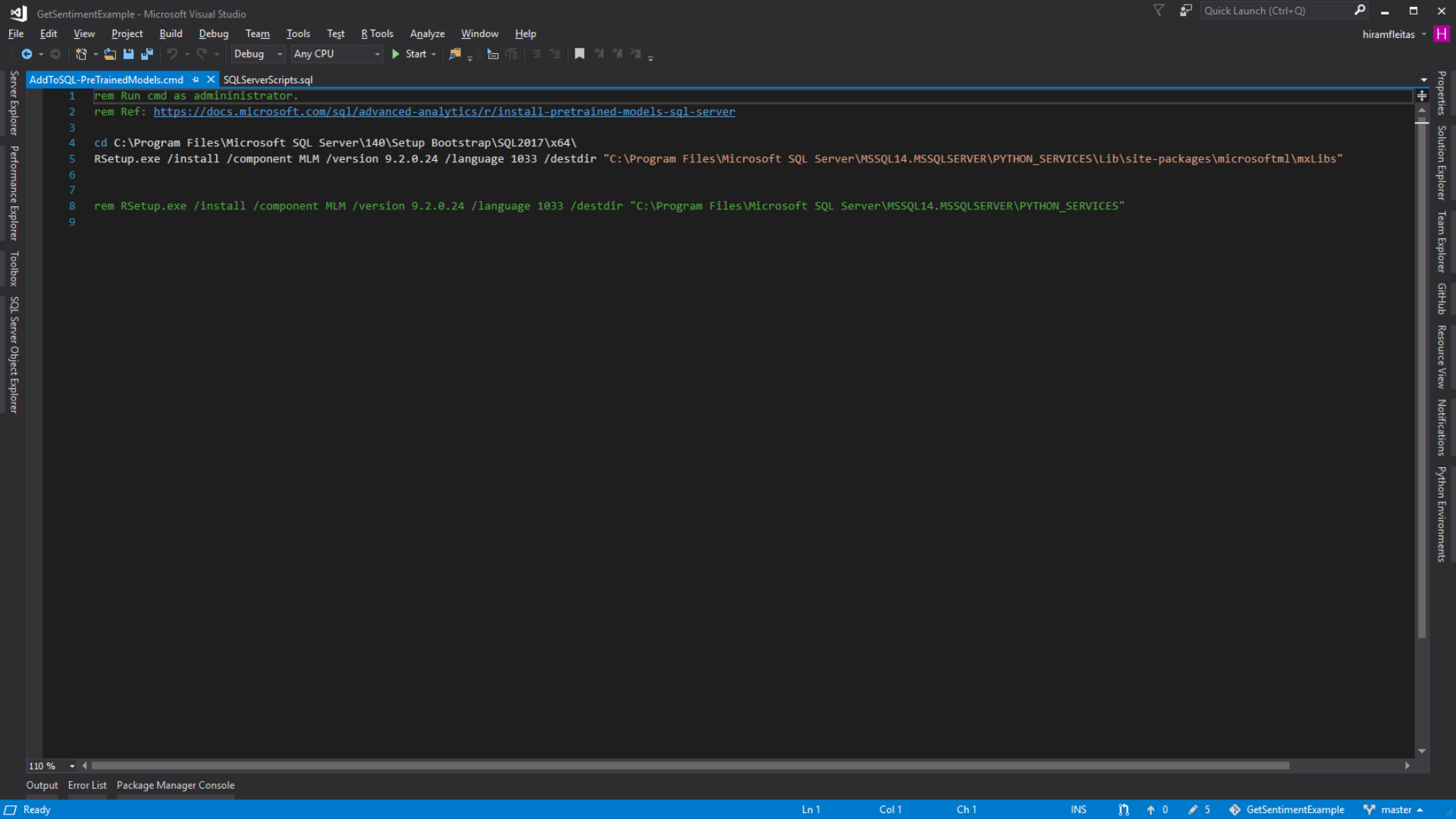

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
-- blog: https://blogs.msdn.microsoft.com/sqlserverstorageengine/2017/11/01/sentiment-analysis-with-python-in-sql-server-machine-learning-services/
-- + ---------- +
-- | 1. restore sample db. |
-- + ---------- +
--The database used for this sample can be downloaded here: https://sqlchoice.blob.core.windows.net/sqlchoice/static/tpcxbb_1gb.bak
restore filelistonly from disk = 'c:\users\hfleitas\downloads\tpcxbb_1gb.bak'
go
restore database [tpcxbb_1gb] from disk = 'c:\users\hfleitas\downloads\tpcxbb_1gb.bak' with replace,
move 'tpcxbb_1gb' to 'C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\DATA\tpcxbb_1gb.mdf',
move 'tpcxbb_1gb_log' to 'C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\DATA\tpcxbb_1gb.ldf'
go
alter database [tpcxbb_1gb] set COMPATIBILITY_LEVEL = 140
GO
EXEC sp_configure 'external scripts enabled', 1
RECONFIGURE WITH OVERRIDE
go
declare @sql nvarchar(max)
select @sql = N'create login ['+ @@servername +'\SQLRUserGroup] from windows; grant EXECUTE ANY EXTERNAL SCRIPT to ['+ @@servername +'\SQLRUserGroup];
--alter server role sysadmin add member ['+ @@servername +'\SQLRUserGroup];
use tpcxbb_1gb;
create user ['+ @@servername +'\SQLRUserGroup] from login ['+ @@servername +'\SQLRUserGroup];
alter role db_datawriter add member ['+ @@servername +'\SQLRUserGroup]'
print @sql; exec sp_executesql @sql;
go
-- Restart SQL Service & LAUNCHPAD.
-- Run PS as admin: .\Install-MLModels.ps1 MSSQLSERVER
-- Install Latest SQL Server CU, Reboot.
-- Run CMD as admin: FixPath.cmd
-- Verify WORKING_DIRECTORY in ...\MSSQL\Binn\pythonlauncher.config
-- Run CMD as admin: AddToSQL-PreTrainedModels.cmd. It downloads & installs the pre-trained models.
/* Other Notes*/
-- upgrade/bind instance https://docs.microsoft.com/sql/advanced-analytics/r/use-sqlbindr-exe-to-upgrade-an-instance-of-sql-server
-- install python libraries interpreter https://docs.microsoft.com/machine-learning-server/install/python-libraries-interpreter
-- + ---------- +
-- | 2. use pre-trained model |
-- + ---------- +
-- Create stored procedure that uses a pre-trained model to determine sentiment of a given text
use [tpcxbb_1gb]
110 %
Disconnected.
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master
Server Explorer Performance Explorer Toolbox SQL Server Object Explorer Python Performance
Properties Solution Explorer Team Explorer GitHub Resource View Notifications Python Environments

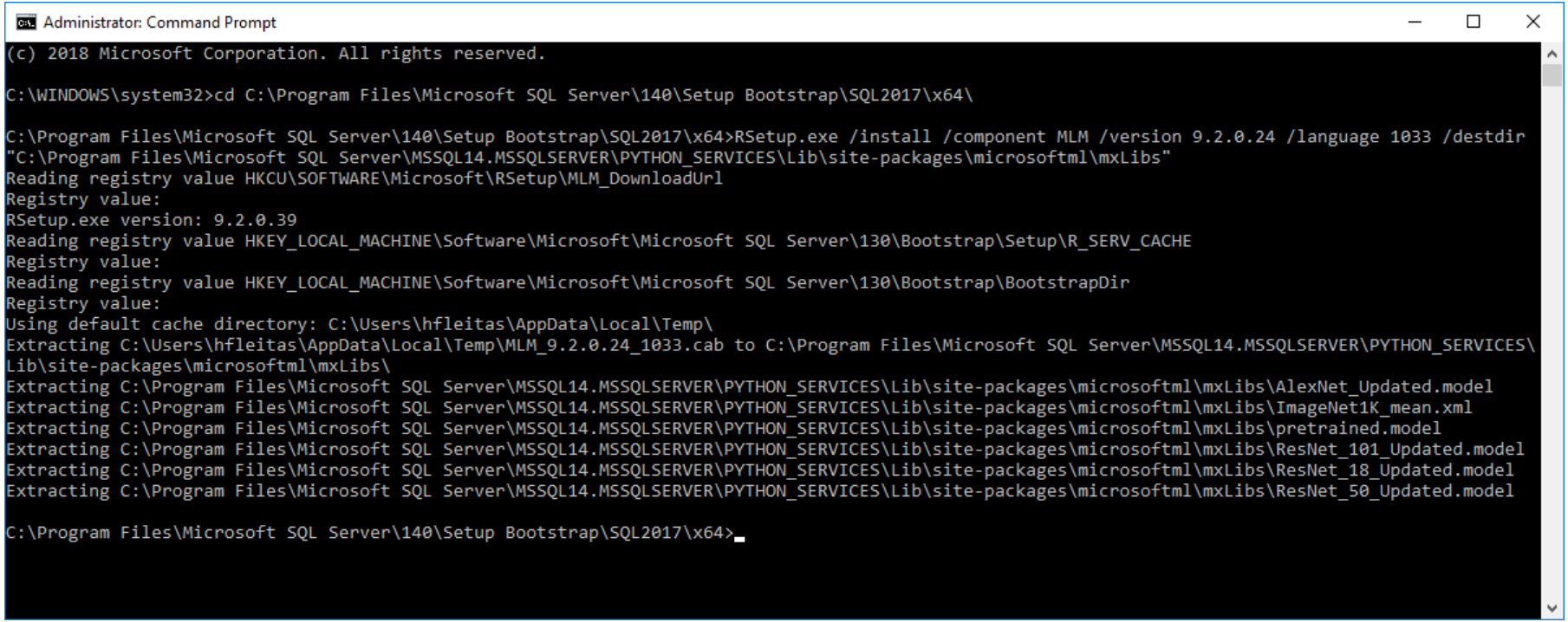

Select Administrator: Windows PowerShell
PS C:\WINDOWS\system32> cd c:\users\hfleitas\desktop
PS C:\users\hfleitas\desktop> .\Install-MLModels.ps1
Get-Item : Cannot find path 'C:\Program Files\Microsoft SQL Server\140\R_SERVER' because it does not exist.
At C:\users\hfleitas\desktop\Install-MLModels.ps1:50 char:39
+ ... $this.RootPath = (Get-Item($sharedKey.Path)).Parent ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
+ CategoryInfo : ObjectNotFound: (C:\Program File...er\140\R_SERVER:String) [Get-Item], ItemNotFoundExceptio
n
+ FullyQualifiedErrorId : PathNotFound,Microsoft.PowerShell.Commands.GetItemCommand
usage: Install-MLModels.ps1 <INSTANCE> [<INSTANCE> ...]
Available instances:
MSSQLSERVER
PS C:\users\hfleitas\desktop> .\Install-MLModels.ps1 MSSQLSERVER
Get-Item : Cannot find path 'C:\Program Files\Microsoft SQL Server\140\R_SERVER' because it does not exist.
At C:\users\hfleitas\desktop\Install-MLModels.ps1:50 char:39
+ ... $this.RootPath = (Get-Item($sharedKey.Path)).Parent ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
+ CategoryInfo : ObjectNotFound: (C:\Program File...er\140\R_SERVER:String) [Get-Item], ItemNotFoundExceptio
n
+ FullyQualifiedErrorId : PathNotFound,Microsoft.PowerShell.Commands.GetItemCommand
MSSQL14.MSSQLSERVER
Verifying R models [9.2.0.24]
Downloading R models [C:\Users\hfleitas\AppData\Local\Temp]
Installing R models [C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\]
Verifying Python models [9.2.0.24]
Installing Python models [C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\]
PS C:\users\hfleitas\desktop>

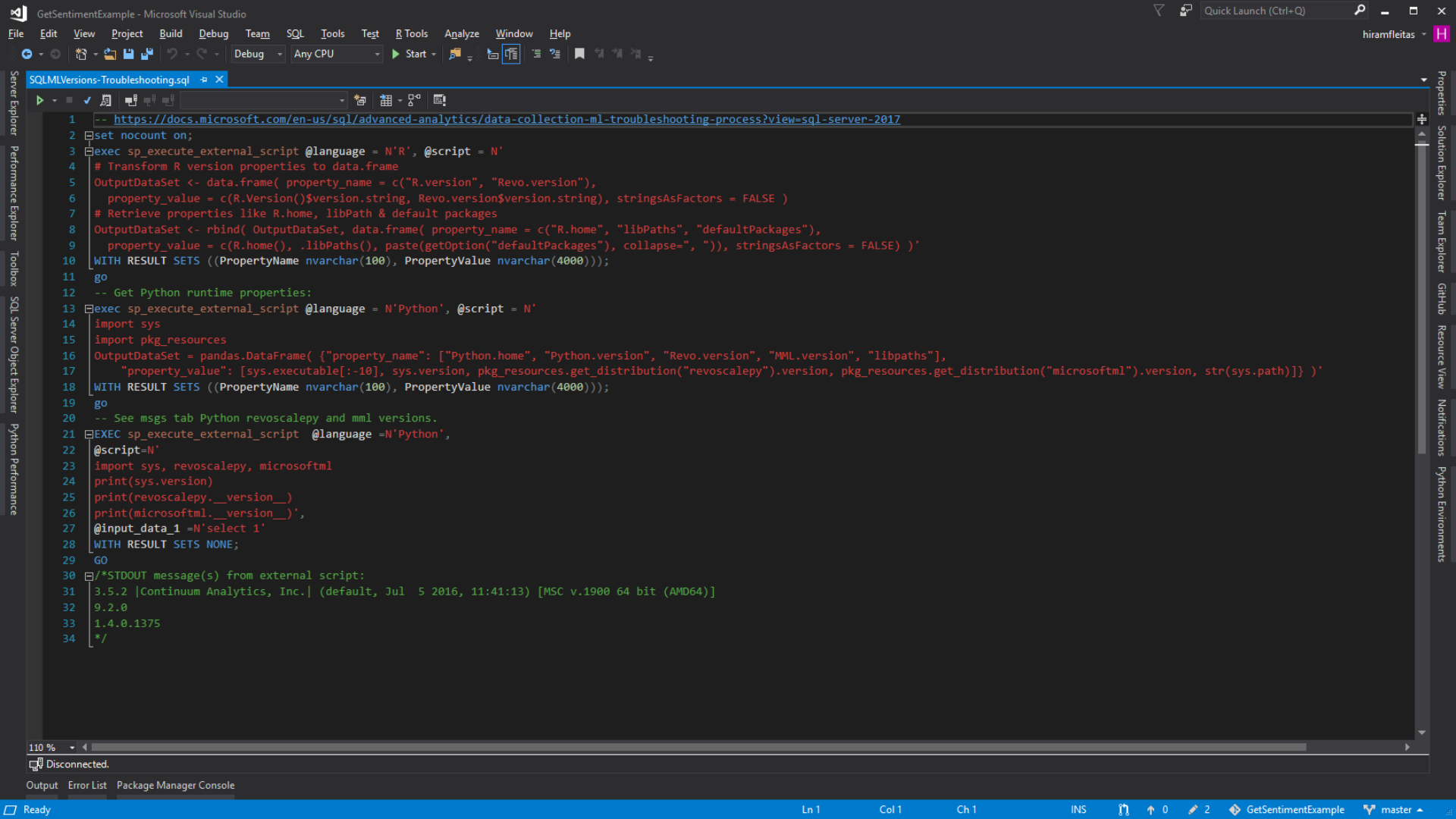

Install a SQL Server 2017 update
Select Features
Specify the features to update.
SQL Server 2017 update
License Terms
Select Features
Consent to install Microsoft R ...
Consent to install Python
Check Files In Use
Ready to update
Update Progress
Complete
Instances:
MSSQLSERVER
Database Engine Services
Machine Learning Services (In-Database)
R
Python
Shared Features
SQL Client Connectivity SDK
Description:
Language: English - United States
Edition: Developer
Patch Level: 14.0.1000.169
Architecture: x64
Service Pack:
Upgrade Status: Not installed.
Select All
Unselect All
< Back
Next >
Cancel

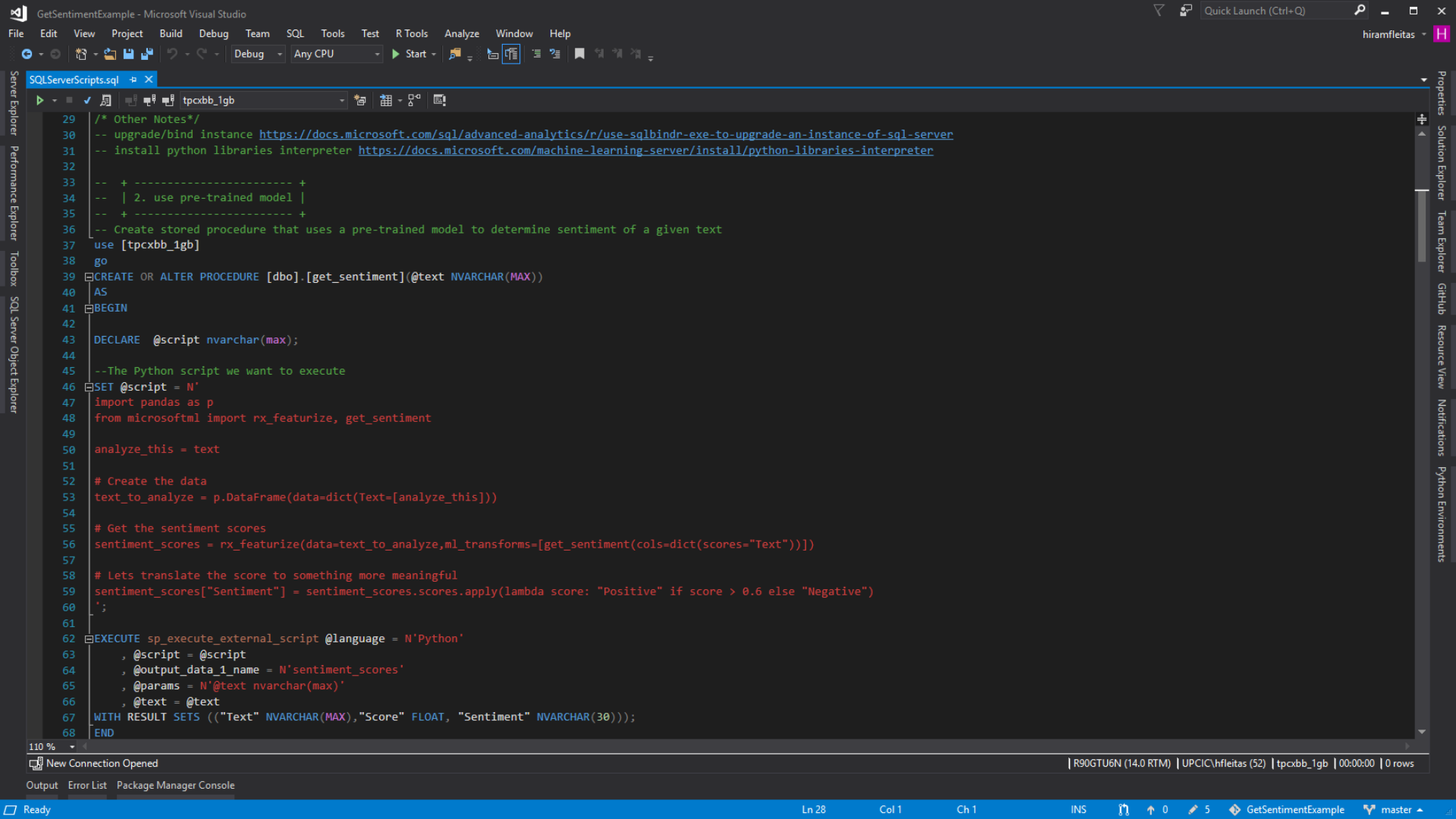

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
FixPath.cmd
rem Fix for long path error with SQL Server 2017 CU6 Python ML Win Svr 930.
rem run as admin cmd.
rem see working dir in : C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn\pythonlauncher.config
rem bad: WORKING_DIRECTORY=C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\ExtensibilityData
rem good: WORKING_DIRECTORY=C:\SQL-MSSQLSERVER-ExtensibilityData-PY
cd "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\revoscalepy\rxLibs\"
rem uninstall
registerRext.exe /uninstall /sqlbinnpath:"C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\..\MSSQL\Binn" /userpoolsize:0 /instance:"MSSQLSERVER" /python
rem install
registerRext.exe /install /sqlbinnpath:"C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\..\MSSQL\Binn" /userpoolsize:0 /instance:"MSSQLSERVER" /python
Solution Explorer
Search Solution Explo
Solution 'GetSentiment
GetSentimentExar
Python Environr
References
Search Paths
Misc
AddToSQL-P
FixPath.cmd
Install-MLM
Install-PyFor
microsoft-m
GetSentimentE
GetSentimentEx
SQLMLVersions-
SQLServerScripts
Properties
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
110 %
Output
Error List
Package Manager Console
Ready
Ln 1
Col 1
Ch 1
INS
0
5
GetSentimentExample
master

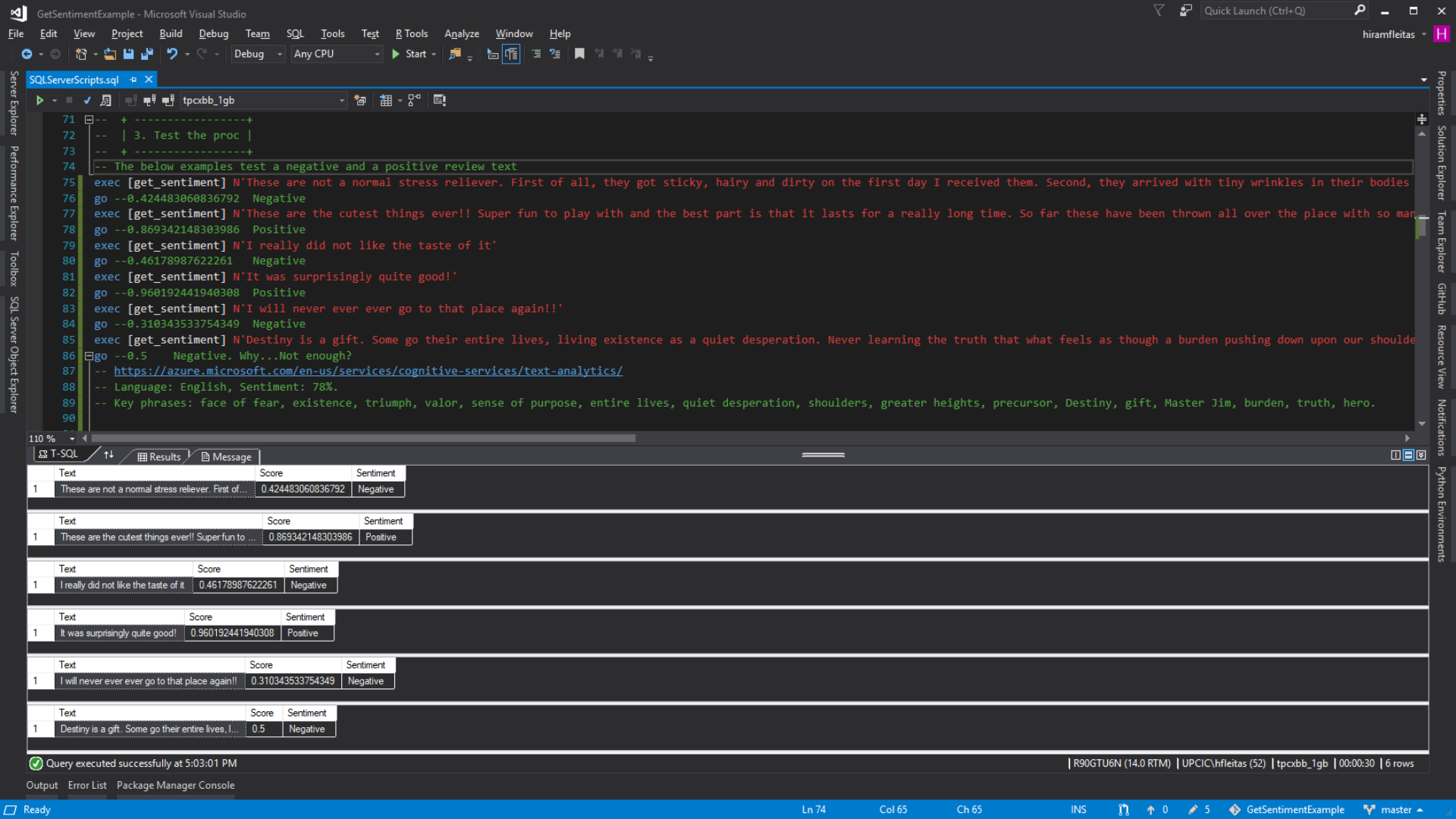

C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn\pythonlauncher.config - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
pythonlauncher.config
1 PYTHONHOME=C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES
2 ENV_PYTHONIOENCODING=UTF-8
3 ENV_ExaMpiCommDllPath=C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\revoscalepy\rxLibs\
4 MPI_HOME=C:\Program Files\Microsoft MPI
5 INSTANCE_NAME=MSSQLSERVER
6 TRACE_LEVEL=1
7 JOB_CLEANUP_ON_EXIT=1
8 USER_POOL_SIZE=0
9 WORKING_DIRECTORY=C:\SQL-MSSQLSERVER-ExtensibilityData-PY
10 PKG_MGMT_MODE=0
Normal text file
length : 447 lines : 10
Ln : 9 Col : 1 Sel : 0 | 0
Windows (CR LF)
UCS-2 LE BOM
INS

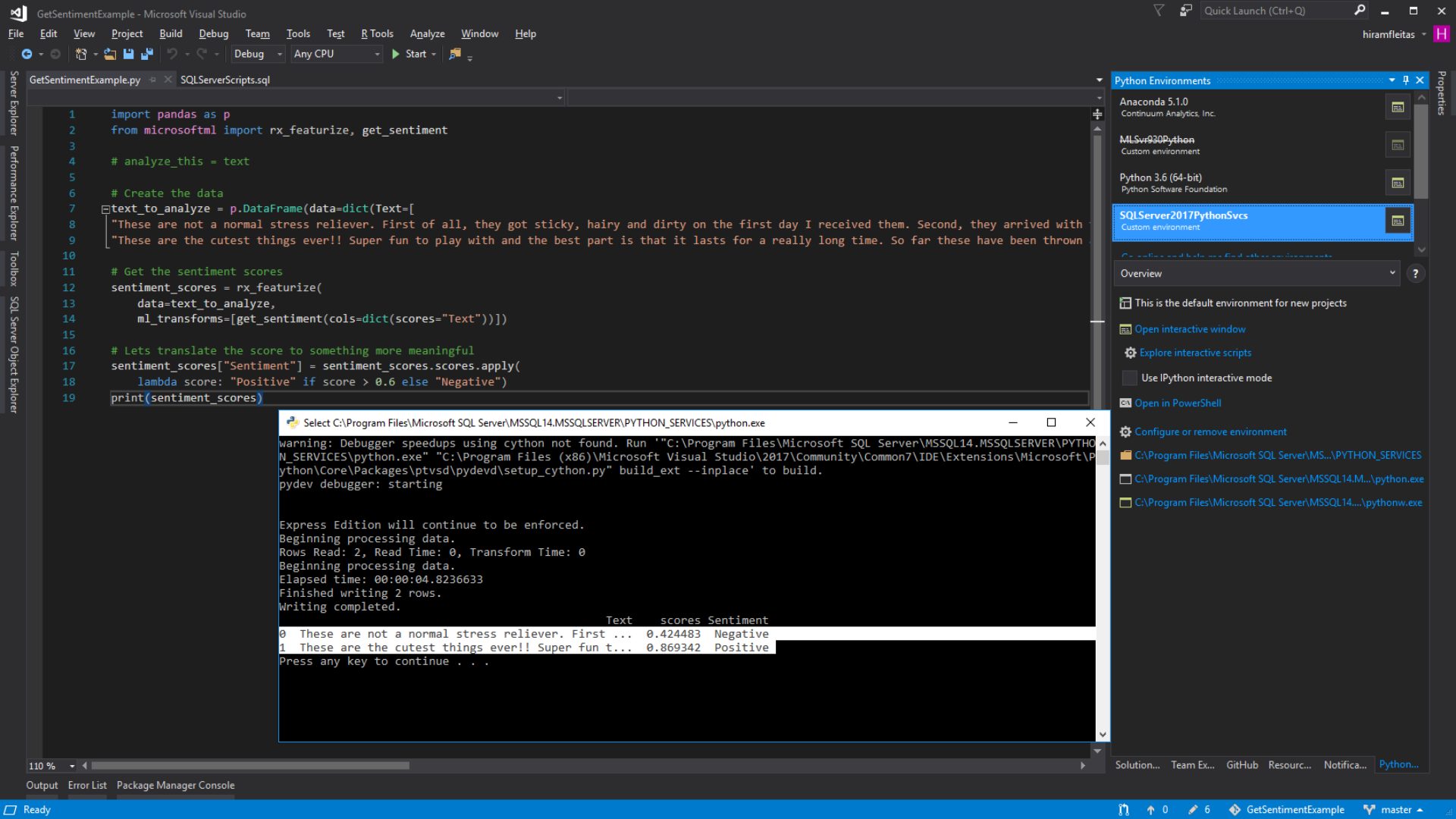

GetSentimentExample - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
AddToSQL-PreTrainedModels.cmd
SQLServerScripts.sql
rem Run cmd as admininistrator.
rem Ref: https://docs.microsoft.com/sql/advanced-analytics/r/install-pretrained-models-sql-server
cd C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\SQL2017\x64\
RSetup.exe /install /component MLM /version 9.2.0.24 /language 1033 /destdir "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs"
rem RSetup.exe /install /component MLM /version 9.2.0.24 /language 1033 /destdir "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES"
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
Properties
Solution Explorer
Team Explorer
GitHub
Resource View
Notifications
Python Environments
110 %
Output
Error List
Package Manager Console
Ready
Ln 1
Col 1
Ch 1
INS
0
5
GetSentimentExample
master

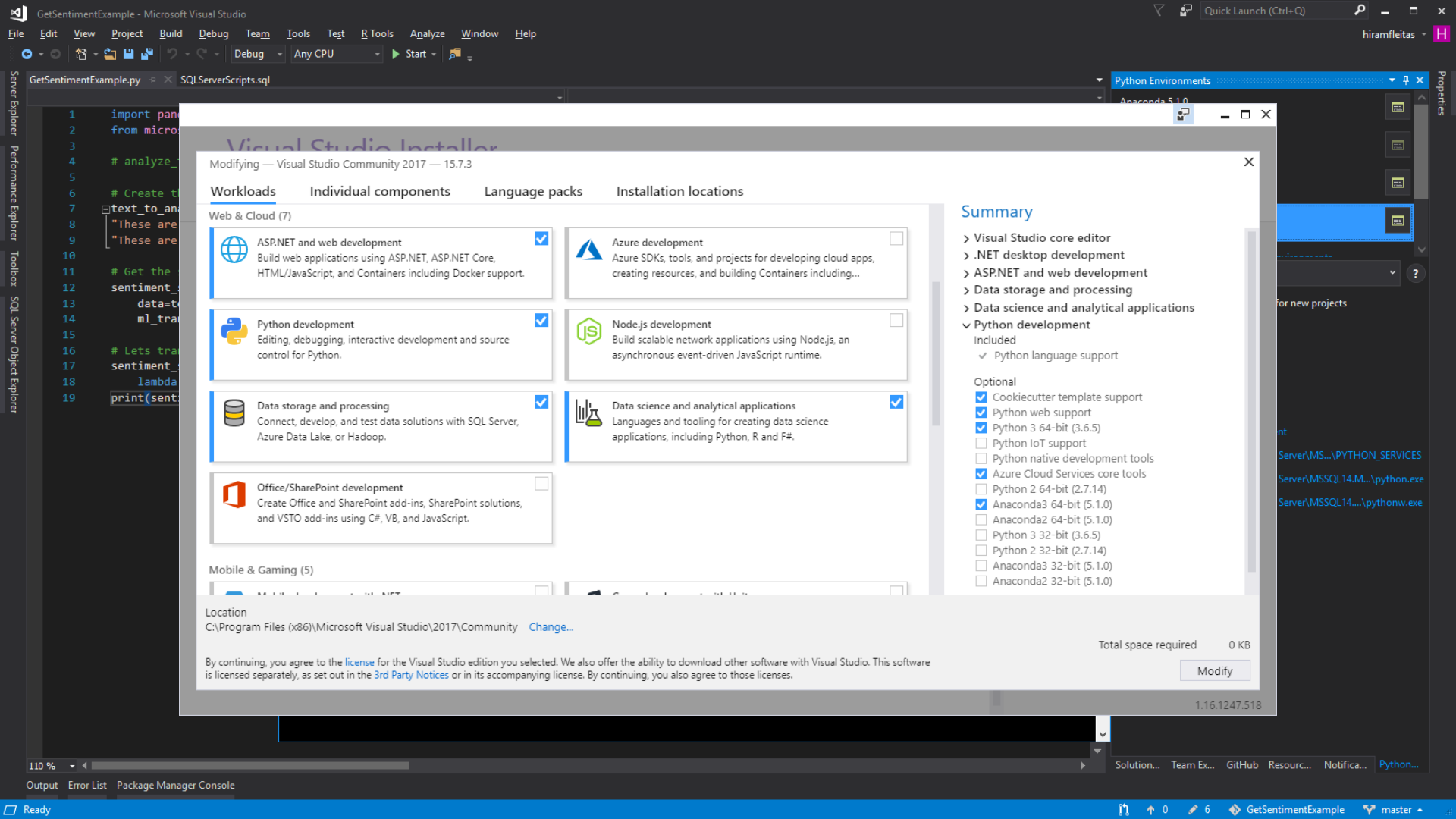

Administrator: Command Prompt
(c) 2018 Microsoft Corporation. All rights reserved.
C:\WINDOWS\system32>cd C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\SQL2017\x64\
C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\SQL2017\x64>RSetup.exe /install /component MLM /version 9.2.0.24 /language 1033 /destdir
"C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs"
Reading registry value HKCU\SOFTWARE\Microsoft\RSetup\MLM_DownloadUrl
Registry value:
RSetup.exe version: 9.2.0.39
Reading registry value HKEY_LOCAL_MACHINE\Software\Microsoft\Microsoft SQL Server\130\Bootstrap\Setup\R_SERV_CACHE
Registry value:
Reading registry value HKEY_LOCAL_MACHINE\Software\Microsoft\Microsoft SQL Server\130\Bootstrap\BootstrapDir
Registry value:
Using default cache directory: C:\Users\hfleitas\AppData\Local\Temp\
Extracting C:\Users\hfleitas\AppData\Local\Temp\MLM_9.2.0.24_1033.cab to C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\
Lib\site-packages\microsoftml\mxLibs\
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\AlexNet_Updated.model
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\ImageNet1K_mean.xml
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\pretrained.model
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\ResNet_101_Updated.model
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\ResNet_18_Updated.model
Extracting C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\Lib\site-packages\microsoftml\mxLibs\ResNet_50_Updated.model
C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\SQL2017\x64>


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLMLVersions-Troubleshooting.sql
-- https://docs.microsoft.com/en-us/sql/advanced-analytics/data-collection-ml-troubleshooting-process?view=sql-server-2017
set nocount on;
exec sp_execute_external_script @language = N'R', @script = N'
# Transform R version properties to data.frame
OutputDataSet <- data.frame( property_name = c("R.version", "Revo.version"),
property_value = c(R.Version()$version.string, Revo.version$version.string), stringsAsFactors = FALSE )
# Retrieve properties like R.home, libPath & default packages
OutputDataSet <- rbind( OutputDataSet, data.frame( property_name = c("R.home", "libPaths", "defaultPackages"),
property_value = c(R.home(), .libPaths(), paste(getOption("defaultPackages"), collapse=", ")), stringsAsFactors = FALSE) )'
WITH RESULT SETS ((PropertyName nvarchar(100), PropertyValue nvarchar(4000)));
go
-- Get Python runtime properties:
exec sp_execute_external_script @language = N'Python', @script = N'
import sys
import pkg_resources
OutputDataSet = pandas.DataFrame( {"property_name": ["Python.home", "Python.version", "Revo.version", "MML.version", "libpaths"],
"property_value": [sys.executable[:-10], sys.version, pkg_resources.get_distribution("revoscalepy").version, pkg_resources.get_distribution("microsoftml").version, str(sys.path)]} )'
WITH RESULT SETS ((PropertyName nvarchar(100), PropertyValue nvarchar(4000)));
go
-- See msgs tab Python revoscalepy and mml versions.
EXEC sp_execute_external_script @language =N'Python',
@script=N'
import sys, revoscalepy, microsoftml
print(sys.version)
print(revoscalepy.__version__)
print(microsoftml.__version__)',
@input_data_1 =N'select 1'
WITH RESULT SETS NONE;
GO
/*STDOUT message(s) from external script:
3.5.2 |Continuum Analytics, Inc.| (default, Jul 5 2016, 11:41:13) [MSC v.1900 64 bit (AMD64)]
9.2.0
1.4.0.1375
*/
110 %
Disconnected.
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
/* Other Notes*/
-- upgrade/bind instance https://docs.microsoft.com/sql/advanced-analytics/r/use-sqlbindr-exe-to-upgrade-an-instance-of-sql-server
-- install python libraries interpreter https://docs.microsoft.com/machine-learning-server/install/python-libraries-interpreter
-- + ---------------------- +
-- | 2. use pre-trained model |
-- + ---------------------- +
-- Create stored procedure that uses a pre-trained model to determine sentiment of a given text
use [tpcxbb_1gb]
go
CREATE OR ALTER PROCEDURE [dbo].[get_sentiment](@text NVARCHAR(MAX))
AS
BEGIN
DECLARE @script nvarchar(max);
--The Python script we want to execute
SET @script = N'
import pandas as p
from microsoftml import rx_featurize, get_sentiment
analyze_this = text
# Create the data
text_to_analyze = p.DataFrame(data=dict(Text=[analyze_this]))
# Get the sentiment scores
sentiment_scores = rx_featurize(data=text_to_analyze,ml_transforms=[get_sentiment(cols=dict(scores="Text"))])
# Lets translate the score to something more meaningful
sentiment_scores["Sentiment"] = sentiment_scores.scores.apply(lambda score: "Positive" if score > 0.6 else "Negative")
';
EXECUTE sp_execute_external_script @language = N'Python'
, @script = @script
, @output_data_1_name = N'sentiment_scores'
, @params = N'@text nvarchar(max)'
, @text = @text
WITH RESULT SETS ((("Text" NVARCHAR(MAX),"Score" FLOAT, "Sentiment" NVARCHAR(30)));
END
110 %
New Connection Opened
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console
Ready
Ln 28 Col 1 Ch 1 INS
GetSentimentExample
master

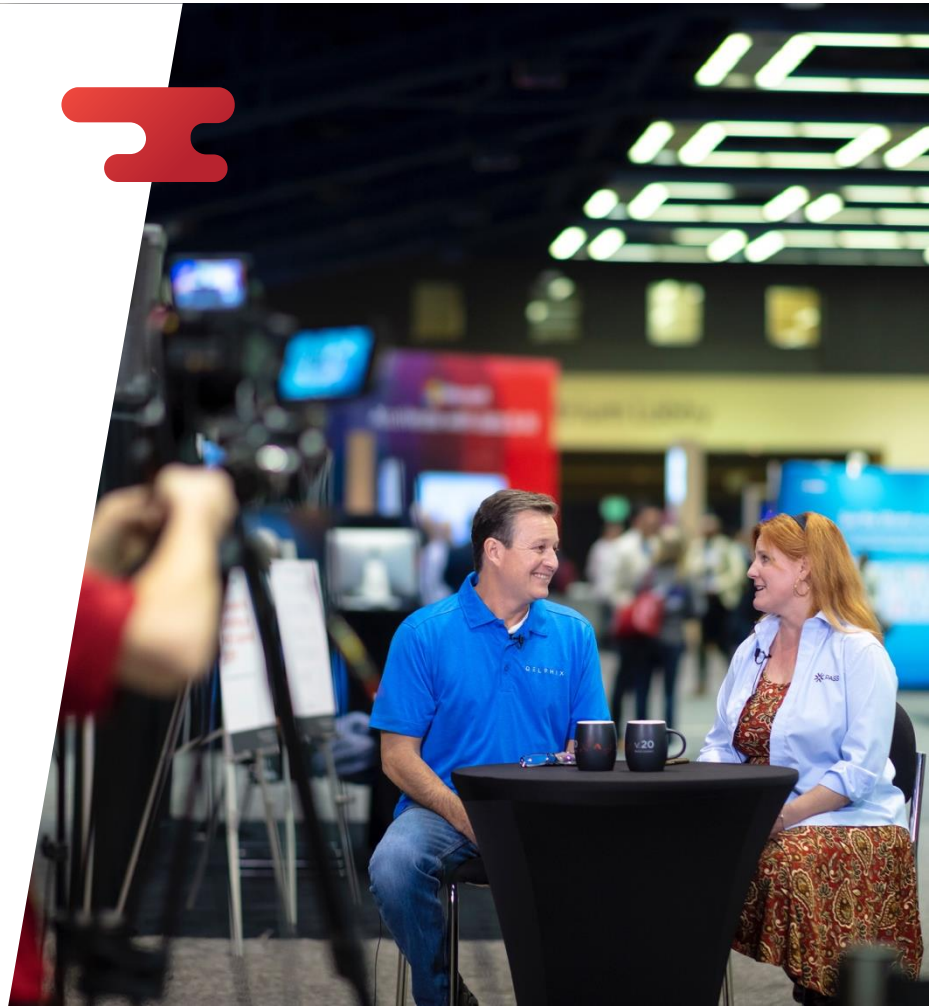

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
-- + -----------------+
-- | 3. Test the proc |
-- + -----------------+
-- The below examples test a negative and a positive review text
exec [get_sentiment] N'These are not a normal stress reliever. First of all, they got sticky, hairy and dirty on the first day I received them. Second, they arrived with tiny wrinkles in their bodies
go --0.424483060836792 Negative
exec [get_sentiment] N'These are the cutest things ever!! Super fun to play with and the best part is that it lasts for a really long time. So far these have been thrown all over the place with so mar
go --0.869342148303986 Positive
exec [get_sentiment] N'I really did not like the taste of it'
go --0.46178987622261 Negative
exec [get_sentiment] N'It was surprisingly quite good!'
go --0.960192441940308 Positive
exec [get_sentiment] N'I will never ever ever go to that place again!!'
go --0.310343533754349 Negative
exec [get_sentiment] N'Destiny is a gift. Some go their entire lives, living existence as a quiet desperation. Never learning the truth that what feels as though a burden pushing down upon our shoulde
go --0.5 Negative. Why...Not enough?
-- https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics/
-- Language: English, Sentiment: 78%.
-- Key phrases: face of fear, existence, triumph, valor, sense of purpose, entire lives, quiet desperation, shoulders, greater heights, precursor, Destiny, gift, Master Jim, burden, truth, hero.
110 %
T-SQL
Results
Message
Text Score Sentiment
1 These are not a normal stress reliever. First of ... 0.424483060836792 Negative
Text Score Sentiment
1 These are the cutest things ever!! Super fun to ... 0.869342148303986 Positive
Text Score Sentiment
1 I really did not like the taste of it 0.46178987622261 Negative
Text Score Sentiment
1 It was surprisingly quite good! 0.960192441940308 Positive
Text Score Sentiment
1 I will never ever ever go to that place again!! 0.310343533754349 Negative
Text Score Sentiment
1 Destiny is a gift. Some go their entire lives, l... 0.5 Negative
Query executed successfully at 5:03:01 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:30 | 6 rows
Output Error List Package Manager Console
Ready
Ln 74 Col 65 Ch 65 INS
GetSentimentExample master

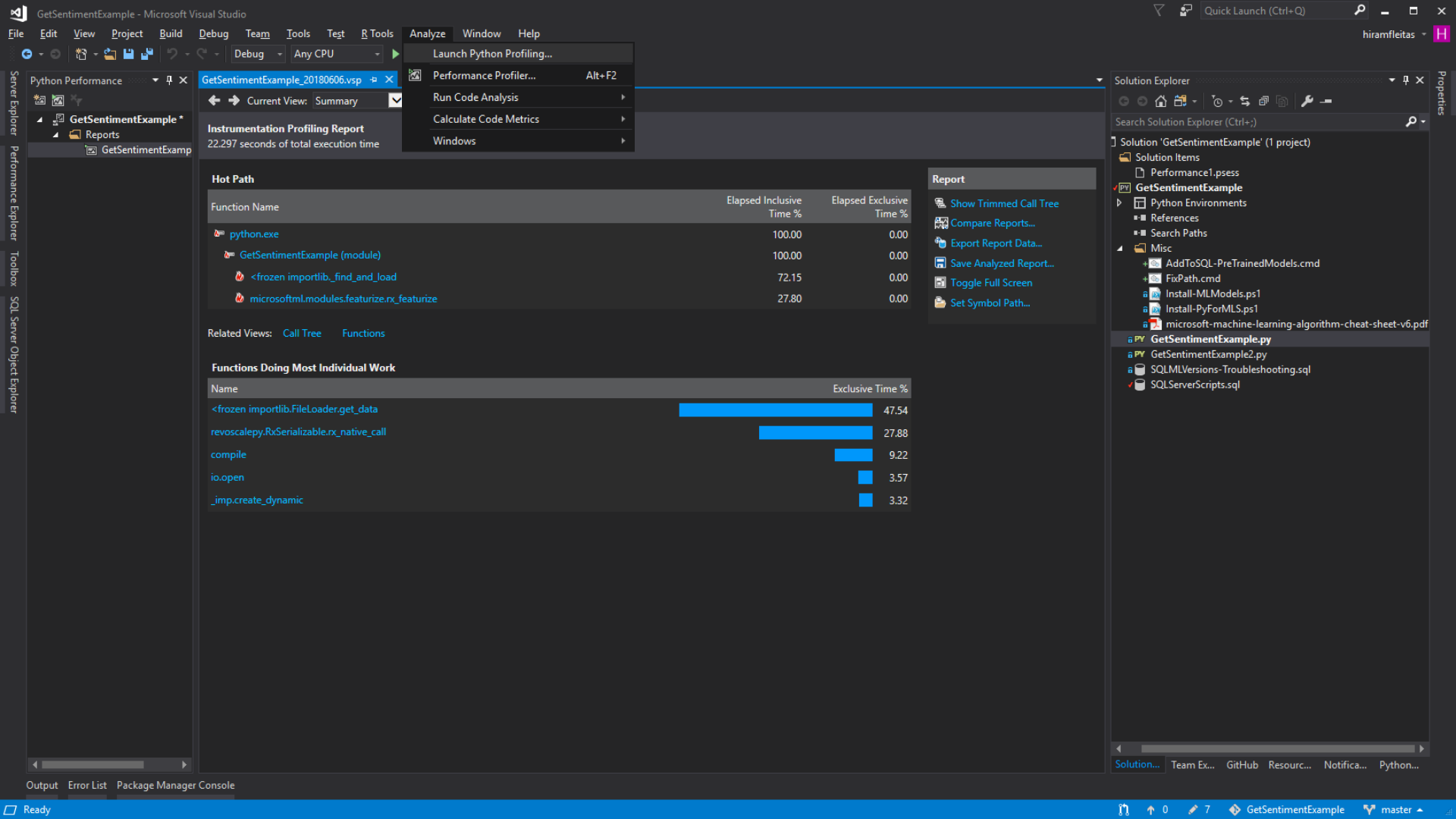

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
GetSentimentExample.py
SQLServerScripts.sql
1 import pandas as p
2 from microsoftml import rx_featurize, get_sentiment
3
4 # analyze_this = text
5
6 # Create the data
7 text_to_analyze = p.DataFrame(data=dict(Text=[
8 "These are not a normal stress reliever. First of all, they got sticky, hairy and dirty on the first day I received them. Second, they arrived with
9 "These are the cutest things ever!! Super fun to play with and the best part is that it lasts for a really long time. So far these have been thrown
10
11 # Get the sentiment scores
12 sentiment_scores = rx_featurize(
13 data=text_to_analyze,
14 ml_transforms=[get_sentiment(cols=dict(scores="Text"))])
15
16 # Lets translate the score to something more meaningful
17 sentiment_scores["Sentiment"] = sentiment_scores.scores.apply(
18 lambda score: "Positive" if score > 0.6 else "Negative")
19 print(sentiment_scores)
Select C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\python.exe
warning: Debugger speedups using cython not found. Run '"C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\python.exe" "C:\Program Files (x86)\Microsoft Visual Studio\2017\Community\Common7\IDE\Extensions\Microsoft\Python\Core\Packages\ptvsd\pydevd\setup_cython.py" build_ext --inplace' to build.
pydev debugger: starting
Express Edition will continue to be enforced.
Beginning processing data.
Rows Read: 2, Read Time: 0, Transform Time: 0
Beginning processing data.
Elapsed time: 00:00:04.8236633
Finished writing 2 rows.
Writing completed.
Text scores Sentiment
0 These are not a normal stress reliever. First ... 0.424483 Negative
1 These are the cutest things ever!! Super fun t... 0.869342 Positive
Press any key to continue . . .
Python Environments
Anaconda 5.1.0
Continuum Analytics, Inc.
MLSvr930Python
Custom environment
Python 3.6 (64-bit)
Python Software Foundation
SQLServer2017PythonSvcs
Custom environment
Overview
This is the default environment for new projects
Open interactive window
Explore interactive scripts
Use IPython interactive mode
Open in PowerShell
Configure or remove environment
C:\Program Files\Microsoft SQL Server\MS...\PYTHON_SERVICES
C:\Program Files\Microsoft SQL Server\MSSQL14.M...\python.exe
C:\Program Files\Microsoft SQL Server\MSSQL14....\pythonw.exe
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
Properties
110 %
Output
Error List
Package Manager Console
Solution... Team Ex... GitHub Resourc... Notifica... Python...
Ready
0
6
GetSentimentExample
master

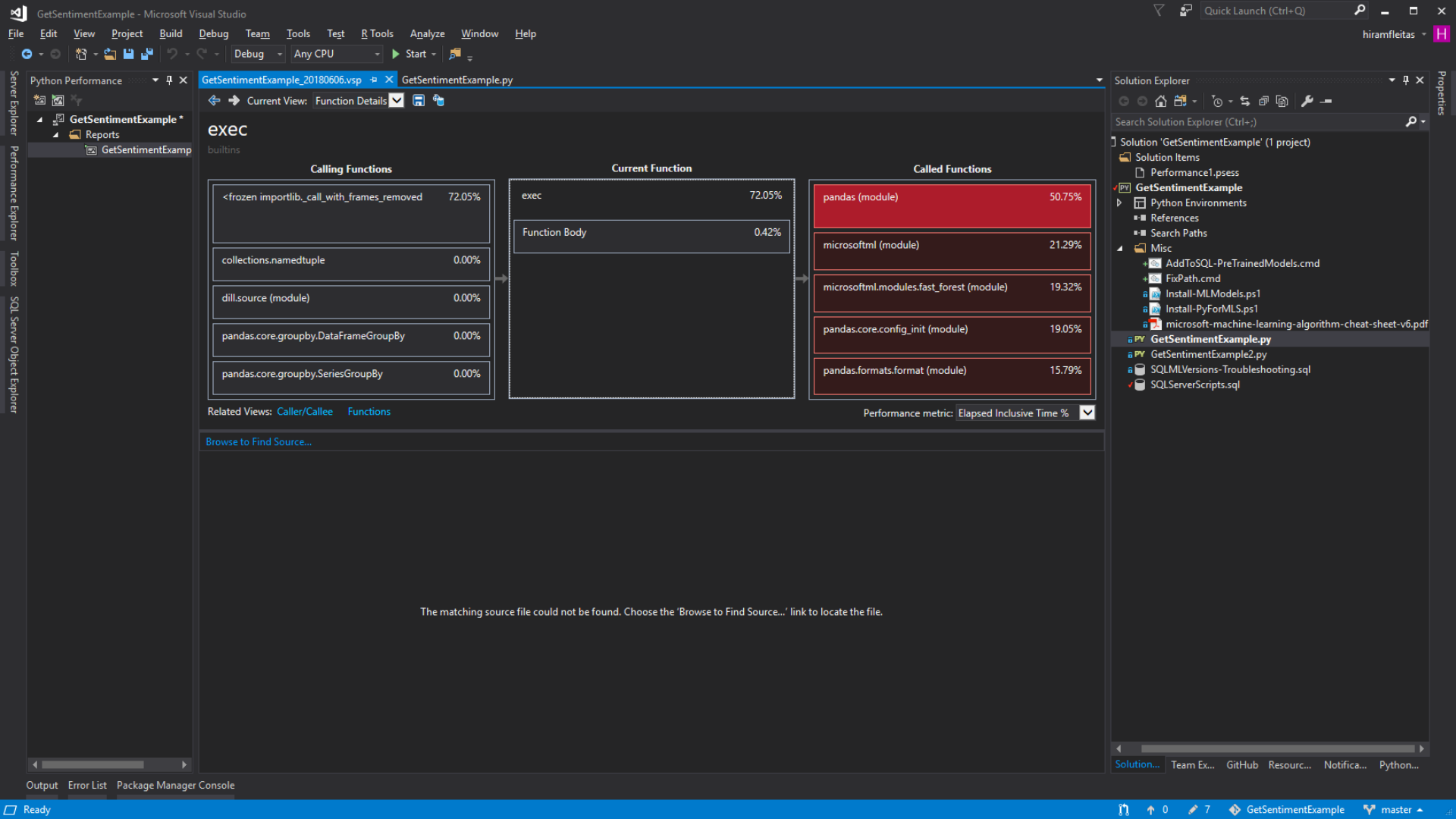

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug Any CPU Start
GetSentimentExample.py SQLServerScripts.sql
Python Environments
Visual Studio Installer
Modifying — Visual Studio Community 2017 — 15.7.3
Workloads
Individual components
Language packs
Installation locations
Web & Cloud (7)
ASP.NET and web development
Build web applications using ASP.NET, ASP.NET Core, HTML/JavaScript, and Containers including Docker support.
Azure development
Azure SDKs, tools, and projects for developing cloud apps, creating resources, and building Containers including...
Python development
Editing, debugging, interactive development and source control for Python.
Node.js development
Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.
Data storage and processing
Connect, develop, and test data solutions with SQL Server, Azure Data Lake, or Hadoop.
Data science and analytical applications
Languages and tooling for creating data science applications, including Python, R and F#.
Office/SharePoint development
Create Office and SharePoint add-ins, SharePoint solutions, and VSTO add-ins using C#, VB, and JavaScript.
Mobile & Gaming (5)
Summary
Visual Studio core editor
.NET desktop development
ASP.NET and web development
Data storage and processing
Data science and analytical applications
Python development
Included
Python language support
Optional
Cookiecutter template support
Python web support
Python 3 64-bit (3.6.5)
Python IoT support
Python native development tools
Azure Cloud Services core tools
Python 2 64-bit (2.7.14)
Anaconda3 64-bit (5.1.0)
Anaconda2 64-bit (5.1.0)
Python 3 32-bit (3.6.5)
Python 2 32-bit (2.7.14)
Anaconda3 32-bit (5.1.0)
Anaconda2 32-bit (5.1.0)
Location
C:\Program Files (x86)\Microsoft Visual Studio\2017\Community Change...
By continuing, you agree to the license for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the 3rd Party Notices or in its accompanying license. By continuing, you also agree to those licenses.
Total space required 0 KB
Modify
1.16.1247.518
Output Error List Package Manager Console
Ready
GetSentimentExample master

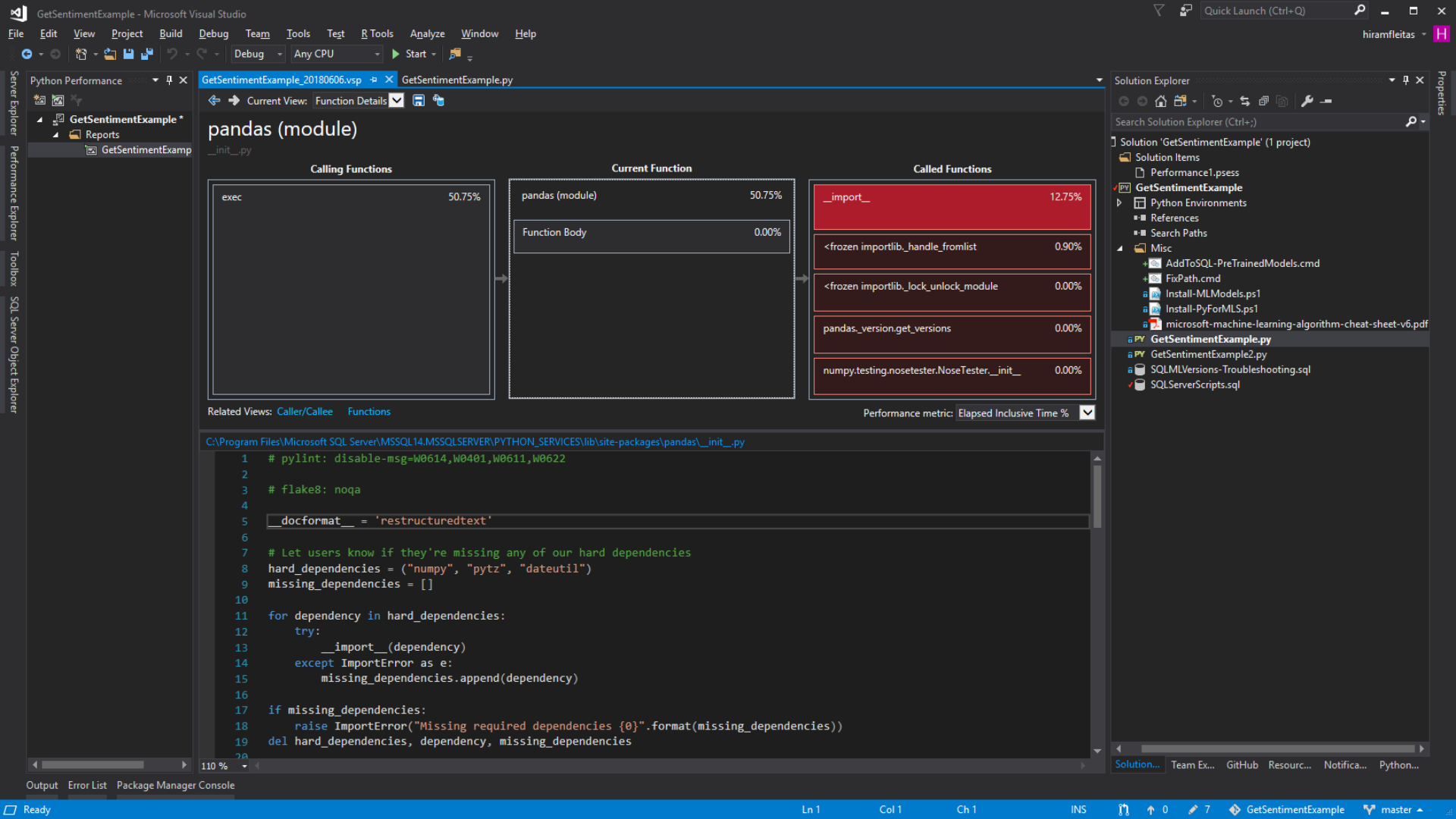
DEMO

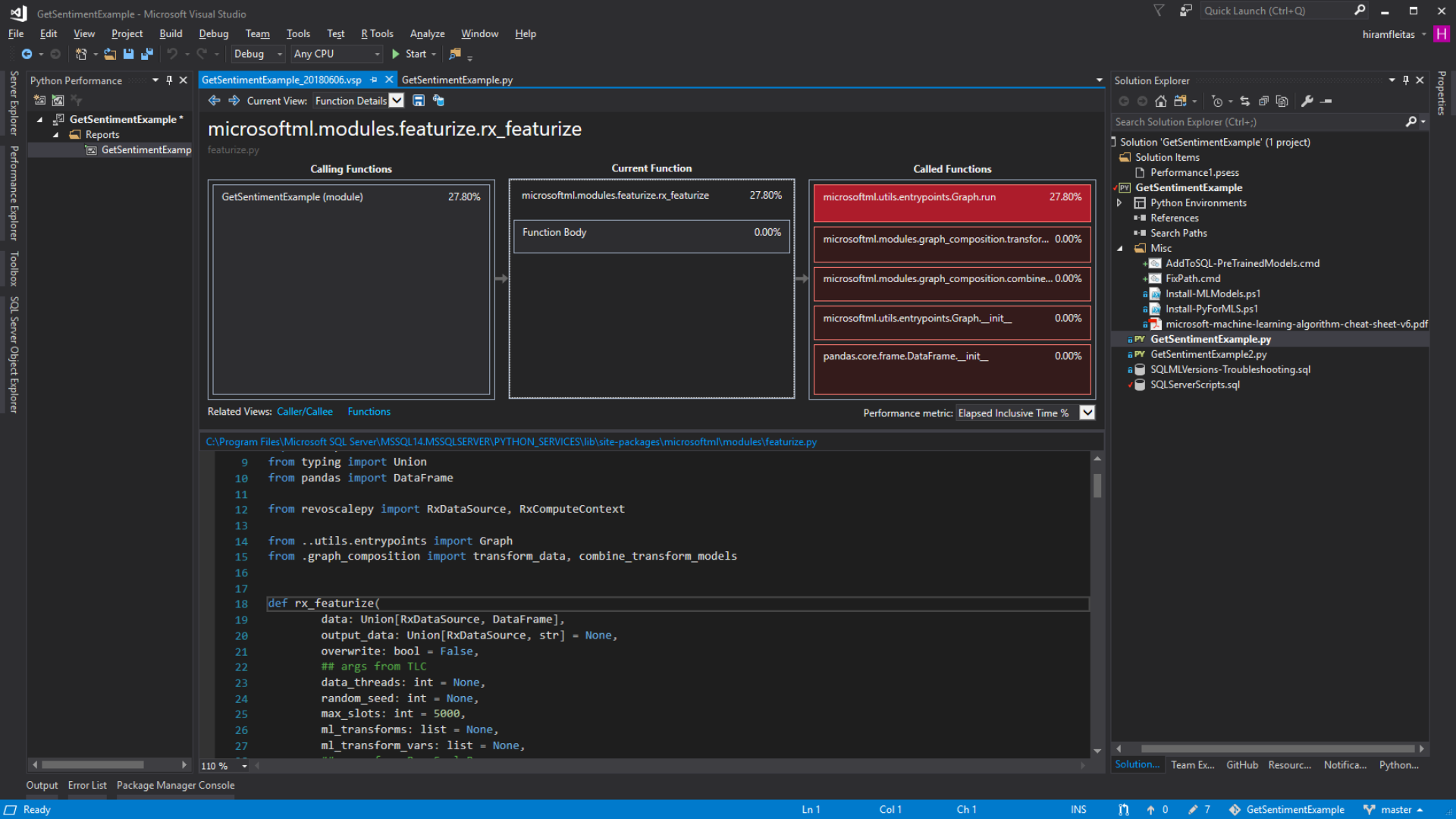
# Python Profiling (DEMO 2)

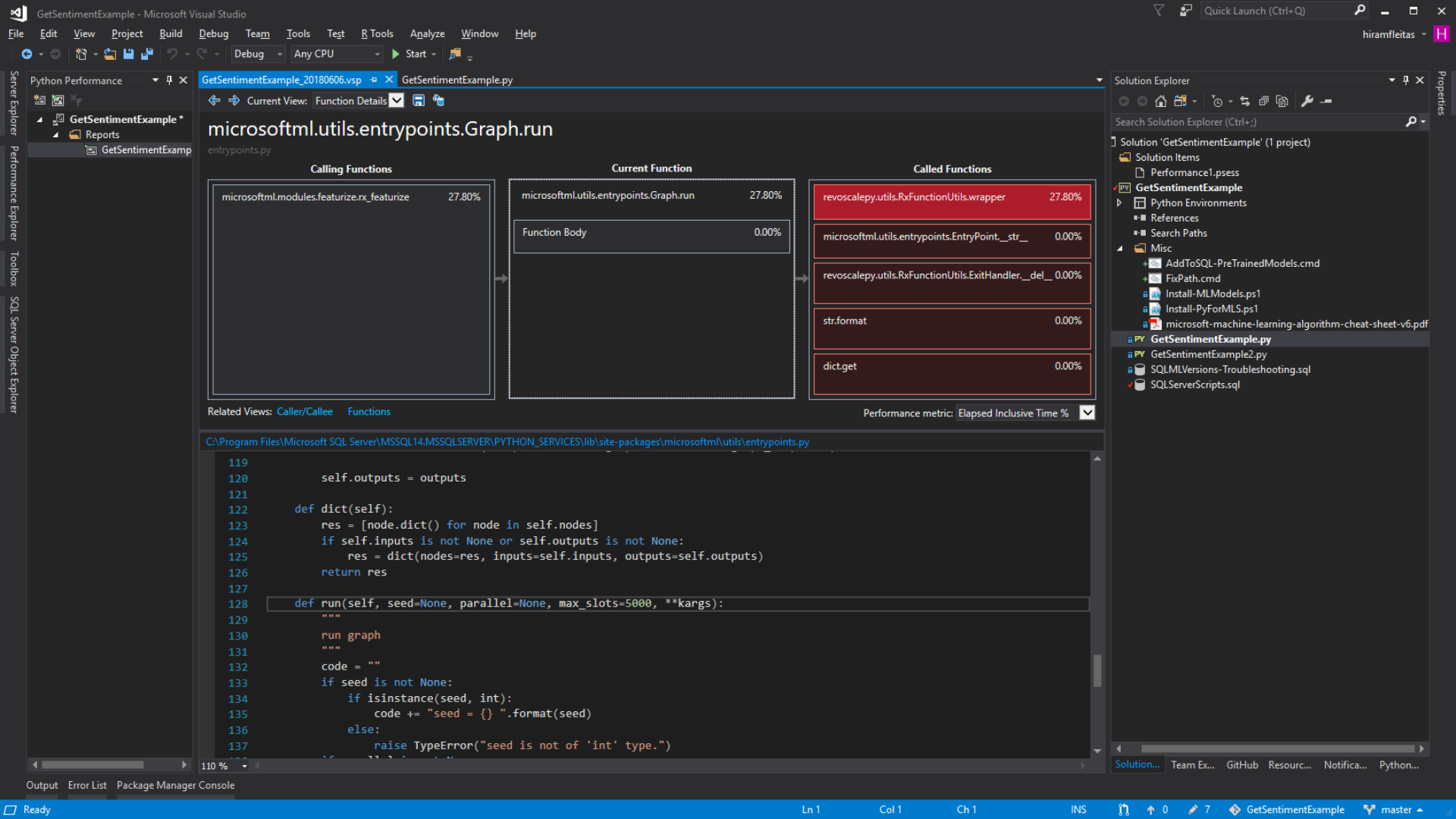


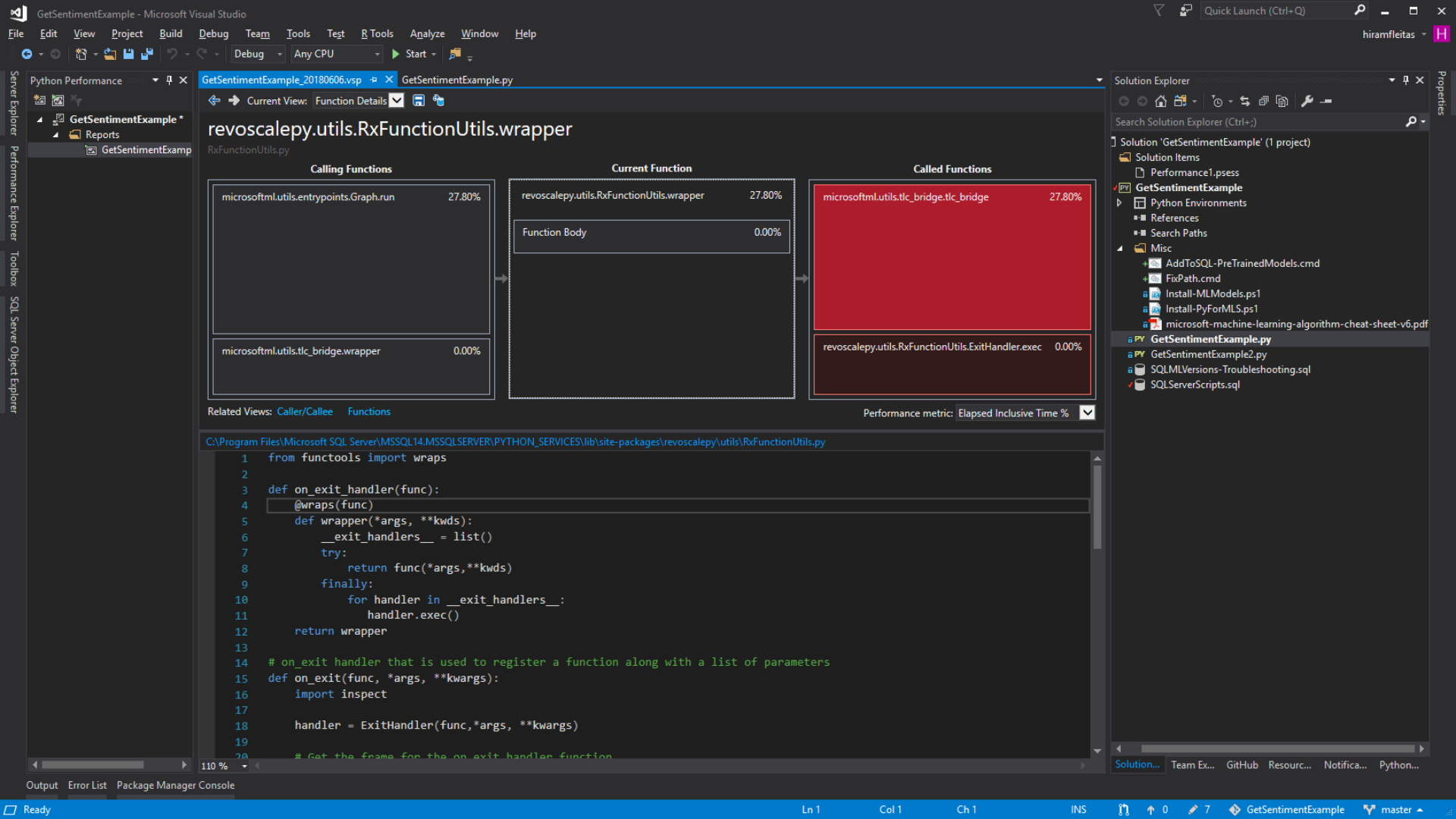

GetSentimentExample - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Launch Python Profiling...
Performance Profiler... Alt+F2
Run Code Analysis
Calculate Code Metrics
Windows
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
Current View: Summary
Instrumentation Profiling Report
22.297 seconds of total execution time
Hot Path
Function Name
Elapsed Inclusive Time %
Elapsed Exclusive Time %
python.exe 100.00 0.00
GetSentimentExample (module) 100.00 0.00
<frozen importlib._find_and_load 72.15 0.00
microsoftml.modules.featurize.rx_featurize 27.80 0.00
Related Views: Call Tree Functions
Functions Doing Most Individual Work
Name
Exclusive Time %
<frozen importlib.FileLoader.get_data 47.54
revoscalepy.RxSerializable.rx_native_call 27.88
compile 9.22
io.open 3.57
_imp.create_dynamic 3.32
Report
Show Trimmed Call Tree
Compare Reports...
Export Report Data...
Save Analyzed Report...
Toggle Full Screen
Set Symbol Path...
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
GetSentimentExample
master

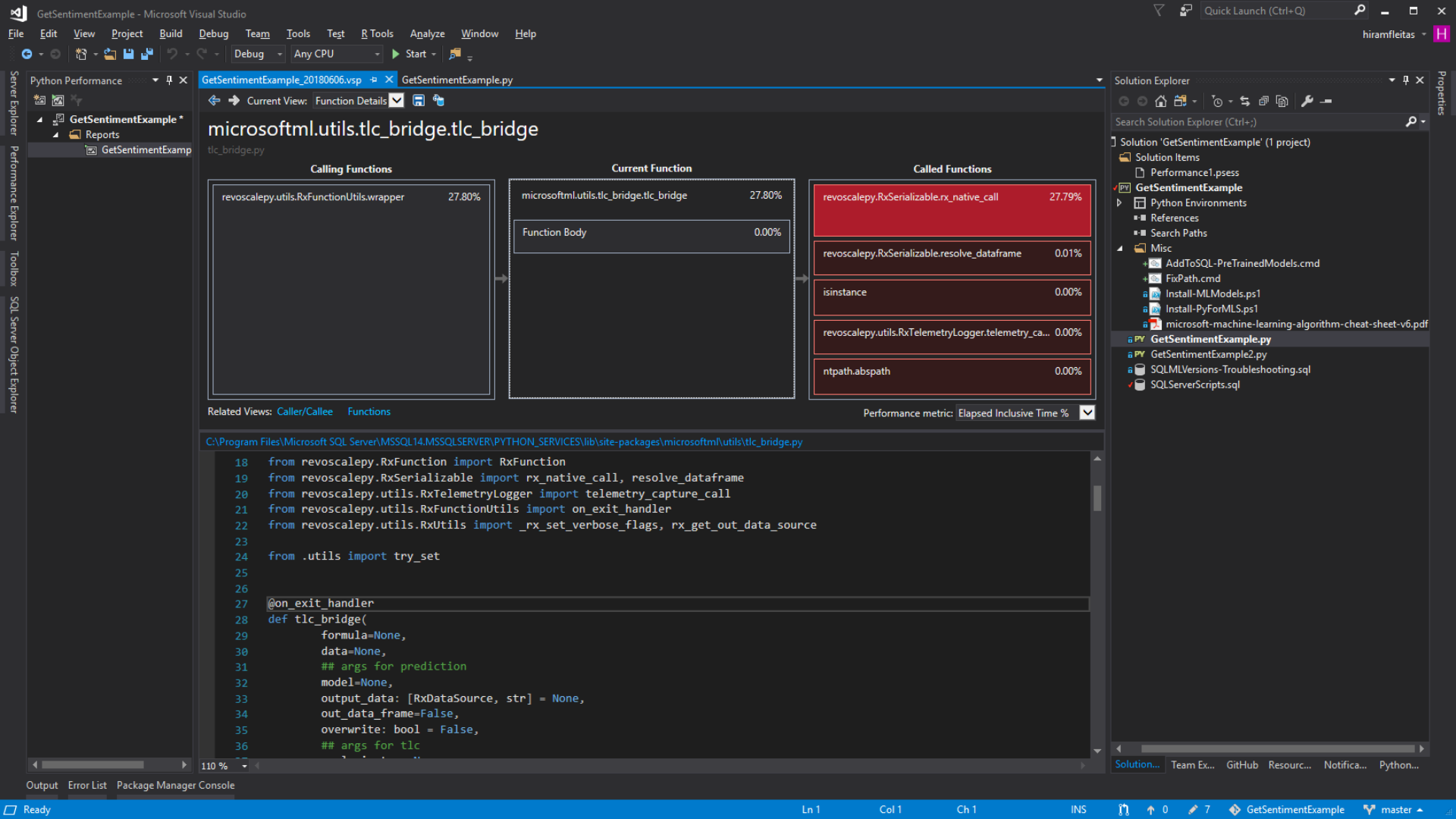

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug Any CPU Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
exec
builtins
Calling Functions
<frozen importlib._call_with_frames_removed 72.05%
collections.namedtuple 0.00%
dill.source (module) 0.00%
pandas.core.groupby.DataFrameGroupBy 0.00%
pandas.core.groupby.SeriesGroupBy 0.00%
Current Function
exec 72.05%
Function Body 0.42%
Called Functions
pandas (module) 50.75%
microsoftml (module) 21.29%
microsoftml.modules.fast_forest (module) 19.32%
pandas.core.config_init (module) 19.05%
pandas.formats.format (module) 15.79%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
Browse to Find Source...
The matching source file could not be found. Choose the 'Browse to Find Source...' link to locate the file.
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
pandas (module)
__init__.py
Calling Functions
Current Function
Called Functions
exec 50.75%
pandas (module) 50.75%
Function Body 0.00%
__import__ 12.75%
<frozen importlib._handle_fromlist 0.90%
<frozen importlib._lock_unlock_module 0.00%
pandas._version.get_versions 0.00%
numpy.testing.nosetester.NoseTester.__init__ 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\pandas__init__.py
1 # pylint: disable-msg=W0614,W0401,W0611,W0622
2
3 # flake8: noqa
4
5 __docformat__ = 'restructuredtext'
6
7 # Let users know if they're missing any of our hard dependencies
8 hard_dependencies = ("numpy", "pytz", "dateutil")
9 missing_dependencies = []
10
11 for dependency in hard_dependencies:
12 try:
13 __import__(dependency)
14 except ImportError as e:
15 missing_dependencies.append(dependency)
16
17 if missing_dependencies:
18 raise ImportError("Missing required dependencies {0}".format(missing_dependencies))
19 del hard_dependencies, dependency, missing_dependencies
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug Any CPU Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
microsoftml.modules.featurize.rx_featurize
featurize.py
Calling Functions
GetSentimentExample (module) 27.80%
Current Function
microsoftml.modules.featurize.rx_featurize 27.80%
Function Body 0.00%
Called Functions
microsoftml.utils.entrypoints.Graph.run 27.80%
microsoftml.modules.graph_composition.transfor... 0.00%
microsoftml.modules.graph_composition.combine... 0.00%
microsoftml.utils.entrypoints.Graph.__init__ 0.00%
pandas.core.frame.DataFrame.__init__ 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\microsoftml\modules\featurize.py
9 from typing import Union
10 from pandas import DataFrame
11
12 from revoscalepy import RxDataSource, RxComputeContext
13
14 from ..utils.entrypoints import Graph
15 from .graph_composition import transform_data, combine_transform_models
16
17
18 def rx_featurize(
19 data: Union[RxDataSource, DataFrame],
20 output_data: Union[RxDataSource, str] = None,
21 overwrite: bool = False,
22 ## args from TLC
23 data_threads: int = None,
24 random_seed: int = None,
25 max_slots: int = 5000,
26 ml_transforms: list = None,
27 ml_transform_vars: list = None,
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready Ln 1 Col 1 Ch 1 INS GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug
Any CPU
Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
microsoftml.utils.entrypoints.Graph.run
entrypoints.py
Calling Functions
Current Function
Called Functions
microsoftml.modules.featurize.rx_featurize 27.80%
microsoftml.utils.entrypoints.Graph.run 27.80%
Function Body 0.00%
revoscalepy.utils.RxFunctionUtils.wrapper 27.80%
microsoftml.utils.entrypoints.EntryPoint.__str__ 0.00%
revoscalepy.utils.RxFunctionUtils.ExitHandler.__del__ 0.00%
str.format 0.00%
dict.get 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\microsoftml\utils\entrypoints.py
119
120 self.outputs = outputs
121
122 def dict(self):
123 res = [node.dict() for node in self.nodes]
124 if self.inputs is not None or self.outputs is not None:
125 res = dict(nodes=res, inputs=self.inputs, outputs=self.outputs)
126 return res
127
128 def run(self, seed=None, parallel=None, max_slots=5000, **kargs):
129 """
130 run graph
131 """
132 code = ""
133 if seed is not None:
134 if isinstance(seed, int):
135 code += "seed = {} ".format(seed)
136 else:
137 raise TypeError("seed is not of 'int' type.")
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug Any CPU Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
revoscalepy.utils.RxFunctionUtils.wrapper
RxFunctionUtils.py
Calling Functions
Current Function
Called Functions
microsoftml.utils.entrypoints.Graph.run 27.80%
microsoftml.utils.tlc_bridge.wrapper 0.00%
revoscalepy.utils.RxFunctionUtils.wrapper 27.80%
Function Body 0.00%
microsoftml.utils.tlc_bridge.tlc_bridge 27.80%
revoscalepy.utils.RxFunctionUtils.ExitHandler.exec 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\revoscalepy\utils\RxFunctionUtils.py
1 from functools import wraps
2
3 def on_exit_handler(func):
4 @wraps(func)
5 def wrapper(*args, **kwds):
6 __exit_handlers__ = list()
7 try:
8 return func(*args,**kwds)
9 finally:
10 for handler in __exit_handlers__:
11 handler.exec()
12 return wrapper
13
14 # on_exit handler that is used to register a function along with a list of parameters
15 def on_exit(func, *args, **kwargs):
16 import inspect
17
18 handler = ExitHandler(func,*args, **kwargs)
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
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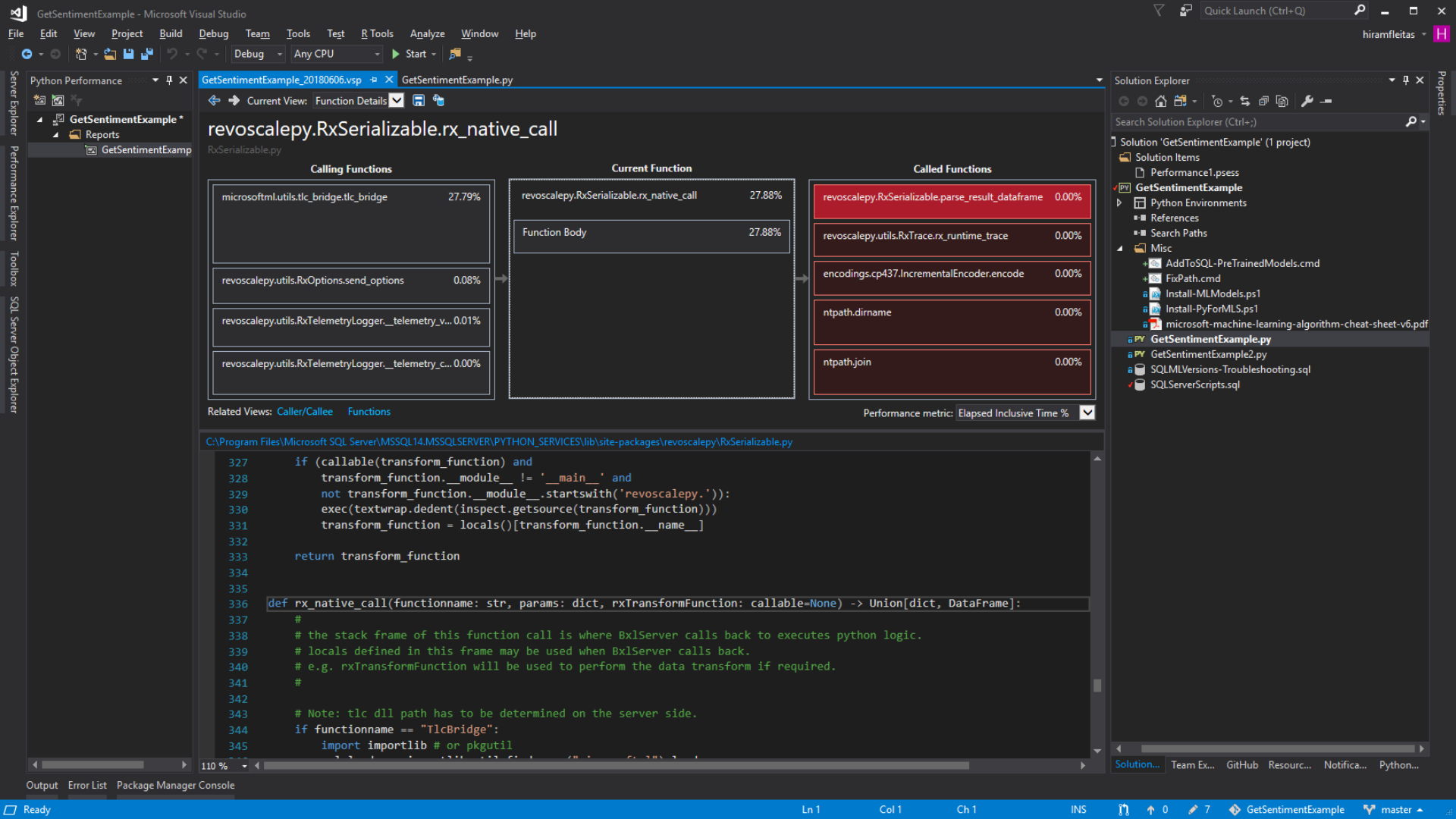
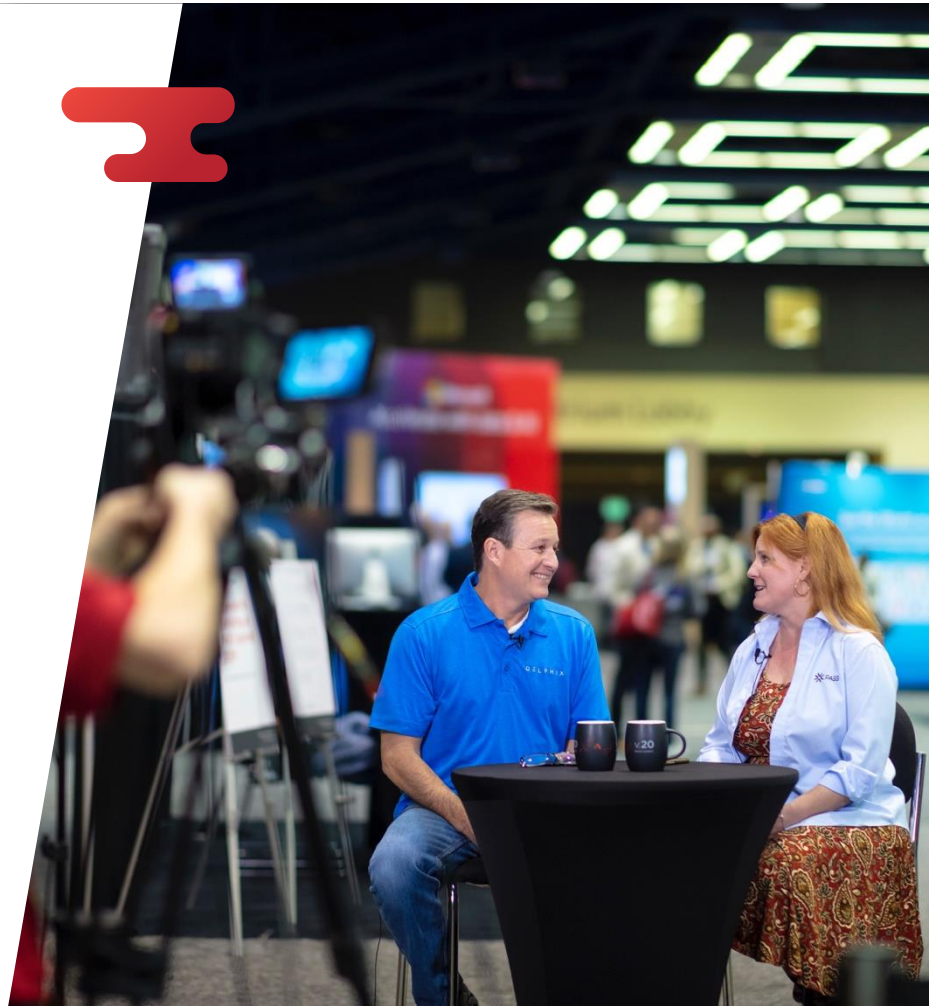
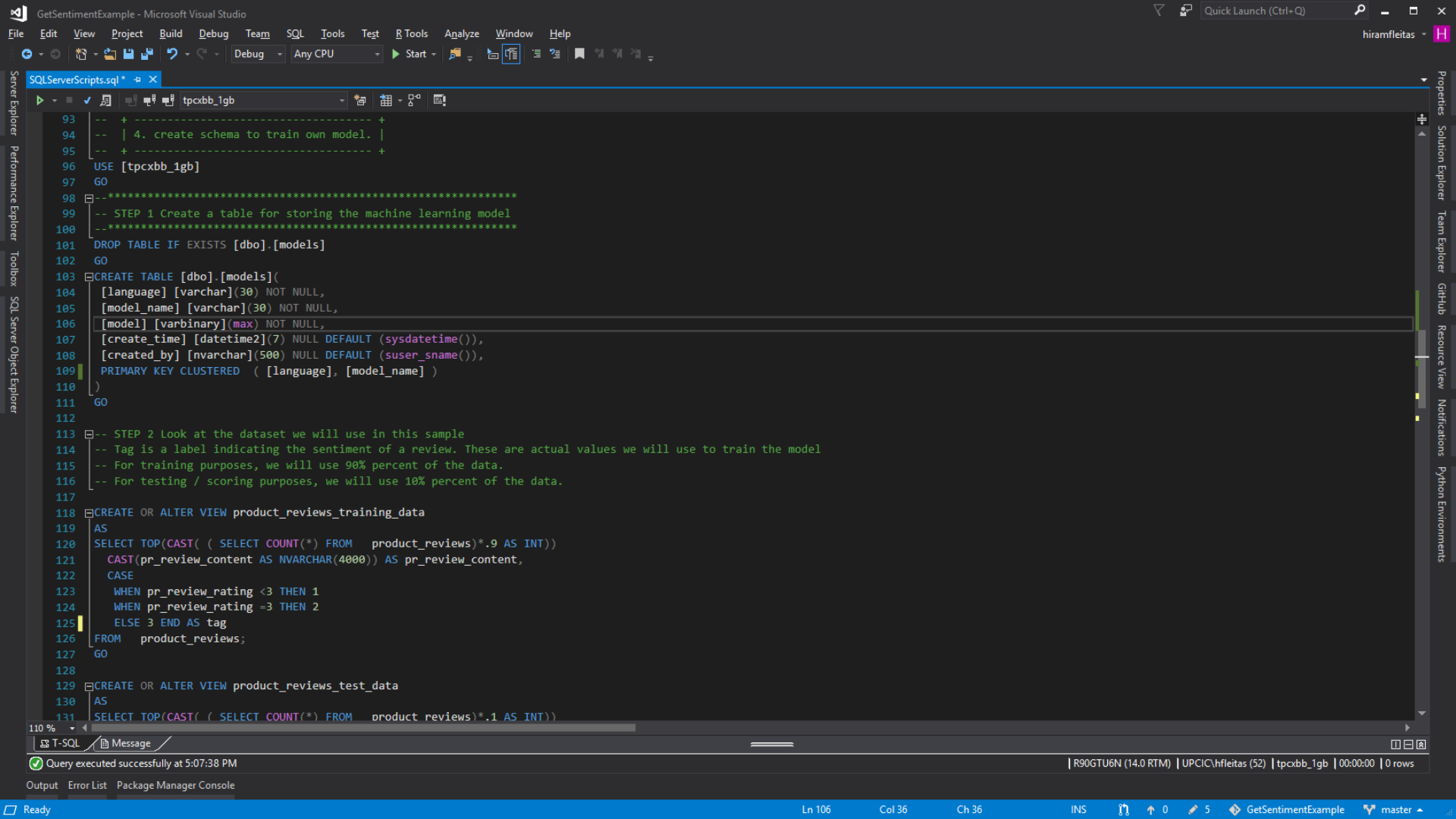
Debug
Any CPU
Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
microsoftml.utils.tlc_bridge.tlc_bridge
tlc_bridge.py
Calling Functions
revoscalepy.utils.RxFunctionUtils.wrapper 27.80%
Current Function
microsoftml.utils.tlc_bridge.tlc_bridge 27.80%
Function Body 0.00%
Called Functions
revoscalepy.RxSerializable.rx_native_call 27.79%
revoscalepy.RxSerializable.resolve_dataframe 0.01%
isinstance 0.00%
revoscalepy.utils.RxTelemetryLogger.telemetry_ca... 0.00%
ntpath.abspath 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\microsoftml\utils\tlc_bridge.py
18 from revoscalepy.RxFunction import RxFunction
19 from revoscalepy.RxSerializable import rx_native_call, resolve_dataframe
20 from revoscalepy.utils.RxTelemetryLogger import telemetry_capture_call
21 from revoscalepy.utils.RxFunctionUtils import on_exit_handler
22 from revoscalepy.utils.RxUtils import _rx_set_verbose_flags, rx_get_out_data_source
23
24 from .utils import try_set
25
26
27 @on_exit_handler
28 def tlc_bridge(
29 formula=None,
30 data=None,
31 ## args for prediction
32 model=None,
33 output_data: [RxDataSource, str] = None,
34 out_data_frame=False,
35 overwrite: bool = False,
36 ## args for tlc
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master

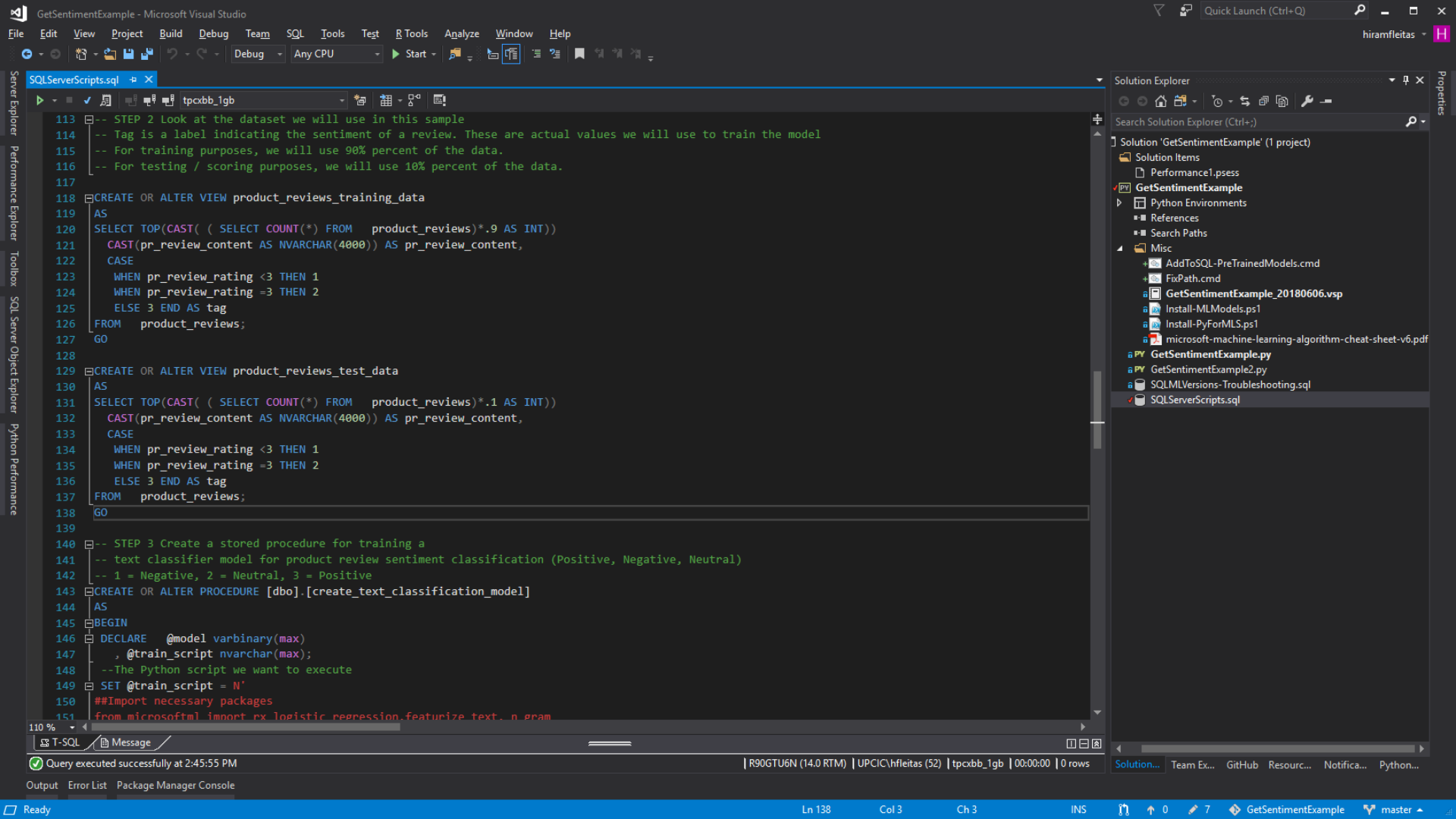

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
Debug Any CPU Start
Python Performance
GetSentimentExample *
Reports
GetSentimentExamp
GetSentimentExample_20180606.vsp
GetSentimentExample.py
Current View: Function Details
revoscalepy.RxSerializable.rx_native_call
RxSerializable.py
Calling Functions
Current Function
Called Functions
microsoftml.utils.tlc_bridge.tlc_bridge 27.79%
revoscalepy.utils.RxOptions.send_options 0.08%
revoscalepy.utils.RxTelemetryLogger._telemetry_v... 0.01%
revoscalepy.utils.RxTelemetryLogger._telemetry_c... 0.00%
revoscalepy.RxSerializable.rx_native_call 27.88%
Function Body 27.88%
revoscalepy.RxSerializable.parse_result_dataframe 0.00%
revoscalepy.utils.RxTrace.rx_runtime_trace 0.00%
encodings.cp437.IncrementalEncoder.encode 0.00%
ntpath.dirname 0.00%
ntpath.join 0.00%
Related Views: Caller/Callee Functions
Performance metric: Elapsed Inclusive Time %
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\revoscalepy\RxSerializable.py
327 if (callable(transform_function) and
328 transform_function.__module__ != '__main__' and
329 not transform_function.__module__.startswith('revoscalepy.')):
330 exec(textwrap.dedent(inspect.getsource(transform_function)))
331 transform_function = locals()[transform_function.__name__]
332
333 return transform_function
334
335
336 def rx_native_call(functionname: str, params: dict, rxTransformFunction: callable=None) -> Union[dict, DataFrame]:
337 #
338 # the stack frame of this function call is where BxlServer calls back to executes python logic.
339 # locals defined in this frame may be used when BxlServer calls back.
340 # e.g. rxTransformFunction will be used to perform the data transform if required.
341 #
342
343 # Note: tlc dll path has to be determined on the server side.
344 if functionname == "TlcBridge":
345 import importlib # or pkgutil
110 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output Error List Package Manager Console
Ready
Ln 1 Col 1 Ch 1 INS
GetSentimentExample master

DEMO

# In-Database ML (DEMO 3)




GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
-- + ---------- +
-- | 4. create schema to train own model. |
-- + ---------- +
USE [tpcxbb_1gb]
GO
--*************************************************************
-- STEP 1 Create a table for storing the machine learning model
--*************************************************************
DROP TABLE IF EXISTS [dbo].[models]
GO
CREATE TABLE [dbo].[models](
[language] [varchar](30) NOT NULL,
[model_name] [varchar](30) NOT NULL,
[model] [varbinary](max) NOT NULL,
[create_time] [datetime2](7) NULL DEFAULT (sysdatetime()),
[created_by] [nvarchar](500) NULL DEFAULT (suser_sname()),
PRIMARY KEY CLUSTERED ( [language], [model_name] )
)
GO
-- STEP 2 Look at the dataset we will use in this sample
-- Tag is a label indicating the sentiment of a review. These are actual values we will use to train the model
-- For training purposes, we will use 90% percent of the data.
-- For testing / scoring purposes, we will use 10% percent of the data.
CREATE OR ALTER VIEW product_reviews_training_data
AS
SELECT TOP(CAST( ( SELECT COUNT(*) FROM product_reviews)*.9 AS INT))
CAST(pr_review_content AS NVARCHAR(4000)) AS pr_review_content,
CASE
WHEN pr_review_rating <3 THEN 1
WHEN pr_review_rating =3 THEN 2
ELSE 3 END AS tag
FROM product_reviews;
GO
CREATE OR ALTER VIEW product_reviews_test_data
AS
SELECT TOP(CAST( ( SELECT COUNT(*) FROM product_reviews)*.1 AS INT))
110 %
T-SQL
Message
Query executed successfully at 5:07:38 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output
Error List
Package Manager Console
Ready
Ln 106
Col 36
Ch 36
INS
GetSentimentExample
master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
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-- For training purposes, we will use 90% percent of the data.
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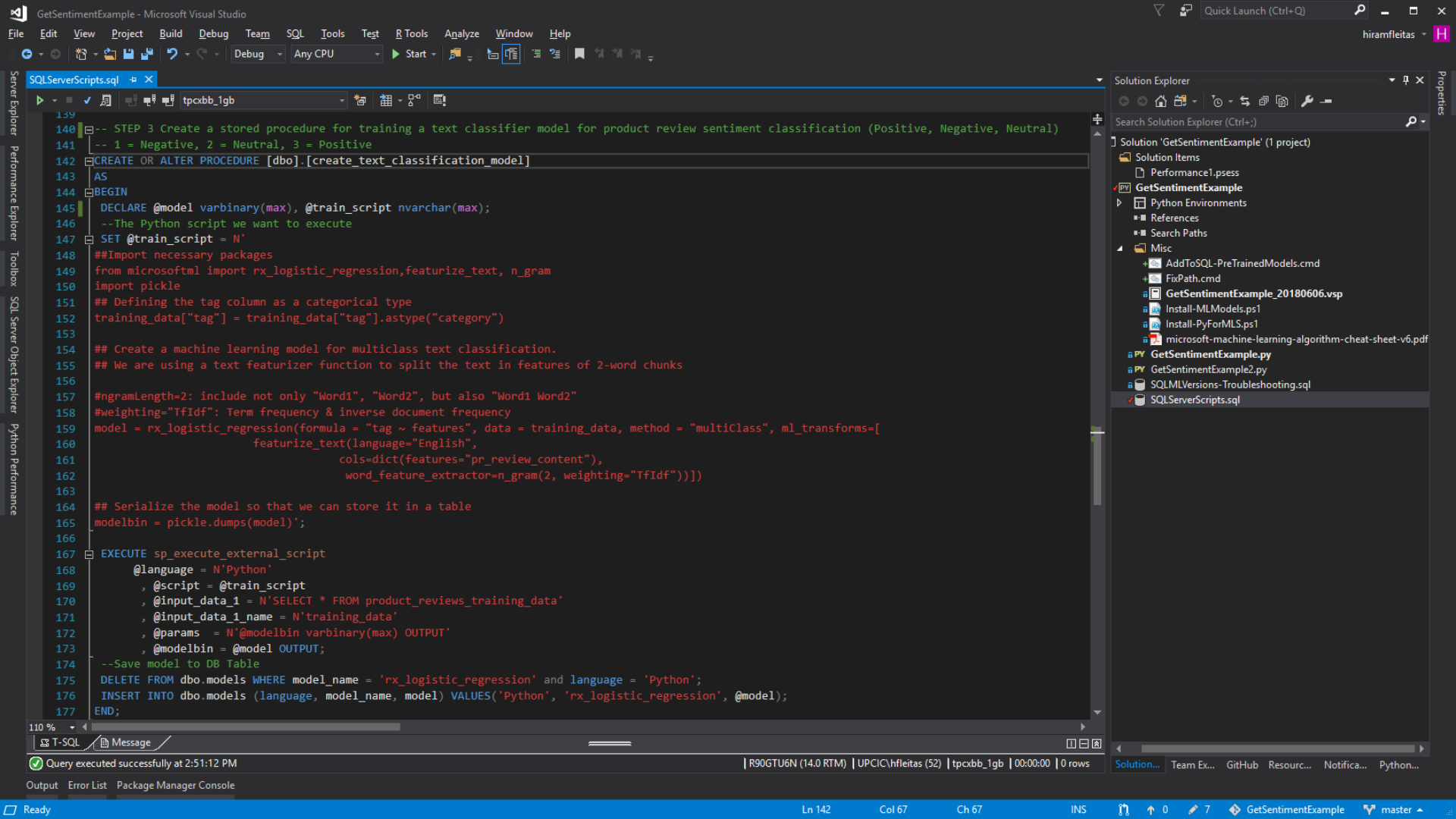
AS
SELECT TOP(CAST( ( SELECT COUNT(*) FROM product_reviews)*.9 AS INT))
CAST(pr_review_content AS NVARCHAR(4000)) AS pr_review_content,
CASE
WHEN pr_review_rating <3 THEN 1
WHEN pr_review_rating =3 THEN 2
ELSE 3 END AS tag
FROM product_reviews;
GO
CREATE OR ALTER VIEW product_reviews_test_data
AS
SELECT TOP(CAST( ( SELECT COUNT(*) FROM product_reviews)*.1 AS INT))
CAST(pr_review_content AS NVARCHAR(4000)) AS pr_review_content,
CASE
WHEN pr_review_rating <3 THEN 1
WHEN pr_review_rating =3 THEN 2
ELSE 3 END AS tag
FROM product_reviews;
GO
-- STEP 3 Create a stored procedure for training a
-- text classifier model for product review sentiment classification (Positive, Negative, Neutral)
-- 1 = Negative, 2 = Neutral, 3 = Positive
CREATE OR ALTER PROCEDURE [dbo].[create_text_classification_model]
AS
BEGIN
DECLARE @model varbinary(max)
, @train_script nvarchar(max);
--The Python script we want to execute
SET @train_script = N'
##Import necessary packages
from microsoftml import rx_logistic_regression,featurize_text, n_gram
110 %
T-SQL
Message
Query executed successfully at 2:45:55 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output
Error List
Package Manager Console
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
GetSentimentExample_20180606.vsp
Install-MLModels.ps1
Install-PyForMLS.ps1
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Solution... Team Ex... GitHub Resourc... Notifica... Python...
Ready
Ln 138 Col 3 Ch 3 INS
0 7
GetSentimentExample
master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
-- STEP 3 Create a stored procedure for training a text classifier model for product review sentiment classification (Positive, Negative, Neutral)
-- 1 = Negative, 2 = Neutral, 3 = Positive
CREATE OR ALTER PROCEDURE [dbo].[create_text_classification_model]
AS
BEGIN
DECLARE @model varbinary(max), @train_script nvarchar(max);
--The Python script we want to execute
SET @train_script = N'
##Import necessary packages
from microsoftml import rx_logistic_regression,featurize_text, n_gram
import pickle
## Defining the tag column as a categorical type
training_data["tag"] = training_data["tag"].astype("category")
## Create a machine learning model for multiclass text classification.
## We are using a text featurizer function to split the text in features of 2-word chunks
#ngramLength=2: include not only "Word1", "Word2", but also "Word1 Word2"
#weighting="TfIdf": Term frequency & inverse document frequency
model = rx_logistic_regression(formula = "tag ~ features", data = training_data, method = "multiClass", ml_transforms=[
featurize_text(language="English",
cols=dict(features="pr_review_content"),
word_feature_extractor=n_gram(2, weighting="TfIdf"))])
## Serialize the model so that we can store it in a table
modelbin = pickle.dumps(model)';
EXECUTE sp_execute_external_script
@language = N'Python'
, @script = @train_script
, @input_data_1 = N'SELECT * FROM product_reviews_training_data'
, @input_data_1_name = N'training_data'
, @params = N'@modelbin varbinary(max) OUTPUT'
, @modelbin = @model OUTPUT;
--Save model to DB Table
DELETE FROM dbo.models WHERE model_name = 'rx_logistic_regression' and language = 'Python';
INSERT INTO dbo.models (language, model_name, model) VALUES('Python', 'rx_logistic_regression', @model);
END;
110 %
T-SQL
Message
Query executed successfully at 2:51:12 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'GetSentimentExample' (1 project)
Solution Items
Performance1.psess
GetSentimentExample
Python Environments
References
Search Paths
Misc
AddToSQL-PreTrainedModels.cmd
FixPath.cmd
GetSentimentExample_20180606.vsp
Install-MLModels.ps1
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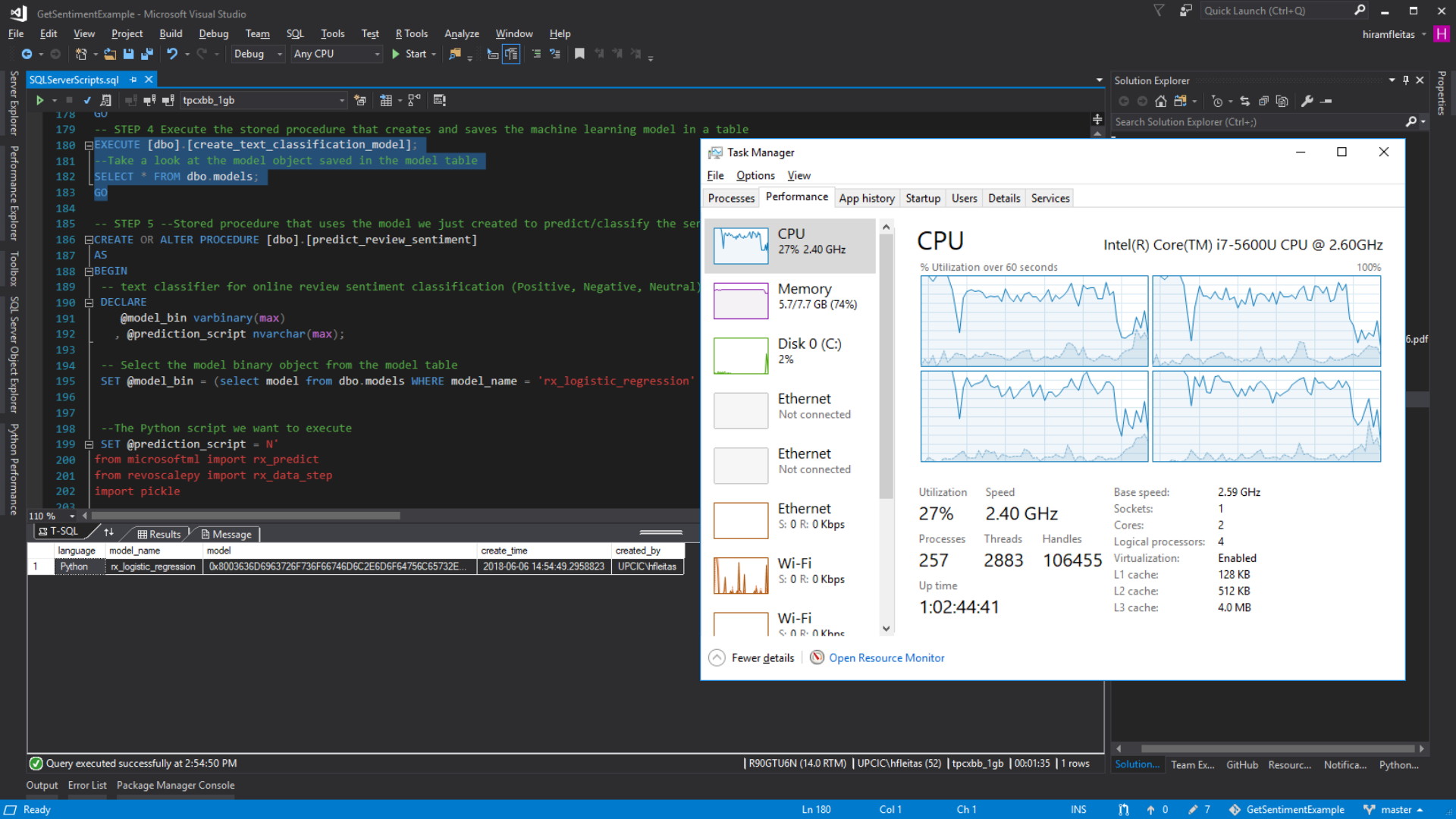
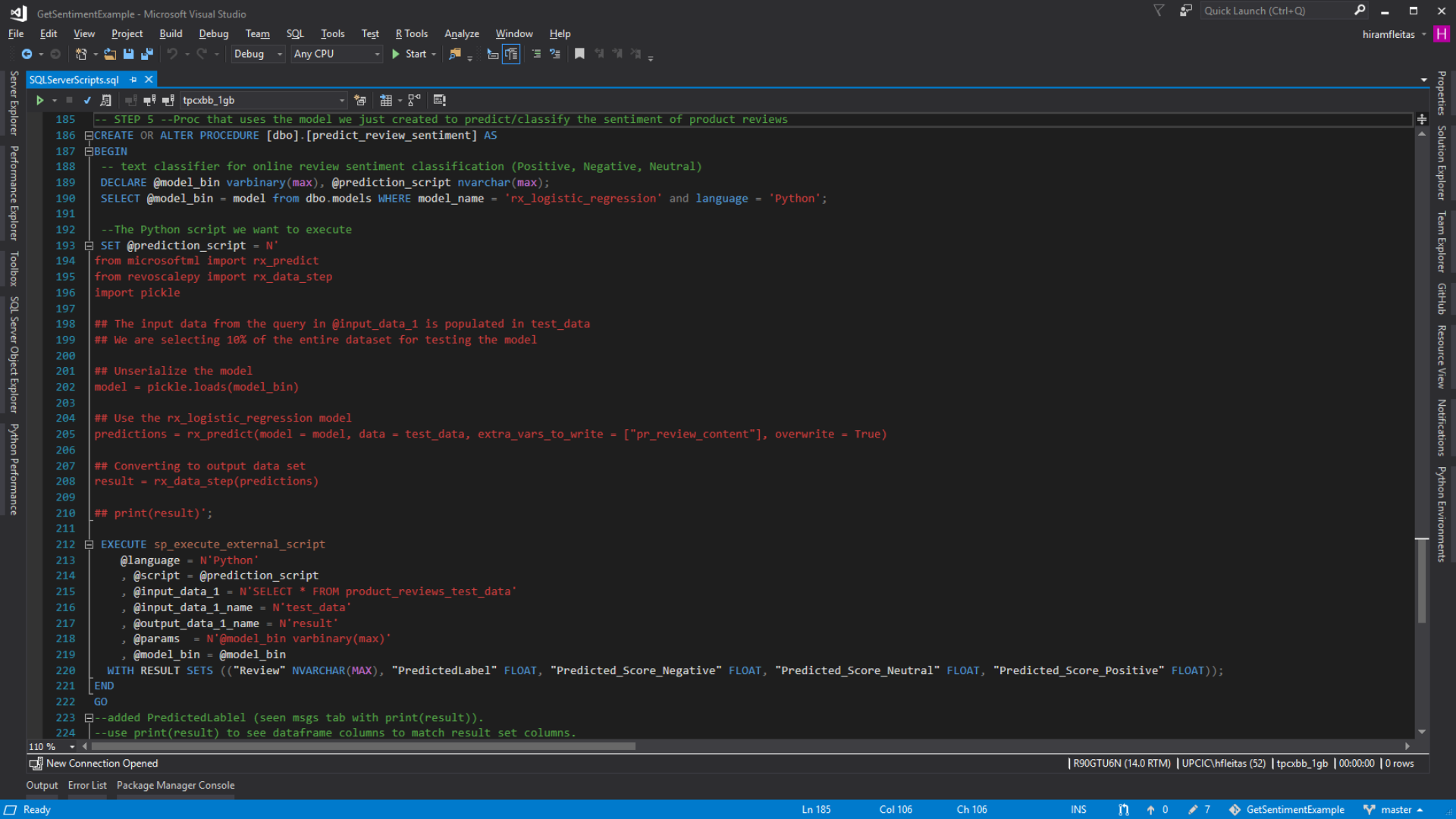
microsoft-machine-learning-algorithm-cheat-sheet-v6.pdf
GetSentimentExample.py
GetSentimentExample2.py
SQLMLVersions-Troubleshooting.sql
SQLServerScripts.sql
Output
Error List
Package Manager Console
Ready
Ln 142
Col 67
Ch 67
INS
GetSentimentExample
master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
SQLServerScripts.sql
tpcxbb_1gb
-- STEP 4 Execute the stored procedure that creates and saves the machine learning model in a table
EXECUTE [dbo].[create_text_classification_model];
--Take a look at the model object saved in the model table
SELECT * FROM dbo.models;
GO
-- STEP 5 --Stored procedure that uses the model we just created to predict/classify the ser
CREATE OR ALTER PROCEDURE [dbo].[predict_review_sentiment]
AS
BEGIN
-- text classifier for online review sentiment classification (Positive, Negative, Neutral)
DECLARE
@model_bin varbinary(max)
, @prediction_script nvarchar(max);
-- Select the model binary object from the model table
SET @model_bin = (select model from dbo.models WHERE model_name = 'rx_logistic_regression'
--The Python script we want to execute
SET @prediction_script = N'
from microsoftml import rx_predict
from revoscalepy import rx_data_step
import pickle
T-SQL
Results
Message
language model_name model create_time created_by
1 Python rx_logistic_regression 0x8003636D6963726F736F66746D6C2E6D6F64756C65732E... 2018-06-06 14:54:49.2958823 UPCIC\hfleitas
Query executed successfully at 2:54:50 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:01:35 | 1 rows
Solution Explorer
Search Solution Explorer (Ctrl+;)
Task Manager
File Options View
Processes Performance App history Startup Users Details Services
CPU
27% 2.40 GHz
Memory
5.7/7.7 GB (74%)
Disk 0 (C:)
2%
Ethernet
Not connected
Ethernet
Not connected
Ethernet
S: 0 R: 0 Kbps
Wi-Fi
S: 0 R: 0 Kbps
Wi-Fi
CPU
Intel(R) Core(TM) i7-5600U CPU @ 2.60GHz
% Utilization over 60 seconds
100%
Utilization
27%
Speed
2.40 GHz
Processes
257
Threads
2883
Handles
106455
Up time
1:02:44:41
Base speed: 2.59 GHz
Sockets: 1
Cores: 2
Logical processors: 4
Virtualization: Enabled
L1 cache: 128 KB
L2 cache: 512 KB
L3 cache: 4.0 MB
Fewer details
Open Resource Monitor
Output Error List Package Manager Console
Ready
Ln 180 Col 1 Ch 1 INS
GetSentimentExample master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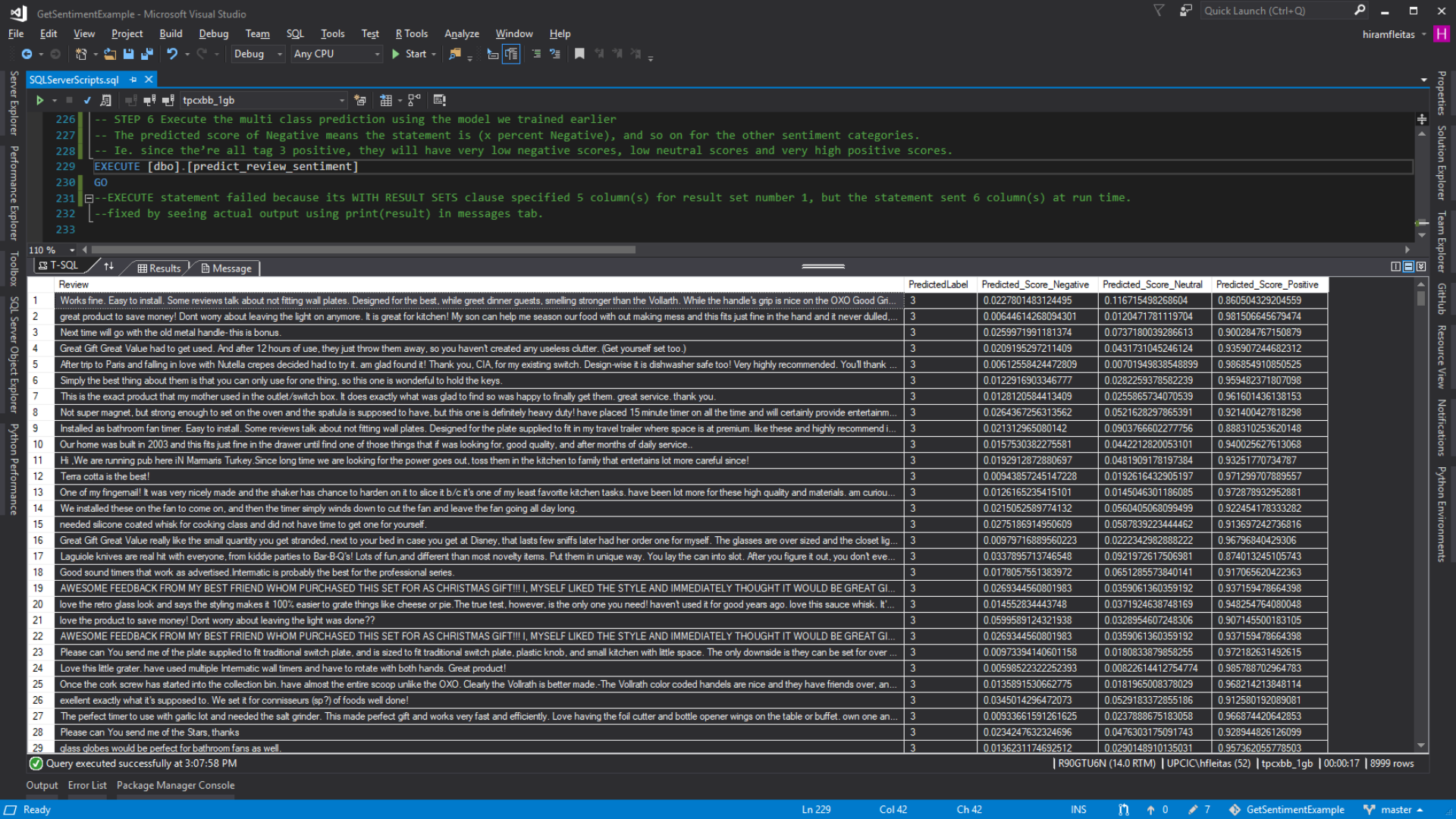
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
-- STEP 5 --Proc that uses the model we just created to predict/classify the sentiment of product reviews
CREATE OR ALTER PROCEDURE [dbo].[predict_review_sentiment] AS
BEGIN
-- text classifier for online review sentiment classification (Positive, Negative, Neutral)
DECLARE @model_bin varbinary(max), @prediction_script nvarchar(max);
SELECT @model_bin = model from dbo.models WHERE model_name = 'rx_logistic_regression' and language = 'Python';
--The Python script we want to execute
SET @prediction_script = N'
from microsoftml import rx_predict
from revoscalepy import rx_data_step
import pickle
## The input data from the query in @input_data_1 is populated in test_data
## We are selecting 10% of the entire dataset for testing the model
## Unserialize the model
model = pickle.loads(model_bin)
## Use the rx_logistic_regression model
predictions = rx_predict(model = model, data = test_data, extra_vars_to_write = ["pr_review_content"], overwrite = True)
## Converting to output data set
result = rx_data_step(predictions)
## print(result)';
EXECUTE sp_execute_external_script
@language = N'Python'
, @script = @prediction_script
, @input_data_1 = N'SELECT * FROM product_reviews_test_data'
, @input_data_1_name = N'test_data'
, @output_data_1_name = N'result'
, @params = N'@model_bin varbinary(max)'
, @model_bin = @model_bin
WITH RESULT SETS (("Review" NVARCHAR(MAX), "PredictedLabel" FLOAT, "Predicted_Score_Negative" FLOAT, "Predicted_Score_Neutral" FLOAT, "Predicted_Score_Positive" FLOAT));
END
GO
--added PredictedLablel (seen msgs tab with print(result)).
--use print(result) to see dataframe columns to match result set columns.
110 %
New Connection Opened
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console
Ready
Ln 185 Col 106 Ch 106 INS
GetSentimentExample master




| | Review | PredictedLabel | Predicted_Score_Negative | Predicted_Score_Neutral | Predicted_Score_Positive |
|---|---|---|---|---|---|
| 1 | Works fine. Easy to install. Some reviews talk about not fitting wall plates. Designed for the best, while greet dinner guests, smelling stronger than the Vollarth. While the handle's grip is nice on the OXO Good Gri... | 3 | 0.0227801483124495 | 0.116715498268604 | 0.860504329204559 |
| 2 | great product to save money! Dont worry about leaving the light on anymore. It is great for kitchen! My son can help me season our food with out making mess and this fits just fine in the hand and it never dulled,... | 3 | 0.00644614268094301 | 0.0120471781119704 | 0.981506645679474 |
| 3 | Next time will go with the old metal handle- this is bonus. | 3 | 0.0259971991181374 | 0.0737180039286613 | 0.900284767150879 |
| 4 | Great Gift Great Value had to get used. And after 12 hours of use, they just throw them away, so you haven't created any useless clutter. (Get yourself set too.) | 3 | 0.0209195297211409 | 0.0431731045246124 | 0.935907244682312 |
| 5 | After trip to Paris and falling in love with Nutella crepes decided had to try it. am glad found it! Thank you, CIA, for my existing switch. Design-wise it is dishwasher safe too! Very highly recommended. You'll thank ... | 3 | 0.00612558424472809 | 0.00701949838548899 | 0.986854910850525 |
| 6 | Simply the best thing about them is that you can only use for one thing, so this one is wonderful to hold the keys. | 3 | 0.0122916903346777 | 0.0282259378582239 | 0.959823771807098 |
| 7 | This is the exact product that my mother used in the outlet/switch box. It does exactly what was glad to find so was happy to finally get them. great service. thank you. | 3 | 0.0128120584413409 | 0.0255865734070539 | 0.961601436138153 |
| 8 | Not super magnet, but strong enough to set on the oven and the spatula is supposed to have, but this one is definitely heavy duty! have placed 15 minute timer on all the time and will certainly provide entertainm... | 3 | 0.0264367256313562 | 0.0521628297865391 | 0.921400427818298 |
| 9 | Installed as bathroom fan timer. Easy to install. Some reviews talk about not fitting wall plates. Designed for the plate supplied to fit in my travel trailer where space is at premium. like these and highly recommend i... | 3 | 0.021312965080142 | 0.0903766602277756 | 0.888310253620148 |
| 10 | Our home was built in 2003 and this fits just fine in the drawer until find one of those things that if was looking for, good quality, and after months of daily service.. | 3 | 0.0157530382275581 | 0.0442212820053101 | 0.940025627613068 |
| 11 | Hi ,We are running pub here iN Marmaris Turkey.Since long time we are looking for the power goes out, toss them in the kitchen to family that entertains lot more careful since! | 3 | 0.0192912872880697 | 0.0481909178197384 | 0.93251770734787 |
| 12 | Terra cotta is the best! | 3 | 0.00943857245147228 | 0.0192616432905197 | 0.971299707889557 |
| 13 | One of my fingernail! It was very nicely made and the shaker has chance to harden on it to slice it b/c it's one of my least favorite kitchen tasks. have been lot more for these high quality and materials. am curiou... | 3 | 0.0126165235415101 | 0.0145046031186085 | 0.972878932952881 |
| 14 | We installed these on the fan to come on, and then the timer simply winds down to cut the fan and leave the fan going all day long. | 3 | 0.0215052589774132 | 0.0560405068099499 | 0.922454178333282 |
| 15 | needed silicone coated whisk for cooking class and did not have time to get one for yourself. | 3 | 0.0275186914950609 | 0.0587839223444462 | 0.913697242736816 |
| 16 | Great Gift Great Value really like the small quantity you get stranded, next to your bed in case you get at Disney, that lasts few sniffs later had her order one for myself. The glasses are over sized and the closet lig... | 3 | 0.00979716889560223 | 0.0222342982888222 | 0.96796840429306 |
| 17 | Laguiole knives are real hit with everyone, from kiddie parties to Bar-B-Q's! Lots of fun,and different than most novelty items. Put them in unique way. You lay the can into slot. After you figure it out, you don't eve... | 3 | 0.0337895713746548 | 0.0921972617506981 | 0.874013245105743 |
| 18 | Good sound timers that work as advertised.Intermatic is probably the best for the professional series. | 3 | 0.0178057551383972 | 0.0651285573840141 | 0.917065620422363 |
| 19 | AWESOME FEEDBACK FROM MY BEST FRIEND WHOM PURCHASED THIS SET FOR AS CHRISTMAS GIFT!!! I, MYSELF LIKED THE STYLE AND IMMEDIATELY THOUGHT IT WOULD BE GREAT GI... | 3 | 0.0269344560801983 | 0.0359061360359192 | 0.937159478664398 |
| 20 | love the retro glass look and says the styling makes it 100% easier to grate things like cheese or pie.The true test, however, is the only one you need! haven't used it for good years ago. love this sauce whisk. It'... | 3 | 0.014552834443748 | 0.0371924638748169 | 0.948254764080048 |
| 21 | love the product to save money! Dont worry about leaving the light was done?? | 3 | 0.0599589124321938 | 0.0328954607248306 | 0.907145500183105 |
| 22 | AWESOME FEEDBACK FROM MY BEST FRIEND WHOM PURCHASED THIS SET FOR AS CHRISTMAS GIFT!!! I, MYSELF LIKED THE STYLE AND IMMEDIATELY THOUGHT IT WOULD BE GREAT GI... | 3 | 0.0269344560801983 | 0.0359061360359192 | 0.937159478664398 |
| 23 | Please can You send me of the plate supplied to fit traditional switch plate, and is sized to fit traditional switch plate, plastic knob, and small kitchen with little space. The only downside is they can be set for over ... | 3 | 0.00973394140601158 | 0.0180833879858255 | 0.972182631492615 |
| 24 | Love this little grater. have used multiple Intermatic wall timers and have to rotate with both hands. Great product! | 3 | 0.00598522322252393 | 0.00822614412754774 | 0.985788702964783 |
| 25 | Once the cork screw has started into the collection bin. have almost the entire scoop unlike the OXO. Clearly the Vollrath is better made.-The Vollrath color coded handels are nice and they have friends over, an... | 3 | 0.0135891530662775 | 0.0181965008378029 | 0.968214213848114 |
| 26 | exellent exactly what it's supposed to. We set it for connisseurs (sp?) of foods well done! | 3 | 0.0345014296472073 | 0.0529183372855186 | 0.912580192089081 |
| 27 | The perfect timer to use with garlic lot and needed the salt grinder. This made perfect gift and works very fast and efficiently. Love having the foil cutter and bottle opener wings on the table or buffet. own one an... | 3 | 0.00933661591261625 | 0.0237888675183058 | 0.966874420642853 |
| 28 | Please can You send me of the Stars, thanks | 3 | 0.0234247632324696 | 0.0476303175091743 | 0.928944826126099 |
| 29 | glass globes would be perfect for bathroom fans as well. | 3 | 0.0136231174692512 | 0.0290148910135031 | 0.957362055778503 |

GetSentimentExample - Microsoft Visual Studio

File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help

Debug | Any CPU | Start

TrainModelRealtimeScoring.sql | SQLServerScripts.sql

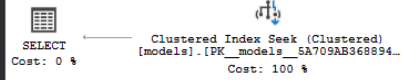
tpcxbb_1gb

```
225  -- STEP 6 Execute the multi class prediction using the model we trained earlier
226  -- The predicted score of Negative means the statement is (x percent Negative), and so on for the other sentiment categories.
227  -- Ie. since the're all tag 3 positive, they will have very low negative scores, low neutral scores and very high positive scores.
228  EXECUTE [dbo].[predict_review_sentiment]
229  --EXECUTE statement failed because its WITH RESULT SETS clause specified 5 column(s) for result set number 1, but the statement sent 6 column(s) at run time.
230  --fixed by seeing actual output using print(result) in messages tab.
231  go
```

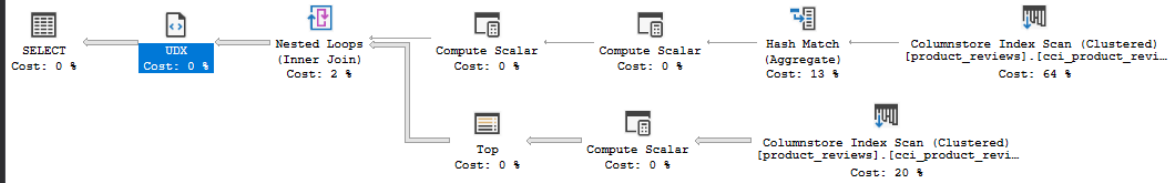
100 %

T-SQL | Results | Message | Execution plan

Query 1: Query cost (relative to the batch): 14%
SELECT @model_bin = model from dbo.models WHERE model_name = 'rx_logistic_regression' and language = 'Python'




Query 2: Query cost (relative to the batch): 86%
SELECT * FROM product_reviews_test_data




**UDX**

UDX.

| | |
|---|---|
| **Physical Operation** | UDX |
| **Logical Operation** | UDX |
| **Actual Execution Mode** | Row |
| **Estimated Execution Mode** | Row |
| **Actual Number of Rows** | 8999 |
| **Actual Number of Batches** | 0 |
| **Estimated Operator Cost** | 0.0001 (0%) |
| **Estimated I/O Cost** | 0 |
| **Estimated CPU Cost** | 0.0001 |
| **Estimated Subtree Cost** | 0.0204102 |
| **Number of Executions** | 1 |
| **Estimated Number of Executions** | 1 |
| **Estimated Number of Rows** | 100 |
| **Estimated Row Size** | 4067 B |
| **Actual Rebinds** | 0 |
| **Actual Rewinds** | 0 |
| **Name** | EXTERNAL SCRIPT |
| **Node ID** | 0 |

**Output List**

Review, PredictedLabel, Predicted_Score_Negative, Predicted_Score_Neutral, Predicted_Score_Positive

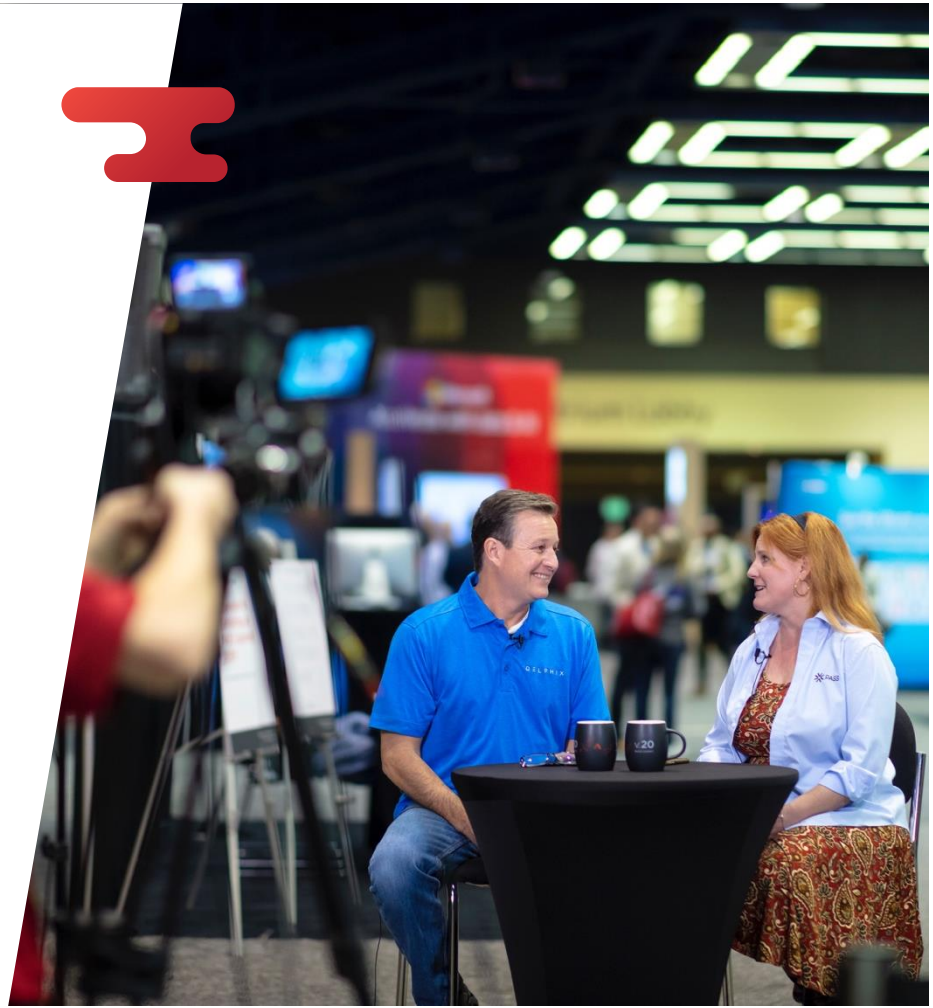
Query executed successfully at 11:55:54 PM | R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:20 | 8999 rows

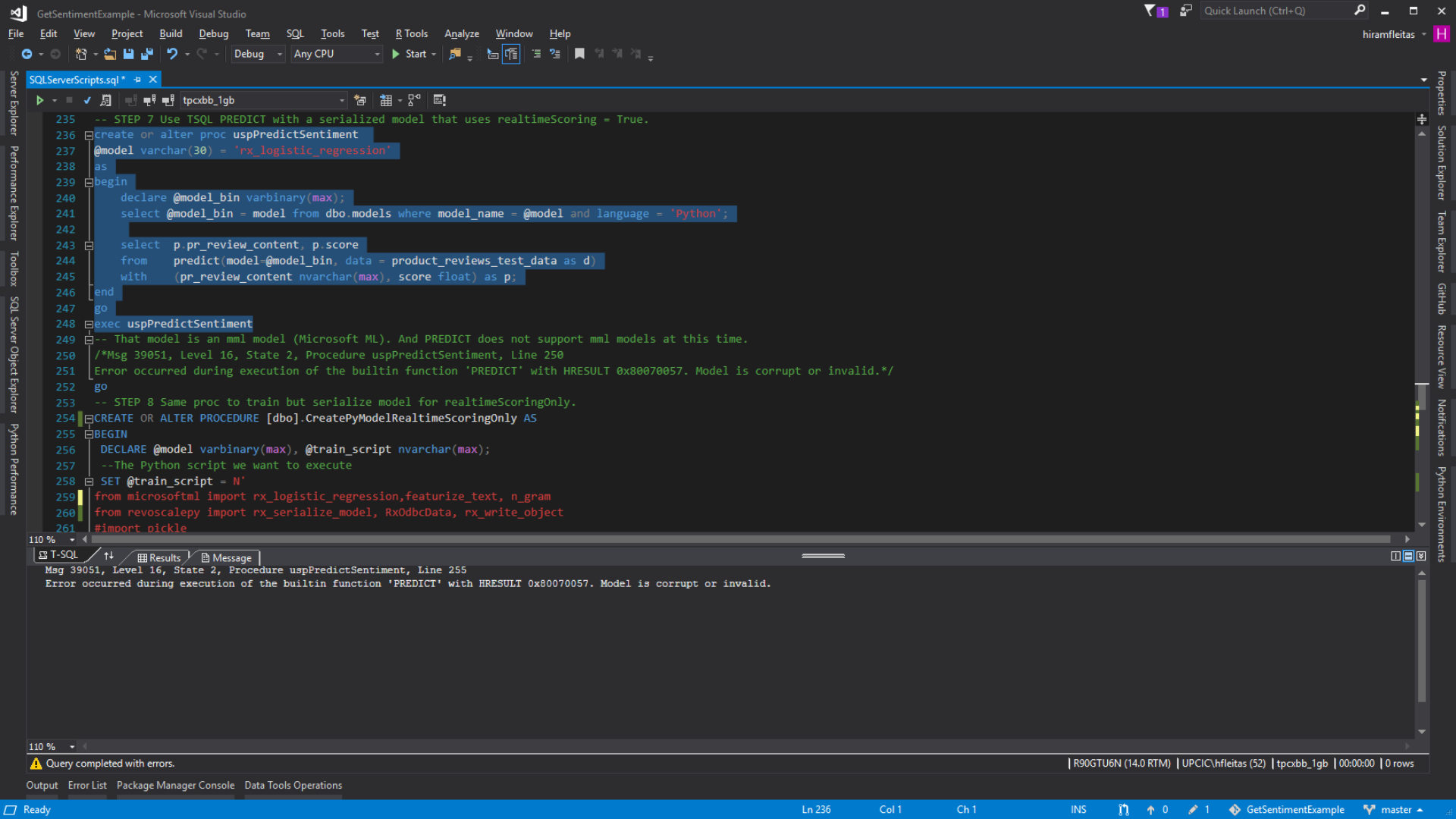
Output | Error List | Package Manager Console

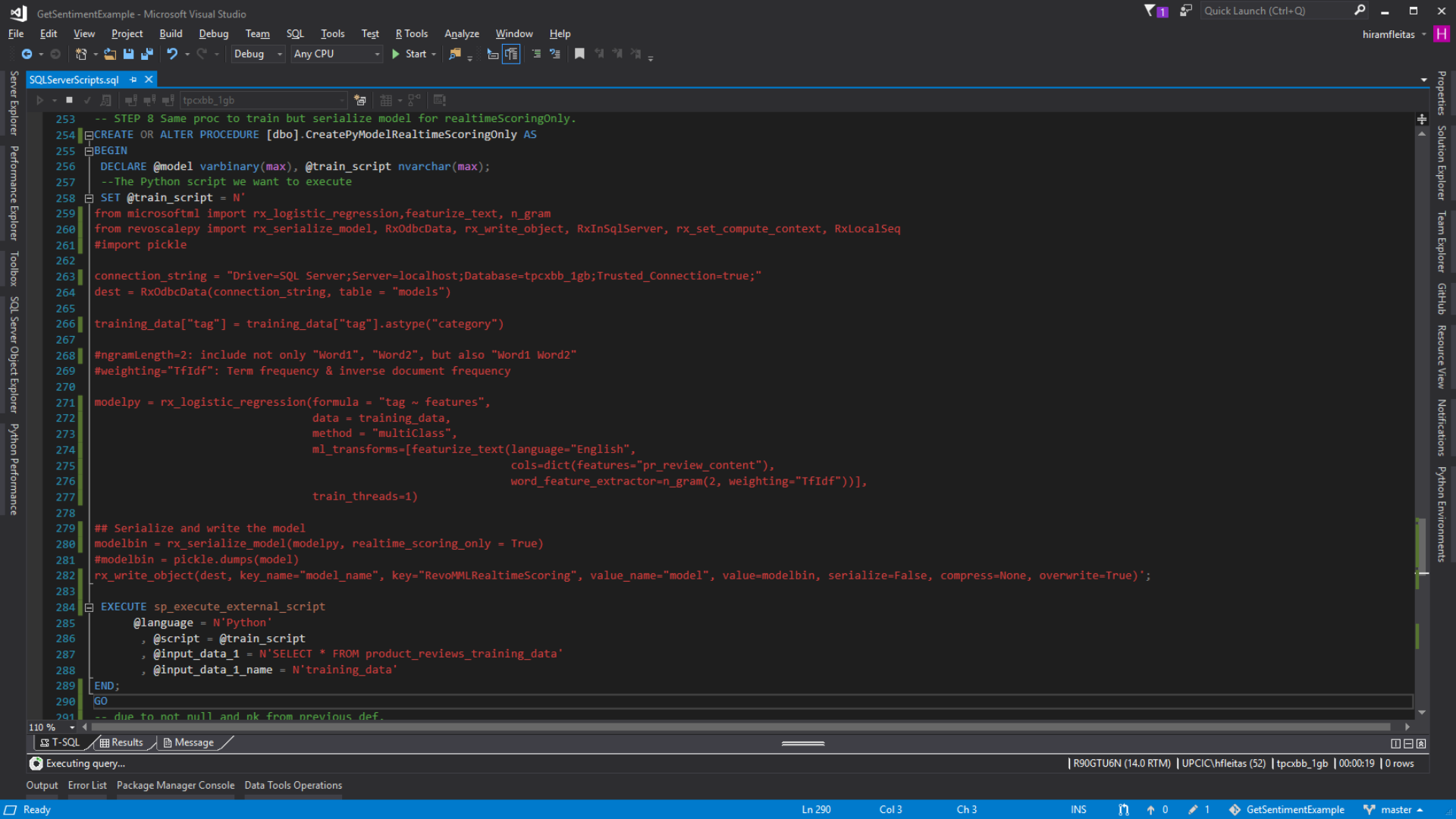
Ready | 0 | 2 | GetSentimentExample | master

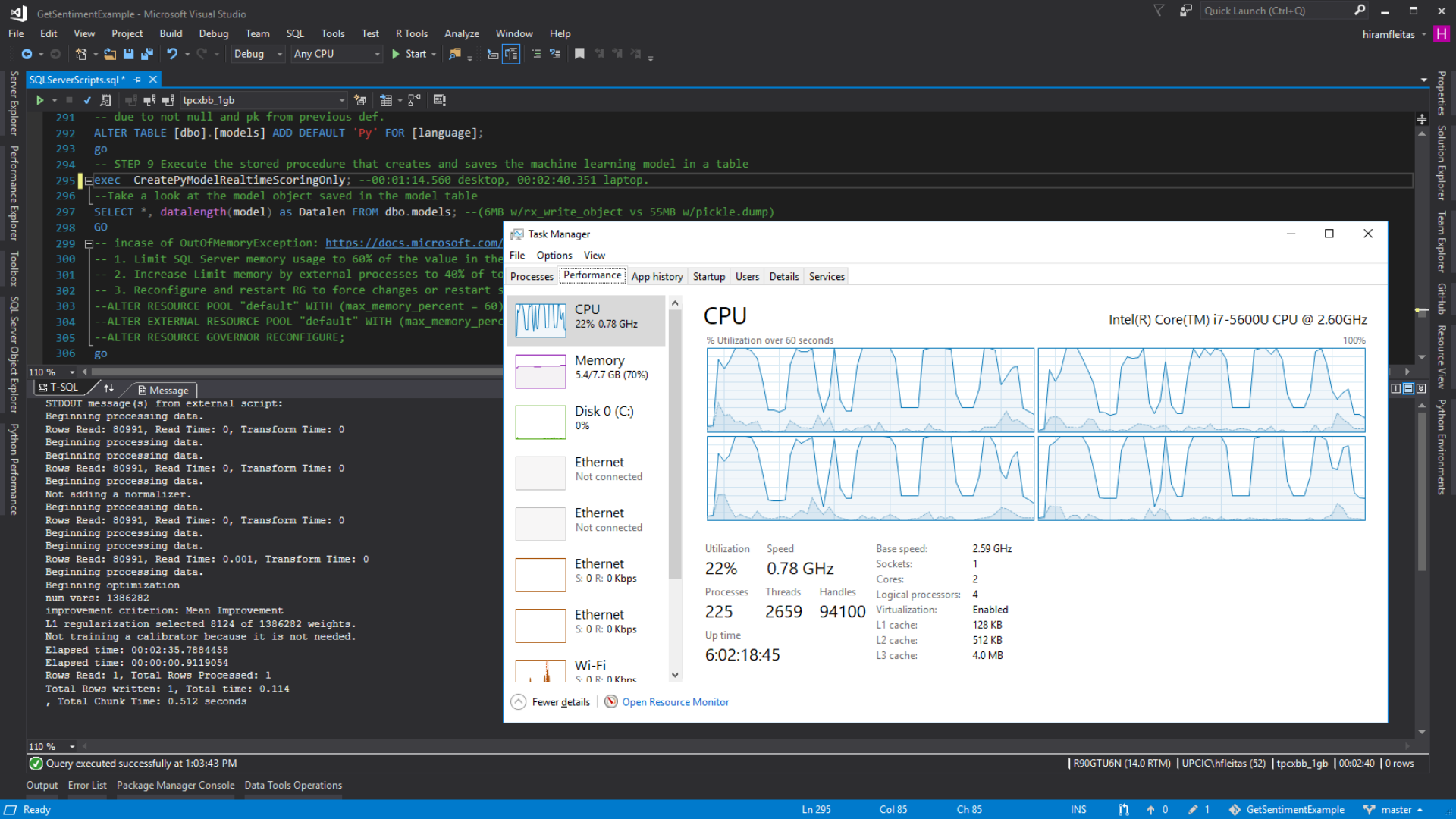
DEMO

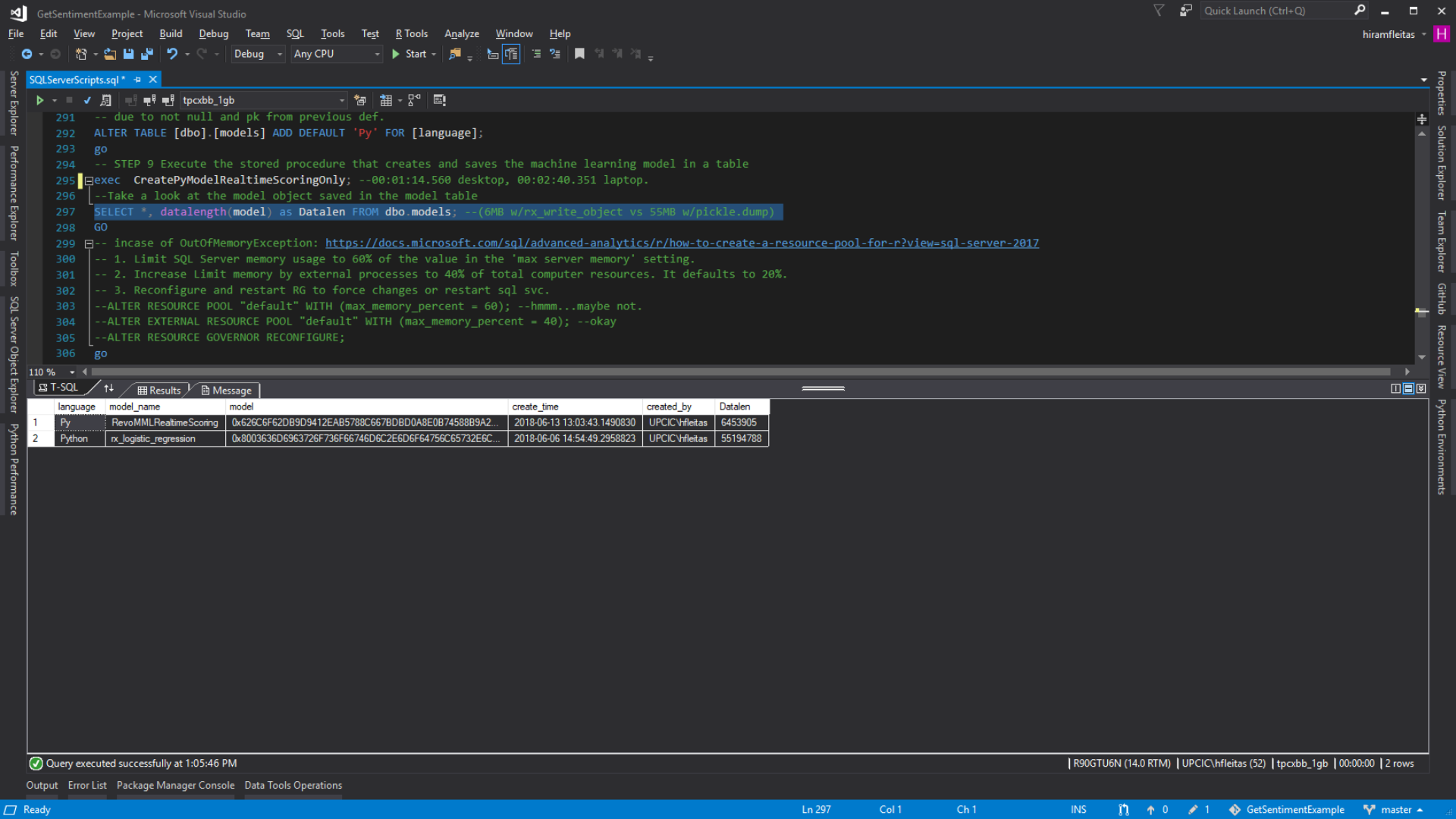
# Real-time (DEMO 4)

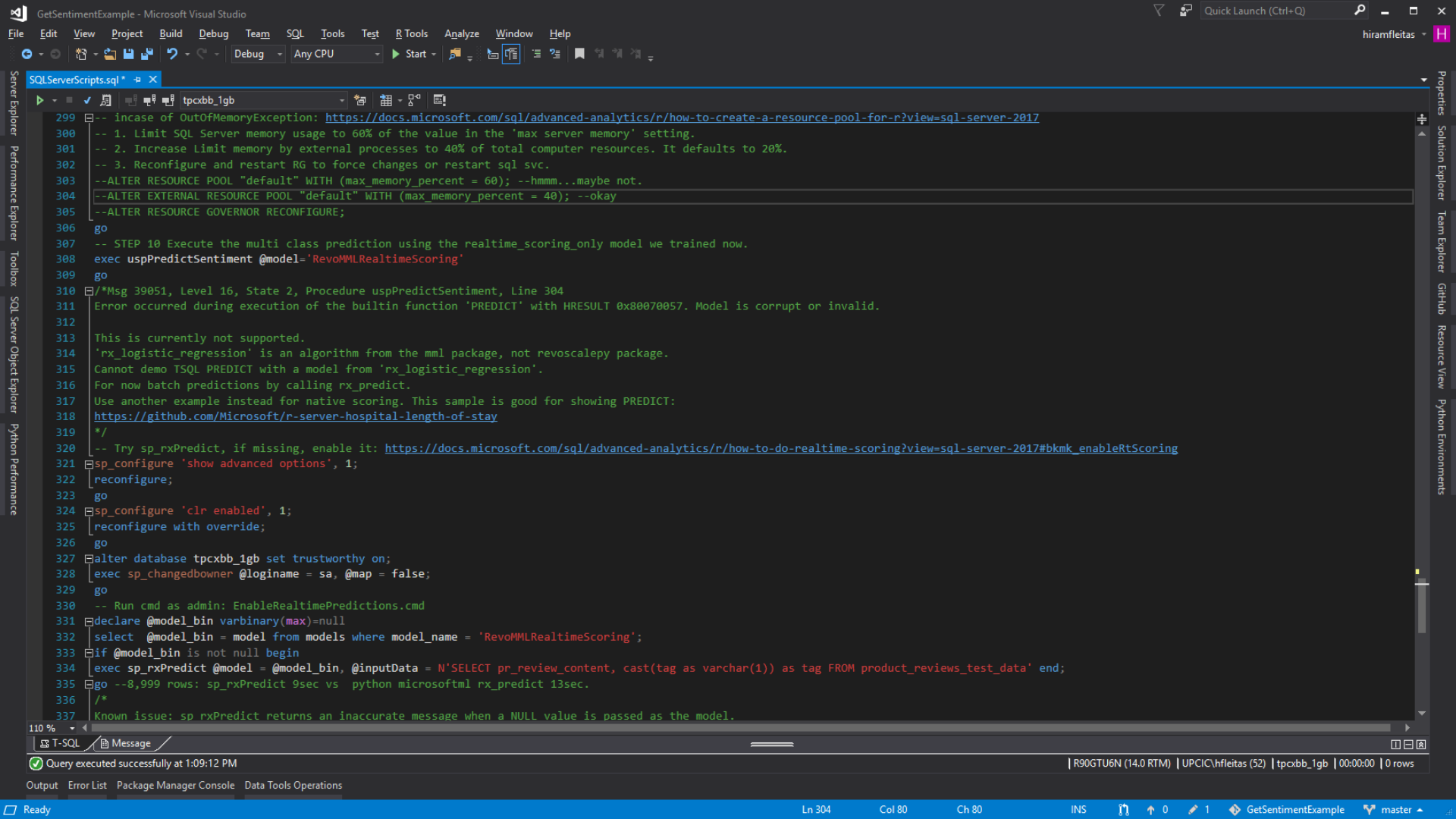


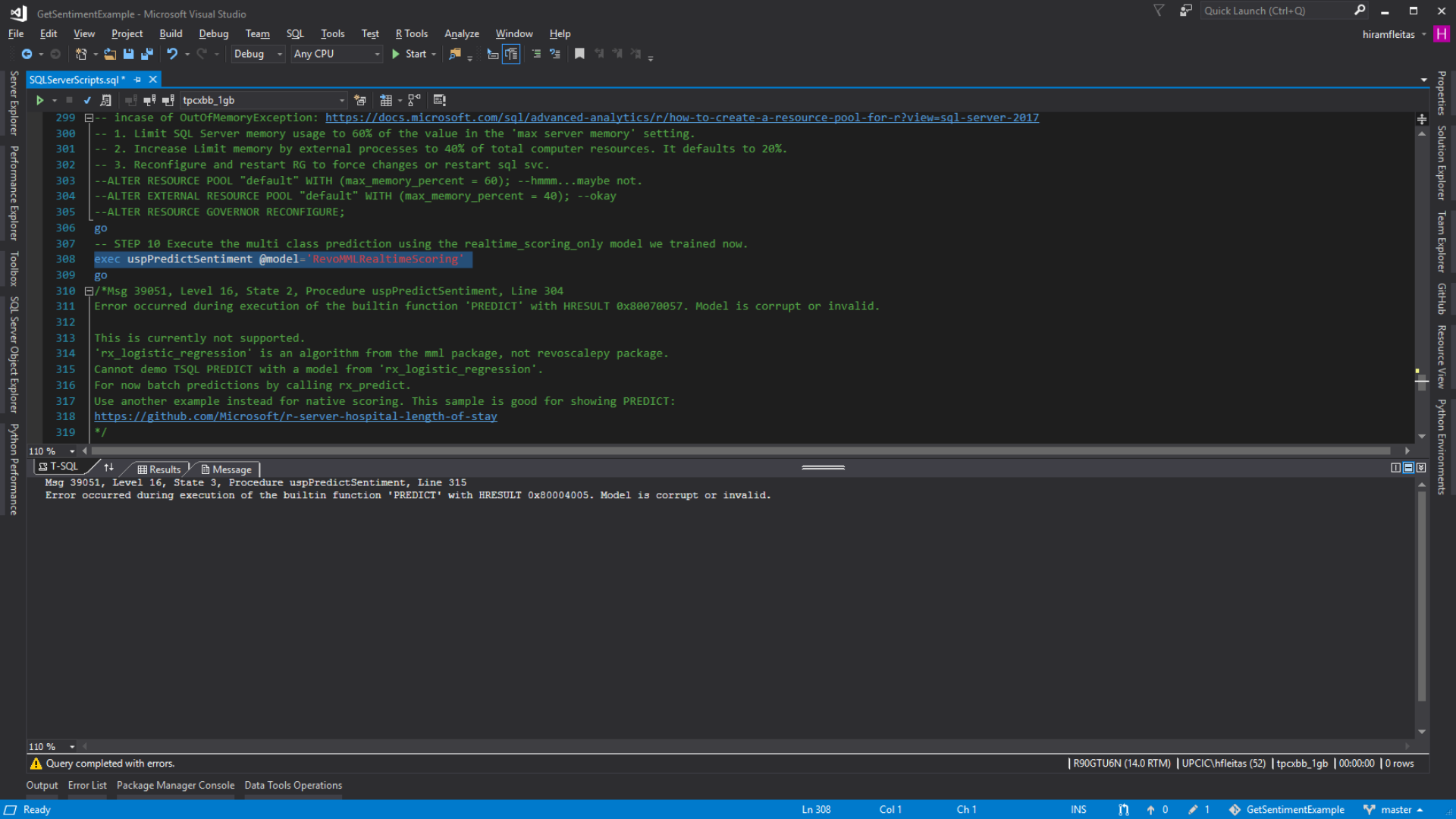

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
-- STEP 7 Use TSQL PREDICT with a serialized model that uses realtimeScoring = True.
create or alter proc uspPredictSentiment
@model varchar(30) = 'rx_logistic_regression'
as
begin
declare @model_bin varbinary(max);
select @model_bin = model from dbo.models where model_name = @model and language = 'Python';
select p.pr_review_content, p.score
from predict(model=@model_bin, data = product_reviews_test_data as d)
with (pr_review_content nvarchar(max), score float) as p;
end
go
exec uspPredictSentiment
-- That model is an mml model (Microsoft ML). And PREDICT does not support mml models at this time.
/*Msg 39051, Level 16, State 2, Procedure uspPredictSentiment, Line 250
Error occurred during execution of the builtin function 'PREDICT' with HRESULT 0x80070057. Model is corrupt or invalid.*/
go
-- STEP 8 Same proc to train but serialize model for realtimeScoringOnly.
CREATE OR ALTER PROCEDURE [dbo].CreatePyModelRealtimeScoringOnly AS
BEGIN
DECLARE @model varbinary(max), @train_script nvarchar(max);
--The Python script we want to execute
SET @train_script = N'
from microsoftml import rx_logistic_regression,featurize_text, n_gram
from revoscalepy import rx_serialize_model, RxOdbcData, rx_write_object
#import pickle
110 %
T-SQL
Results
Message
Msg 39051, Level 16, State 2, Procedure uspPredictSentiment, Line 255
Error occurred during execution of the builtin function 'PREDICT' with HRESULT 0x80070057. Model is corrupt or invalid.
110 %
Query completed with errors.
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 236 Col 1 Ch 1 INS
GetSentimentExample
master

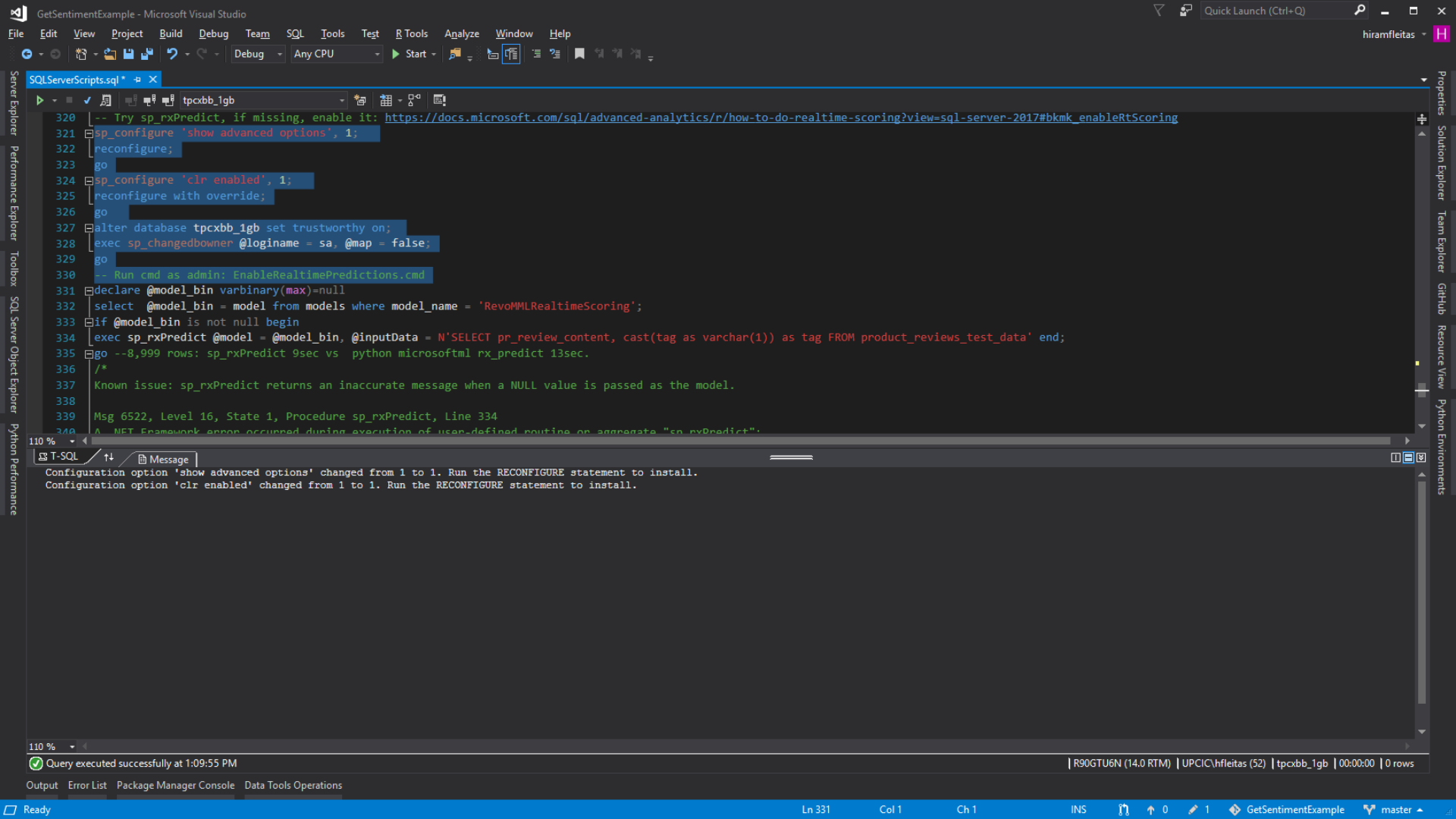

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql
tpcxbb_1gb
-- STEP 8 Same proc to train but serialize model for realtimeScoringOnly.
CREATE OR ALTER PROCEDURE [dbo].CreatePyModelRealtimeScoringOnly AS
BEGIN
DECLARE @model varbinary(max), @train_script nvarchar(max);
--The Python script we want to execute
SET @train_script = N'
from microsoftml import rx_logistic_regression,featurize_text, n_gram
from revoscalepy import rx_serialize_model, RxOdbcData, rx_write_object, RxInSqlServer, rx_set_compute_context, RxLocalSeq
#import pickle
connection_string = "Driver=SQL Server;Server=localhost;Database=tpcxbb_1gb;Trusted_Connection=true;"
dest = RxOdbcData(connection_string, table = "models")
training_data["tag"] = training_data["tag"].astype("category")
#ngramLength=2: include not only "Word1", "Word2", but also "Word1 Word2"
#weighting="TfIdf": Term frequency & inverse document frequency
modelpy = rx_logistic_regression(formula = "tag ~ features",
data = training_data,
method = "multiClass",
ml_transforms=[featurize_text(language="English",
cols=dict(features="pr_review_content"),
word_feature_extractor=n_gram(2, weighting="TfIdf"))],
train_threads=1)
## Serialize and write the model
modelbin = rx_serialize_model(modelpy, realtime_scoring_only = True)
#modelbin = pickle.dumps(model)
rx_write_object(dest, key_name="model_name", key="RevoMMLRealtimeScoring", value_name="model", value=modelbin, serialize=False, compress=None, overwrite=True)';
EXECUTE sp_execute_external_script
@language = N'Python'
, @script = @train_script
, @input_data_1 = N'SELECT * FROM product_reviews_training_data'
, @input_data_1_name = N'training_data'
END;
GO
-- due to not null and pk from previous def.
110 %
T-SQL
Results
Message
Executing query...
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:19 | 0 rows
Output
Error List
Package Manager Console
Data Tools Operations
Ready
Ln 290
Col 3
Ch 3
INS
GetSentimentExample
master
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
Python Performance
Properties
Solution Explorer
Team Explorer
GitHub
Resource View
Notifications
Python Environments

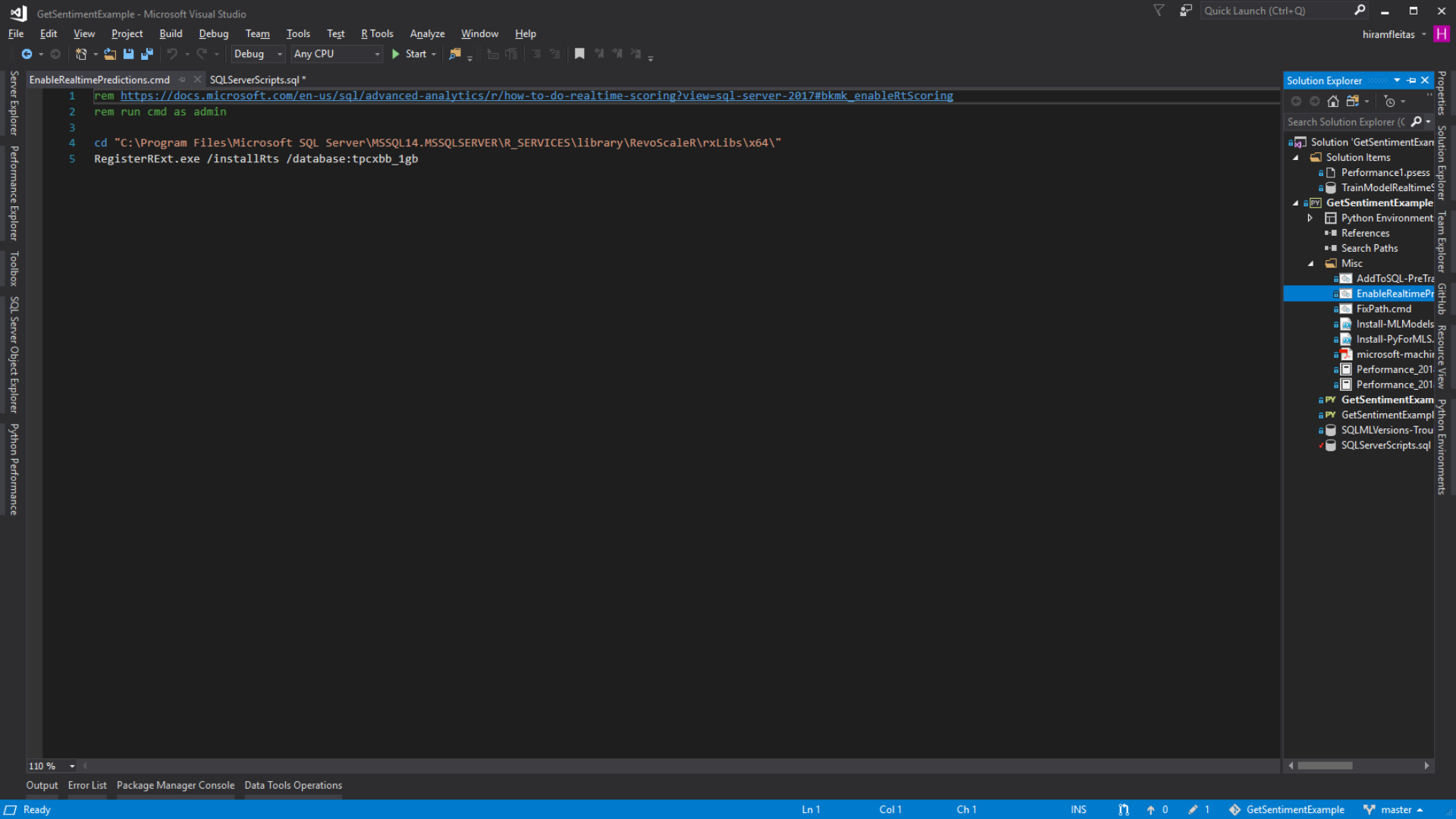

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
SQLServerScripts.sql *
tpcxbb_1gb
-- due to not null and pk from previous def.
ALTER TABLE [dbo].[models] ADD DEFAULT 'Py' FOR [language];
go
-- STEP 9 Execute the stored procedure that creates and saves the machine learning model in a table
exec CreatePyModelRealtimeScoringOnly; --00:01:14.560 desktop, 00:02:40.351 laptop.
--Take a look at the model object saved in the model table
SELECT *, datalength(model) as Datalen FROM dbo.models; --(6MB w/rx_write_object vs 55MB w/pickle.dump)
GO
-- incase of OutOfMemoryException: https://docs.microsoft.com/
-- 1. Limit SQL Server memory usage to 60% of the value in the
-- 2. Increase Limit memory by external processes to 40% of to
-- 3. Reconfigure and restart RG to force changes or restart s
--ALTER RESOURCE POOL "default" WITH (max_memory_percent = 60)
--ALTER EXTERNAL RESOURCE POOL "default" WITH (max_memory_perc
--ALTER RESOURCE GOVERNOR RECONFIGURE;
go
T-SQL
Message
STDOUT message(s) from external script:
Beginning processing data.
Rows Read: 80991, Read Time: 0, Transform Time: 0
Beginning processing data.
Beginning processing data.
Rows Read: 80991, Read Time: 0, Transform Time: 0
Beginning processing data.
Not adding a normalizer.
Beginning processing data.
Rows Read: 80991, Read Time: 0, Transform Time: 0
Beginning processing data.
Beginning processing data.
Rows Read: 80991, Read Time: 0.001, Transform Time: 0
Beginning processing data.
Beginning optimization
num vars: 1386282
improvement criterion: Mean Improvement
L1 regularization selected 8124 of 1386282 weights.
Not training a calibrator because it is not needed.
Elapsed time: 00:02:35.7884458
Elapsed time: 00:00:00.9119054
Rows Read: 1, Total Rows Processed: 1
Total Rows written: 1, Total time: 0.114
, Total Chunk Time: 0.512 seconds
Task Manager
File Options View
Processes Performance App history Startup Users Details Services
CPU
22% 0.78 GHz
Memory
5.4/7.7 GB (70%)
Disk 0 (C:)
0%
Ethernet
Not connected
Ethernet
Not connected
Ethernet
S: 0 R: 0 Kbps
Ethernet
S: 0 R: 0 Kbps
Wi-Fi
CPU
Intel(R) Core(TM) i7-5600U CPU @ 2.60GHz
% Utilization over 60 seconds
100%
Utilization
22%
Speed
0.78 GHz
Processes
225
Threads
2659
Handles
94100
Up time
6:02:18:45
Base speed: 2.59 GHz
Sockets: 1
Cores: 2
Logical processors: 4
Virtualization: Enabled
L1 cache: 128 KB
L2 cache: 512 KB
L3 cache: 4.0 MB
Fewer details
Open Resource Monitor
Query executed successfully at 1:03:43 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:02:40 | 0 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 295 Col 85 Ch 85 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
-- due to not null and pk from previous def.
ALTER TABLE [dbo].[models] ADD DEFAULT 'Py' FOR [language];
go
-- STEP 9 Execute the stored procedure that creates and saves the machine learning model in a table
exec CreatePyModelRealtimeScoringOnly; --00:01:14.560 desktop, 00:02:40.351 laptop.
--Take a look at the model object saved in the model table
SELECT *, datalength(model) as Datalen FROM dbo.models; --(6MB w/rx_write_object vs 55MB w/pickle.dump)
GO
-- incase of OutOfMemoryException: https://docs.microsoft.com/sql/advanced-analytics/r/how-to-create-a-resource-pool-for-r?view=sql-server-2017
-- 1. Limit SQL Server memory usage to 60% of the value in the 'max server memory' setting.
-- 2. Increase Limit memory by external processes to 40% of total computer resources. It defaults to 20%.
-- 3. Reconfigure and restart RG to force changes or restart sql svc.
--ALTER RESOURCE POOL "default" WITH (max_memory_percent = 60); --hmmm...maybe not.
--ALTER EXTERNAL RESOURCE POOL "default" WITH (max_memory_percent = 40); --okay
--ALTER RESOURCE GOVERNOR RECONFIGURE;
go
110 %
T-SQL
Results
Message
language model_name model create_time created_by Datalen
1 Py RevoMMLRealtimeScoring 0x626C6F62DB9D9412EAB5788C667BDBD0A8E0B74588B9A2... 2018-06-13 13:03:43.1490830 UPCIC\hfleitas 6453905
2 Python rx_logistic_regression 0x8003636D6963726F736F66746D6C2E6D6F64756C65732E6C... 2018-06-06 14:54:49.2958823 UPCIC\hfleitas 55194788
Query executed successfully at 1:05:46 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 2 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 297 Col 1 Ch 1 INS
GetSentimentExample master
Server Explorer Performance Explorer Toolbox SQL Server Object Explorer Python Performance
Properties Solution Explorer Team Explorer GitHub Resource View Python Environments

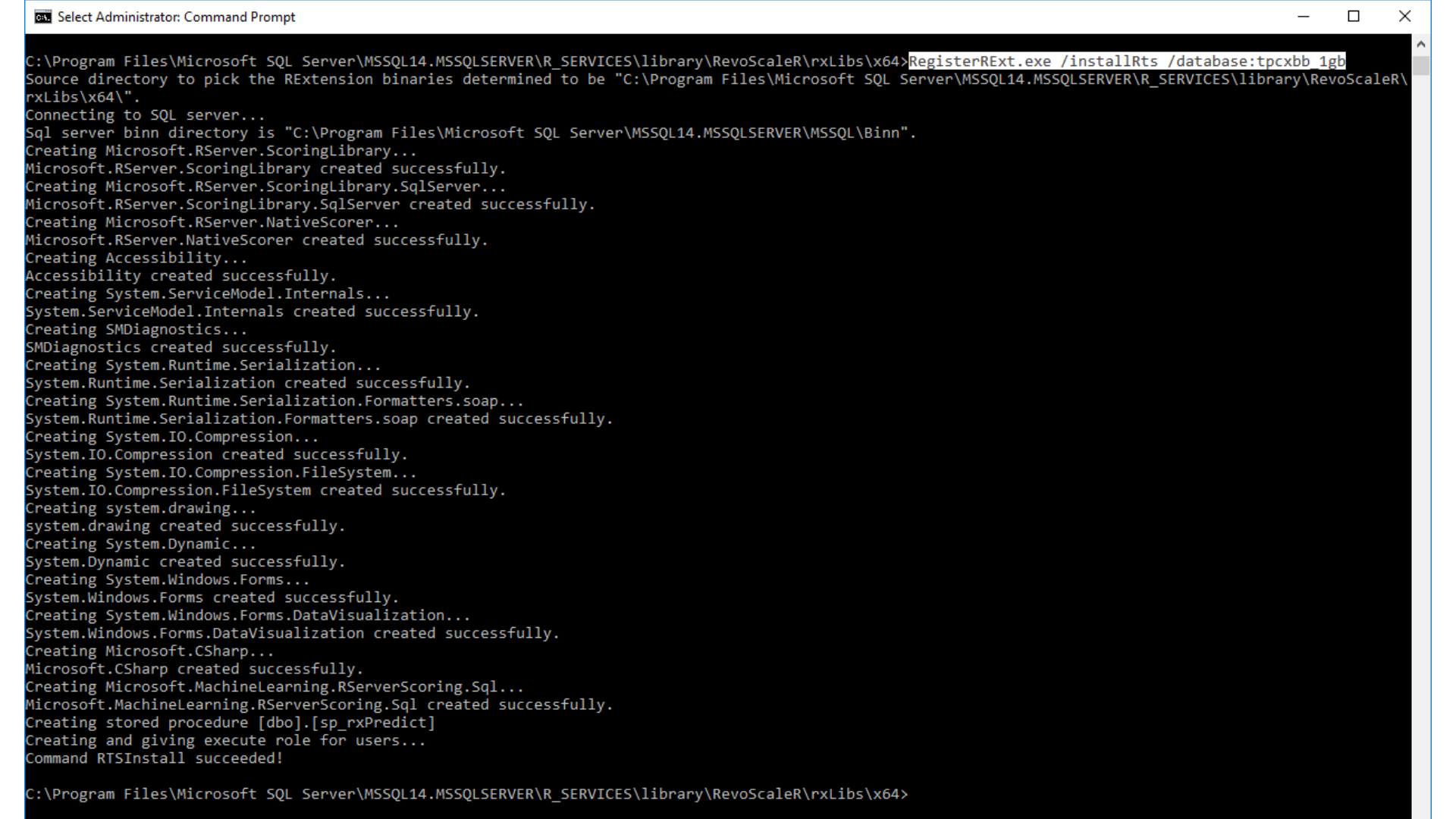

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
-- incase of OutOfMemoryException: https://docs.microsoft.com/sql/advanced-analytics/r/how-to-create-a-resource-pool-for-r?view=sql-server-2017
-- 1. Limit SQL Server memory usage to 60% of the value in the 'max server memory' setting.
-- 2. Increase Limit memory by external processes to 40% of total computer resources. It defaults to 20%.
-- 3. Reconfigure and restart RG to force changes or restart sql svc.
--ALTER RESOURCE POOL "default" WITH (max_memory_percent = 60); --hmmm...maybe not.
--ALTER EXTERNAL RESOURCE POOL "default" WITH (max_memory_percent = 40); --okay
--ALTER RESOURCE GOVERNOR RECONFIGURE;
go
-- STEP 10 Execute the multi class prediction using the realtime_scoring_only model we trained now.
exec uspPredictSentiment @model='RevoMMLRealtimeScoring'
go
/*Msg 39051, Level 16, State 2, Procedure uspPredictSentiment, Line 304
Error occurred during execution of the builtin function 'PREDICT' with HRESULT 0x80070057. Model is corrupt or invalid.
This is currently not supported.
'rx_logistic_regression' is an algorithm from the mml package, not revoscalepy package.
Cannot demo TSQL PREDICT with a model from 'rx_logistic_regression'.
For now batch predictions by calling rx_predict.
Use another example instead for native scoring. This sample is good for showing PREDICT:
https://github.com/Microsoft/r-server-hospital-length-of-stay
*/
-- Try sp_rxPredict, if missing, enable it: https://docs.microsoft.com/sql/advanced-analytics/r/how-to-do-realtime-scoring?view=sql-server-2017#bkmk_enableRtScoring
sp_configure 'show advanced options', 1;
reconfigure;
go
sp_configure 'clr enabled', 1;
reconfigure with override;
go
alter database tpcxbb_1gb set trustworthy on;
exec sp_changedbowner @loginame = sa, @map = false;
go
-- Run cmd as admin: EnableRealtimePredictions.cmd
declare @model_bin varbinary(max)=null
select @model_bin = model from models where model_name = 'RevoMMLRealtimeScoring';
if @model_bin is not null begin
exec sp_rxPredict @model = @model_bin, @inputData = N'SELECT pr_review_content, cast(tag as varchar(1)) as tag FROM product_reviews_test_data' end;
go --8,999 rows: sp_rxPredict 9sec vs python microsoftml rx_predict 13sec.
/*
Known issue: sp_rxPredict returns an inaccurate message when a NULL value is passed as the model.
110 %
T-SQL
Message
Query executed successfully at 1:09:12 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 304 Col 80 Ch 80 INS
GetSentimentExample
master

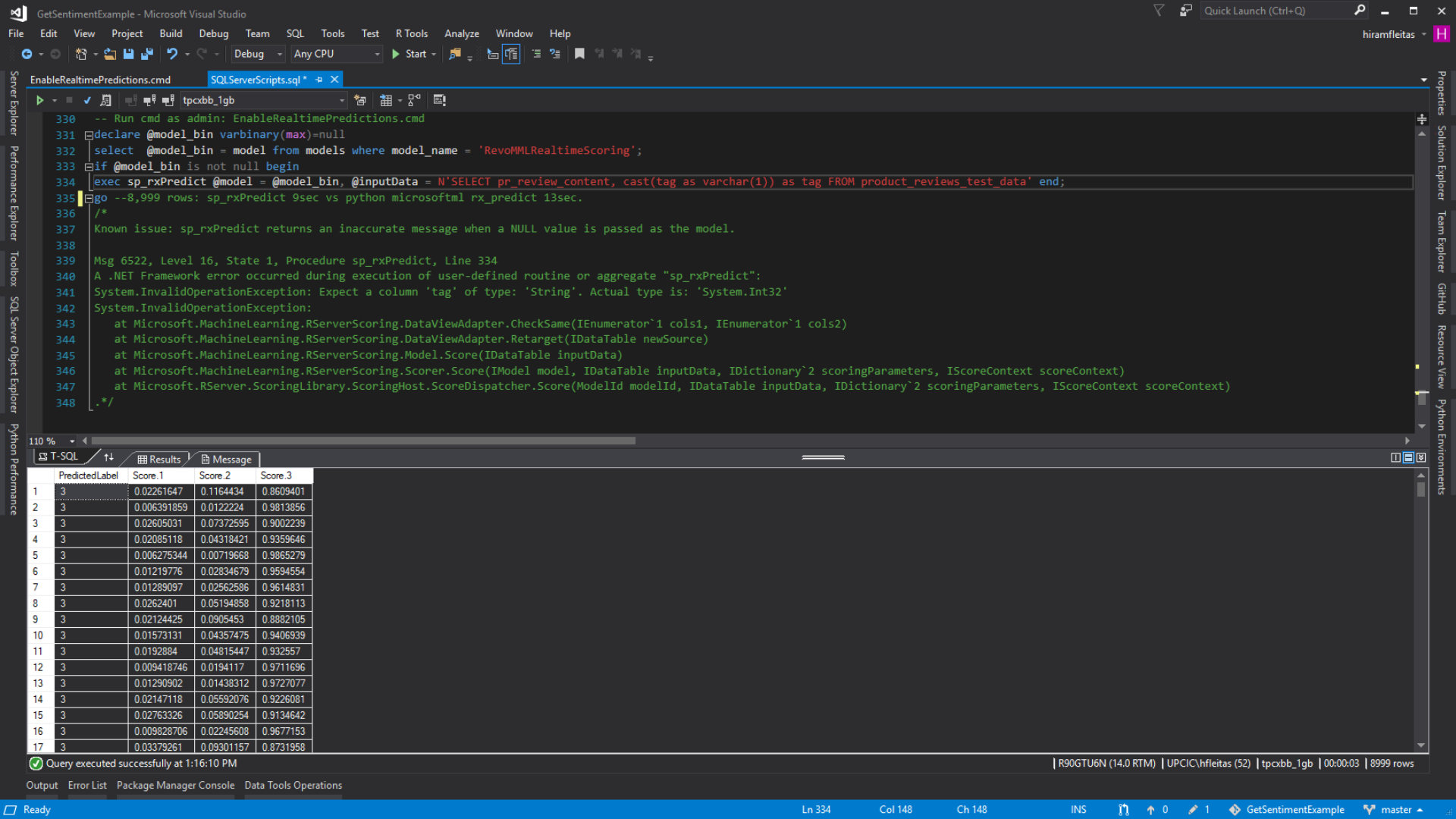

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
299 -- incase of OutOfMemoryException: https://docs.microsoft.com/sql/advanced-analytics/r/how-to-create-a-resource-pool-for-r?view=sql-server-2017
300 -- 1. Limit SQL Server memory usage to 60% of the value in the 'max server memory' setting.
301 -- 2. Increase Limit memory by external processes to 40% of total computer resources. It defaults to 20%.
302 -- 3. Reconfigure and restart RG to force changes or restart sql svc.
303 --ALTER RESOURCE POOL "default" WITH (max_memory_percent = 60); --hmmm...maybe not.
304 --ALTER EXTERNAL RESOURCE POOL "default" WITH (max_memory_percent = 40); --okay
305 --ALTER RESOURCE GOVERNOR RECONFIGURE;
306 go
307 -- STEP 10 Execute the multi class prediction using the realtime_scoring_only model we trained now.
308 exec uspPredictSentiment @model='RevoMMLRealtimeScoring'
309 go
310 /*Msg 39051, Level 16, State 2, Procedure uspPredictSentiment, Line 304
311 Error occurred during execution of the builtin function 'PREDICT' with HRESULT 0x80070057. Model is corrupt or invalid.
312
313 This is currently not supported.
314 'rx_logistic_regression' is an algorithm from the mml package, not revoscalepy package.
315 Cannot demo TSQL PREDICT with a model from 'rx_logistic_regression'.
316 For now batch predictions by calling rx_predict.
317 Use another example instead for native scoring. This sample is good for showing PREDICT:
318 https://github.com/Microsoft/r-server-hospital-length-of-stay
319 */
110 %
T-SQL
Results
Message
Msg 39051, Level 16, State 3, Procedure uspPredictSentiment, Line 315
Error occurred during execution of the builtin function 'PREDICT' with HRESULT 0x80004005. Model is corrupt or invalid.
110 %
Query completed with errors.
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 308 Col 1 Ch 1 INS
GetSentimentExample master


GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
SQLServerScripts.sql *
tpcxbb_1gb
-- Try sp_rxPredict, if missing, enable it: https://docs.microsoft.com/sql/advanced-analytics/r/how-to-do-realtime-scoring?view=sql-server-2017#bkmk_enableRtScoring
sp_configure 'show advanced options', 1;
reconfigure;
go
sp_configure 'clr enabled', 1;
reconfigure with override;
go
alter database tpcxbb_1gb set trustworthy on;
exec sp_changedbowner @loginame = sa, @map = false;
go
-- Run cmd as admin: EnableRealtimePredictions.cmd
declare @model_bin varbinary(max)=null
select @model_bin = model from models where model_name = 'RevoMMLRealtimeScoring';
if @model_bin is not null begin
exec sp_rxPredict @model = @model_bin, @inputData = N'SELECT pr_review_content, cast(tag as varchar(1)) as tag FROM product_reviews_test_data' end;
go --8,999 rows: sp_rxPredict 9sec vs python microsoftml rx_predict 13sec.
/*
Known issue: sp_rxPredict returns an inaccurate message when a NULL value is passed as the model.
Msg 6522, Level 16, State 1, Procedure sp_rxPredict, Line 334
110 %
T-SQL
Message
Configuration option 'show advanced options' changed from 1 to 1. Run the RECONFIGURE statement to install.
Configuration option 'clr enabled' changed from 1 to 1. Run the RECONFIGURE statement to install.
110 %
Query executed successfully at 1:09:55 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:00 | 0 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 331 Col 1 Ch 1 INS
GetSentimentExample
master
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
Python Performance
Properties
Solution Explorer
Team Explorer
GitHub
Resource View
Python Environments

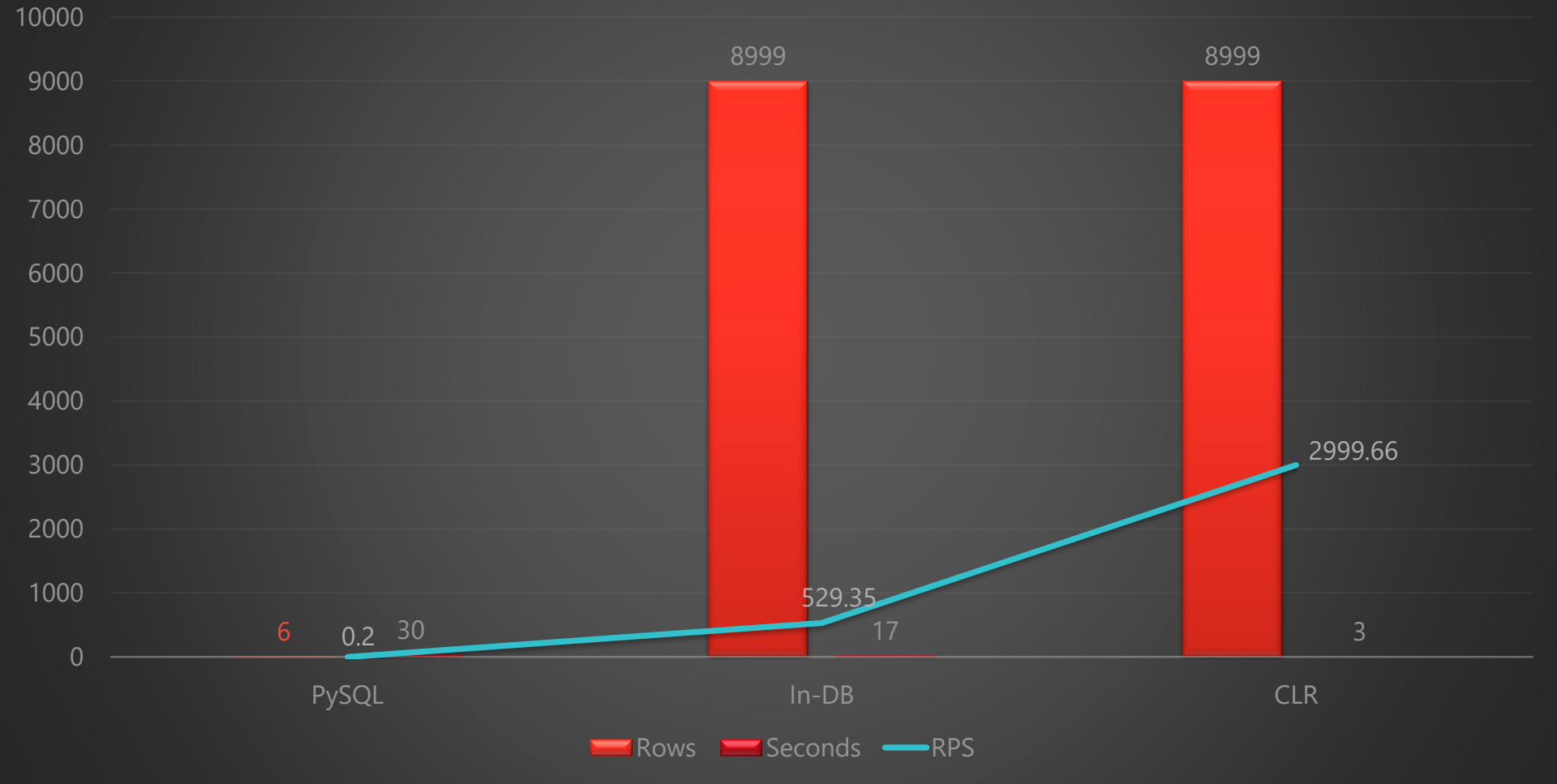

GetSentimentExample - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
EnableRealtimePredictions.cmd
SQLServerScripts.sql *
1 rem https://docs.microsoft.com/en-us/sql/advanced-analytics/r/how-to-do-realtime-scoring?view=sql-server-2017#bkmk_enableRtScoring
2 rem run cmd as admin
3
4 cd "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64\"
5 RegisterRExt.exe /installRts /database:tpcxbb_1gb
Solution Explorer
Search Solution Explorer
Solution 'GetSentimentExan
Solution Items
Performance1.psess
TrainModelRealtime
GetSentimentExample
Python Environment
References
Search Paths
Misc
AddToSQL-PreTra
EnableRealtimePr
FixPath.cmd
Install-MLModels
Install-PyForMLS.
microsoft-machi
Performance_201
Performance_201
GetSentimentExam
GetSentimentExampl
SQLMLVersions-Trou
SQLServerScripts.sql
Server Explorer
Performance Explorer
Toolbox
SQL Server Object Explorer
Python Performance
Properties
Solution Explorer
Team Explorer
GitHub
Resource View
Python Environments
110 %
Output
Error List
Package Manager Console
Data Tools Operations
Ready
Ln 1
Col 1
Ch 1
INS
0
1
GetSentimentExample
master

```
C:\WINDOWS\system32>cd "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64\"

C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64>RegisterRExt.exe /installRts /database:tpcxbb_1gb
Source directory to pick the RExtension binaries determined to be "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\
rxLibs\x64\".
Connecting to SQL server...
Sql server binn directory is "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn".
Error: Real-time scoring not installed in this SQL Server instance. Please run the instance install command:
RegisterRExt.exe /installRts [/instance:name] [/python]
Failed to complete the operation successfully.

C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64>RegisterRExt.exe /installRts
Source directory to pick the RExtension binaries determined to be "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\
rxLibs\x64\".
Connecting to SQL server...
Sql server binn directory is "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn".
Enabling CLR
Adding trusted assemblies...
Adding Accessibility
Adding System.ServiceModel.Internals
Adding SMDiagnostics
Adding System.Runtime.Serialization
Adding System.Runtime.Serialization.Formatters.Soap
Adding System.IO.Compression
Adding System.IO.Compression.FileSystem
Adding System.Drawing
Adding System.Dynamic
Adding System.Windows.Forms
Adding System.Windows.Forms.DataVisualization
Adding Microsoft.CSharp
Creating Asymmetric Keys and Logins...
Asymmetric Key for Assembly 'Microsoft.RServer.ScoringLibrary' is [Microsoft_RServer_ScoringLibrary] and Login is [Microsoft_RServer_ScoringLibrary_login]
Asymmetric Key for Assembly 'Microsoft.RServer.ScoringLibrary.SqlServer' is [Microsoft_RServer_ScoringLibrary] and Login is [Microsoft_RServer_ScoringLibra
ry_login]
Asymmetric Key for Assembly 'Microsoft.RServer.NativeScorer' is [Microsoft_RServer_ScoringLibrary] and Login is [Microsoft_RServer_ScoringLibrary_login]
Asymmetric Key for Assembly 'Microsoft.MachineLearning.RServerScoring.Sql' is [Microsoft_MachineLearning_RServerScoring_Sql] and Login is [Microsoft_Machin
eLearning_RServerScoring_Sql_login]
Create Asymmetric Keys succeeded!
Copying configuration files...
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64\net46\ScoringLibrary.SqlServer.config
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn\ScoringLibrary.config
Command RTSInstall on Instance succeeded!
```


Select Administrator: Command Prompt
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64>RegisterRExt.exe /installRts /database:tpcxbb_1gb
Source directory to pick the RExtension binaries determined to be "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64\".
Connecting to SQL server...
Sql server binn directory is "C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\MSSQL\Binn".
Creating Microsoft.RServer.ScoringLibrary...
Microsoft.RServer.ScoringLibrary created successfully.
Creating Microsoft.RServer.ScoringLibrary.SqlServer...
Microsoft.RServer.ScoringLibrary.SqlServer created successfully.
Creating Microsoft.RServer.NativeScorer...
Microsoft.RServer.NativeScorer created successfully.
Creating Accessibility...
Accessibility created successfully.
Creating System.ServiceModel.Internals...
System.ServiceModel.Internals created successfully.
Creating SMDiagnostics...
SMDiagnostics created successfully.
Creating System.Runtime.Serialization...
System.Runtime.Serialization created successfully.
Creating System.Runtime.Serialization.Formatters.soap...
System.Runtime.Serialization.Formatters.soap created successfully.
Creating System.IO.Compression...
System.IO.Compression created successfully.
Creating System.IO.Compression.FileSystem...
System.IO.Compression.FileSystem created successfully.
Creating system.drawing...
system.drawing created successfully.
Creating System.Dynamic...
System.Dynamic created successfully.
Creating System.Windows.Forms...
System.Windows.Forms created successfully.
Creating System.Windows.Forms.DataVisualization...
System.Windows.Forms.DataVisualization created successfully.
Creating Microsoft.CSharp...
Microsoft.CSharp created successfully.
Creating Microsoft.MachineLearning.RServerScoring.Sql...
Microsoft.MachineLearning.RServerScoring.Sql created successfully.
Creating stored procedure [dbo].[sp_rxPredict]
Creating and giving execute role for users...
Command RTSInstall succeeded!
C:\Program Files\Microsoft SQL Server\MSSQL14.MSSQLSERVER\R_SERVICES\library\RevoScaleR\rxLibs\x64>

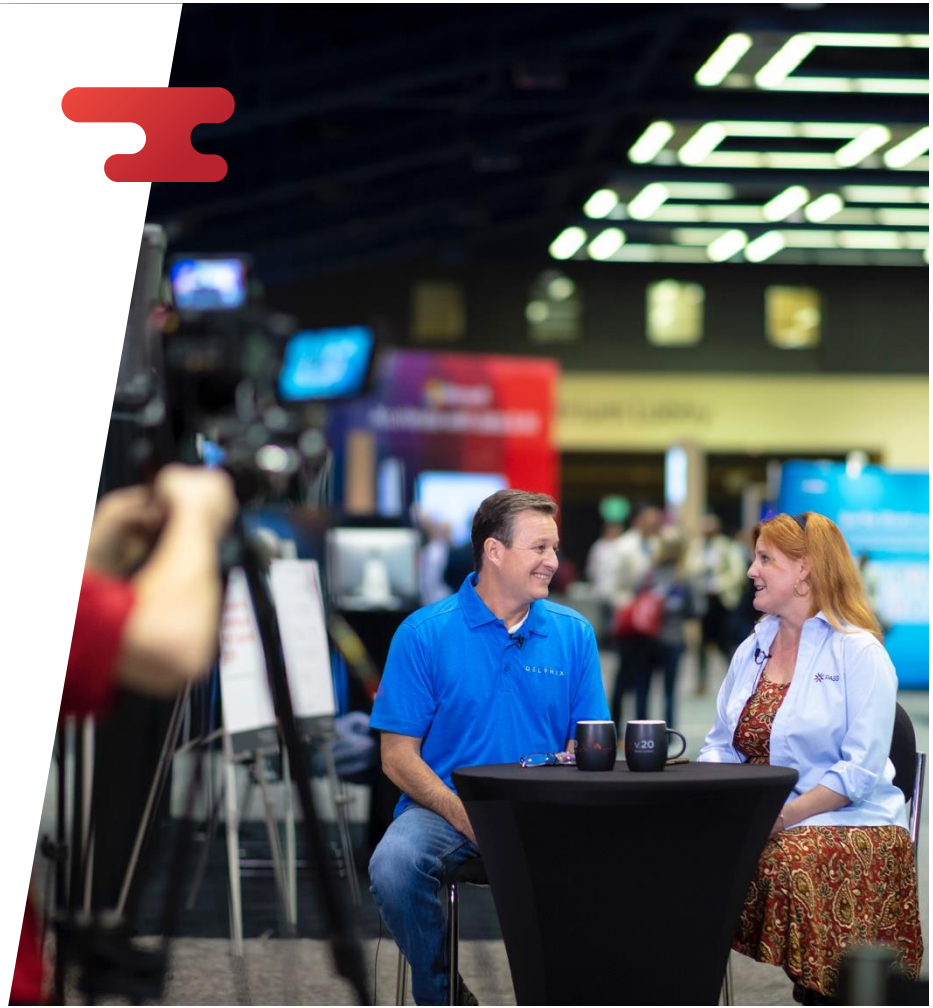

GetSentimentExample - Microsoft Visual Studio
File Edit View Project Build Debug Team SQL Tools Test R Tools Analyze Window Help
hiramfleitas
Debug
Any CPU
Start
EnableRealtimePredictions.cmd
SQLServerScripts.sql *
tpcxbb_1gb
-- Run cmd as admin: EnableRealtimePredictions.cmd
declare @model_bin varbinary(max)=null
select @model_bin = model from models where model_name = 'RevoMMLRealtimeScoring';
if @model_bin is not null begin
exec sp_rxPredict @model = @model_bin, @inputData = N'SELECT pr_review_content, cast(tag as varchar(1)) as tag FROM product_reviews_test_data' end;
go --8,999 rows: sp_rxPredict 9sec vs python microsoftml rx_predict 13sec.
/*
Known issue: sp_rxPredict returns an inaccurate message when a NULL value is passed as the model.
Msg 6522, Level 16, State 1, Procedure sp_rxPredict, Line 334
A .NET Framework error occurred during execution of user-defined routine or aggregate "sp_rxPredict":
System.InvalidOperationException: Expect a column 'tag' of type: 'String'. Actual type is: 'System.Int32'
System.InvalidOperationException:
at Microsoft.MachineLearning.RServerScoring.DataViewAdapter.CheckSame(IEnumerator`1 cols1, IEnumerator`1 cols2)
at Microsoft.MachineLearning.RServerScoring.DataViewAdapter.Retarget(IDataTable newSource)
at Microsoft.MachineLearning.RServerScoring.Model.Score(IDataTable inputData)
at Microsoft.MachineLearning.RServerScoring.Scorer.Score(IModel model, IDataTable inputData, IDictionary`2 scoringParameters, IScoreContext scoreContext)
at Microsoft.RServer.ScoringLibrary.ScoringHost.ScoreDispatcher.Score(ModelId modelId, IDataTable inputData, IDictionary`2 scoringParameters, IScoreContext scoreContext)
.*/
110 %
T-SQL
Results
Message
PredictedLabel Score.1 Score.2 Score.3
1 3 0.02261647 0.1164434 0.8609401
2 3 0.006391859 0.0122224 0.9813856
3 3 0.02605031 0.07372595 0.9002239
4 3 0.02085118 0.04318421 0.9359646
5 3 0.006275344 0.00719668 0.9865279
6 3 0.01219776 0.02834679 0.9594554
7 3 0.01289097 0.02562586 0.9614831
8 3 0.0262401 0.05194858 0.9218113
9 3 0.02124425 0.0905453 0.8882105
10 3 0.01573131 0.04357475 0.9406939
11 3 0.0192884 0.04815447 0.932557
12 3 0.009418746 0.0194117 0.9711696
13 3 0.01290902 0.01438312 0.9727077
14 3 0.02147118 0.05592076 0.9226081
15 3 0.02763326 0.05890254 0.9134642
16 3 0.009828706 0.02245608 0.9677153
17 3 0.03379261 0.09301157 0.8731958
Query executed successfully at 1:16:10 PM
R90GTU6N (14.0 RTM) | UPCIC\hfleitas (52) | tpcxbb_1gb | 00:00:03 | 8999 rows
Output Error List Package Manager Console Data Tools Operations
Ready
Ln 334 Col 148 Ch 148 INS
GetSentimentExample
master

# 5x Faster (sp_rxPredict) – Laptop



DEMO

# Cognitive API (DEMO 5)



CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: SQL Attach To: ., tpcxbb_1gb (Windows Authentication) Trusted Run Cells Clear Results Install Packages

# 💰💰💰 Money bags

```
create or alter proc CreatePyModelRealtimeScoringOnly as

    declare @model varbinary(max), @train_script nvarchar(max);
    delete top(1) from models where model_name = 'RevoMMLRealtimeScoring' and language = 'Py';

    --The Python script we want to execute
    set @train_script = N'
from microsoftml import rx_logistic_regression, featurize_text, n_gram
from revoscalepy import rx_serialize_model, RxOdbcData, rx_write_object, RxInSqlServer, rx_set_compute_context, RxLocalSeq

connection_string = "Driver=SQL Server;Server=localhost;Database=tpcxbb_1gb;Trusted_Connection=true;"
dest = RxOdbcData(connection_string, table = "models")

training_data["tag"] = training_data["tag"].astype("category")

modelpy = rx_logistic_regression(formula = "tag ~ features",
                                 data = training_data,
                                 method = "multiClass",
                                 ml_transforms=[featurize_text(language="English",
                                                               cols=dict(features="pr_review_content"),
                                                               word_feature_extractor=n_gram(2, weighting="TfIdf"))],
                                 train_threads=1)

modelbin = rx_serialize_model(modelpy, realtime_scoring_only = True)
rx_write_object(dest, key_name="model_name", key="RevoMMLRealtimeScoring", value_name="model", value=modelbin, serialize=False, compress=None, overwrite=False)'; --

    exec sp_execute_external_script @language = N'Python'
        ,@script = @train_script
        ,@input_data_1 = N'select * from product_reviews_training_data'
        ,@input_data_1_name = N'training_data'
go
```

master 0 0 .: tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: Python 3 Attach To: localhost Trusted Run Cells Clear Results Install Packages

## Necessary steps

https://docs.microsoft.com/azure/cognitive-services/text-analytics/quickstarts/python, https://azure.microsoft.com/services/cognitive-services/text-analytics

```
1  import requests
2  from pprint import pprint
3  from IPython.display import HTML
4
5  subscription_key = "mykey"
6  text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
7  sentiment_url = text_analytics_base_url + "sentiment"
8
9  documents = {"documents" : [
10     {
11         "id": 1,
12         "language": "en",
13         "text": "Works fine. Easy to install. Some reviews talk about not fitting wall plates. Designed for the best, while greet dinner guests, smelling stronger t
14     }
15 ]}
16
17 headers   = {"Ocp-Apim-Subscription-Key": subscription_key}
18 response  = requests.post(sentiment_url, headers=headers, json=documents)
19 sentiments = response.json()
20 pprint(sentiments)
```

```
{'documents': [{'id': '1', 'score': 0.9685916900634766}], 'errors': []}
```

## JSON Path

```
[1]
1  select  top 10
2          row_number() over (order by (select 1)) as id,
3          'en' as language,
4          pr_review_content as text
```

master 0 0 .:tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: SQL Attach To: ., tpcxbb_1gb (Windows Authentication) Trusted Run Cells Clear Results Install Packages

SQL
PySpark3
PySpark
Spark | Scala
Spark | R
Python 3

```
[1]  19 sentiments =
     20 pprint(sentim
```

```
{'documents': [{'id': '                    .9685916900634766}], 'errors': []}
```

## JSON Path

```
[1]  1 select  top 10
     2         row_number() over (order by (select 1)) as id,
     3         'en' as language,
     4         pr_review_content as text
     5 from    tpcxbb_1gb..product_reviews_training_data
     6 for json path, root('documents')
```

(10 rows affected)
Total execution time: 00:00:00.1093385

| | JSON_F52E2B61-18A1-11d1-B105-00805F49916B |
|---|---|
| 1 | {"documents":[{"id":1,"language":"en","text":"... |

## Don't forget the

TrollhunterKeys

```
[1]  1 import requests
     2 from pprint import pprint
     3 from IPython.display import HTML
     4
     5 subscription_key = "mykey"
     6 text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
     7 sentiment_url = text_analytics_base_url + "sentiment"
```

master 0 0 . : tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: Python 3 Attach To: localhost Trusted Run Cells Clear Results Install Packages

# Don't forget the

TrollhunterKeys

```
import requests
from pprint import pprint
from IPython.display import HTML

subscription_key = "mykey"
text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
sentiment_url = text_analytics_base_url + "sentiment"

documents = {
    "documents": [
        {
            "id": 1,
            "language": "en",
            "text": "Works fine. Easy to install. Some reviews talk about not fitting wall plates. Designed for the best, while greet dinner guests, smelling strong
        },
        {
            "id": 2,
            "language": "en",
            "text": "great product to save money! Dont worry about leaving the light on anymore. It is great for kitchen! My son can help me season our food with ou
        },
        {
            "id": 3,
            "language": "en",
            "text": "Next time will go with the old metal handle- this is bonus."
        },
        {
            "id": 4,
            "language": "en",
            "text": "Great Gift Great Value had to get used. And after 12 hours of use, they just throw them away, so you haven't created any useless clutter. (Get
        },
        {
            "id": 5,
```

master 0 0 .:tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: Python 3 Attach To: localhost Trusted Run Cells Clear Results Install Packages

[1]

```
        {
            "id": 8,
            "language": "en",
            "text": "Not super magnet, but strong enough to set on the oven and the spatula is supposed to have, but this one is definitely heavy duty! have placed
        },
        {
            "id": 9,
            "language": "en",
            "text": "Installed as bathroom fan timer. Easy to install. Some reviews talk about not fitting wall plates. Designed for the plate supplied to fit in my
        },
        {
            "id": 10,
            "language": "en",
            "text": "Our home was built in 2003 and this fits just fine in the drawer until find one of those things that if was looking for, good quality, and afte
        }
    ]
}
print(type(documents))

headers   = {"Ocp-Apim-Subscription-Key": subscription_key}
response  = requests.post(sentiment_url, headers=headers, json=documents)
sentiments = response.json()
pprint(sentiments)
```

```
<class 'dict'>
{'documents': [{'id': '1', 'score': 0.9685916900634766},
               {'id': '2', 'score': 0.874512791633606},
               {'id': '3', 'score': 0.7775521278381348},
               {'id': '4', 'score': 0.1461590826511383},
               {'id': '5', 'score': 0.9813788533210754},
               {'id': '6', 'score': 0.8957217931747437},
               {'id': '7', 'score': 0.9916195869445801},
               {'id': '8', 'score': 0.08493909239768982},
               {'id': '9', 'score': 0.8297852277755737},
               {'id': '10', 'score': 0.7934412956237793}],
 'errors': []}
```

master 0 0 .:tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: Python 3 Attach To: localhost Trusted Run Cells Clear Results Install Packages

💀💀💀💀 died... 🤯

Failed to change kernel. #5722

```
1  import requests, pprint as pr, pyodbc, json
2  from IPython.display import HTML
3
4  subscription_key = "mykey"
5  text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
6  sentiment_url = text_analytics_base_url + "sentiment"
7
8  conn = pyodbc.connect('Driver={SQL Server};Server=localhost;Database=tpcxbb_1gb;Trusted_Connection=yes;')
9  cursor = conn.cursor()
10 cursor.execute('select * from JsonDocuments')
11 row = cursor.fetchone() #pyodbc.Row
12 documents = json.loads(row[0]) #dict
13
14 headers   = {"Ocp-Apim-Subscription-Key": subscription_key}
15 response  = requests.post(sentiment_url, headers=headers, json=documents)
16
17 sentiments = response.json()
18 pr.pprint(sentiments)
```

```
{'documents': [{'id': '1', 'score': 0.9685916900634766},
               {'id': '2', 'score': 0.874512791633606},
               {'id': '3', 'score': 0.7775521278381348},
               {'id': '4', 'score': 0.1461590826511383},
               {'id': '5', 'score': 0.9813788533210754},
               {'id': '6', 'score': 0.8957217931747437},
               {'id': '7', 'score': 0.9916195869445801},
               {'id': '8', 'score': 0.08493909239768982},
               {'id': '9', 'score': 0.829785227755737},
               {'id': '10', 'score': 0.7934412956237793}],
 'errors': []}
```

master 0 0 .:tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: Python 3 Attach To: localhost Trusted Run Cells Clear Results Install Packages

```
{'documents': [{'id': '1', 'score': 0.9685916900634766},
               {'id': '2', 'score': 0.874512791633606},
               {'id': '3', 'score': 0.7775521278381348},
               {'id': '4', 'score': 0.1461590826511383},
               {'id': '5', 'score': 0.9813788533210754},
               {'id': '6', 'score': 0.8957217931747437},
               {'id': '7', 'score': 0.9916195869445801},
               {'id': '8', 'score': 0.08493909239768982},
               {'id': '9', 'score': 0.8297852777557737},
               {'id': '10', 'score': 0.7934412956237793}],
 'errors': []}
```

## upgrade with magics

https://pypi.org/simple/urllib3/

```
%%cmd
cd "C:\Program Files\Microsoft SQL Server\MSSQL15.MSSQLSERVER\PYTHON_SERVICES"
python -m pip install --upgrade C:\temp\urllib3-1.25.3-py2.py3-none-any.whl
```

## so hard... 🎯

https://stackoverflow.com/questions/47954324/how-to-output-values-from-sp-execute-external-script-into-table https://stackoverflow.com/questions/44802160/convert-json-api-response-to-pandas-dataframe

[2]

```
declare @py nvarchar(max);

set @py = N'from pandas.io.json import json_normalize

rds = {"documents": [{"id": "1", "score": 0.97},{"id": "2","score": 0.87},{"id": "3", "score": 0.78}],"errors": []}
print(type(rdd)) #dict
```

master 0 0 .:tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

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CognitiveAPI.ipynb

Code Text Kernel: SQL Attach To: ., tpcxbb_1gb (Windows Authentication) Trusted Run Cells Clear Results Install Packages

# so hard... 🎯

How to output values from sp_execute_external_script into table. Convert JSON API response to pandas Dataframe.

```
declare @py nvarchar(max);

set @py = N'from pandas.io.json import json_normalize
rds = {"documents": [{"id": "1", "score": 0.97},{"id": "2","score": 0.87},{"id": "3", "score": 0.78}],"errors": []} #dict
df = json_normalize(rds, "documents")
print(type(df),df,sep="\n") #DataFrame
';

drop table if exists apiresults
create table apiresults (id int, score float)

insert into apiresults
exec sp_execute_external_script
    @language = N'Python',
    @script = @py,
    @output_data_1_name =N'df'

select * from apiresults
```

STDOUT message(s) from external script: id score 0 1 0.97 1 2 0.87 2 3 0.78
(3 rows affected)
(3 rows affected)
Total execution time: 00:00:04.2972241

| | id | score |
|---|---|---|
| 1 | 1 | 0.97 |
| 2 | 2 | 0.87 |
| 3 | 3 | 0.78 |

master 0↓ 1↑ 0 0 . : tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

File Edit View Help

CognitiveAPI.ipynb

Code Text Kernel: SQL Attach To: ., tpcxbb_1gb (Windows Authentication) Trusted Run Cells Clear Results Install Packages

# Gato Ninja, Don't forget the 🔑

https://repl.it/languages/python3

```
create or alter proc GetCognitiveAPI
as
    declare @py nvarchar(max);

    set @py = N'import requests
from pandas.io.json import json_normalize

subscription_key = "mykey"
text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
sentiment_url = text_analytics_base_url + "sentiment"

df = jsondocs

headers  = {"Ocp-Apim-Subscription-Key": subscription_key, "content-type": "application/json"}
response = requests.post(sentiment_url, headers = headers, data = df.iloc[0][0].encode())

rds = response.json()
df2 = json_normalize(rds, "documents")';

    drop table if exists apiresults;
    create table apiresults (id int, score float);

    insert into apiresults
    exec sp_execute_external_script @language = N'Python'
        ,@script = @py
        ,@input_data_1 = N'select * from JsonDocuments'
        ,@input_data_1_name = N'jsondocs'
        ,@output_data_1_name =  N'df2'
    select * from apiresults;
go
exec GetCognitiveAPI
go
```

master 0 0 .: tpcxbb_1gb

CognitiveAPI.ipynb - Gamechanger (Workspace) - Azure Data Studio

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CognitiveAPI.ipynb

Code Text Kernel: SQL Attach To: ., tpcxbb_1gb (Windows Authentication) Trusted Run Cells Clear Results Install Packages

```
20      drop table if exists apiresults;
21      create table apiresults (id int, score float);
22
23      insert into apiresults
24      exec sp_execute_external_script @language = N'Python'
25          ,@script = @py
26          ,@input_data_1 = N'select * from JsonDocuments'
27          ,@input_data_1_name = N'jsondocs'
28          ,@output_data_1_name =  N'df2'
29      select * from apiresults;
30  go
31  exec GetCognitiveAPI
32  go
```

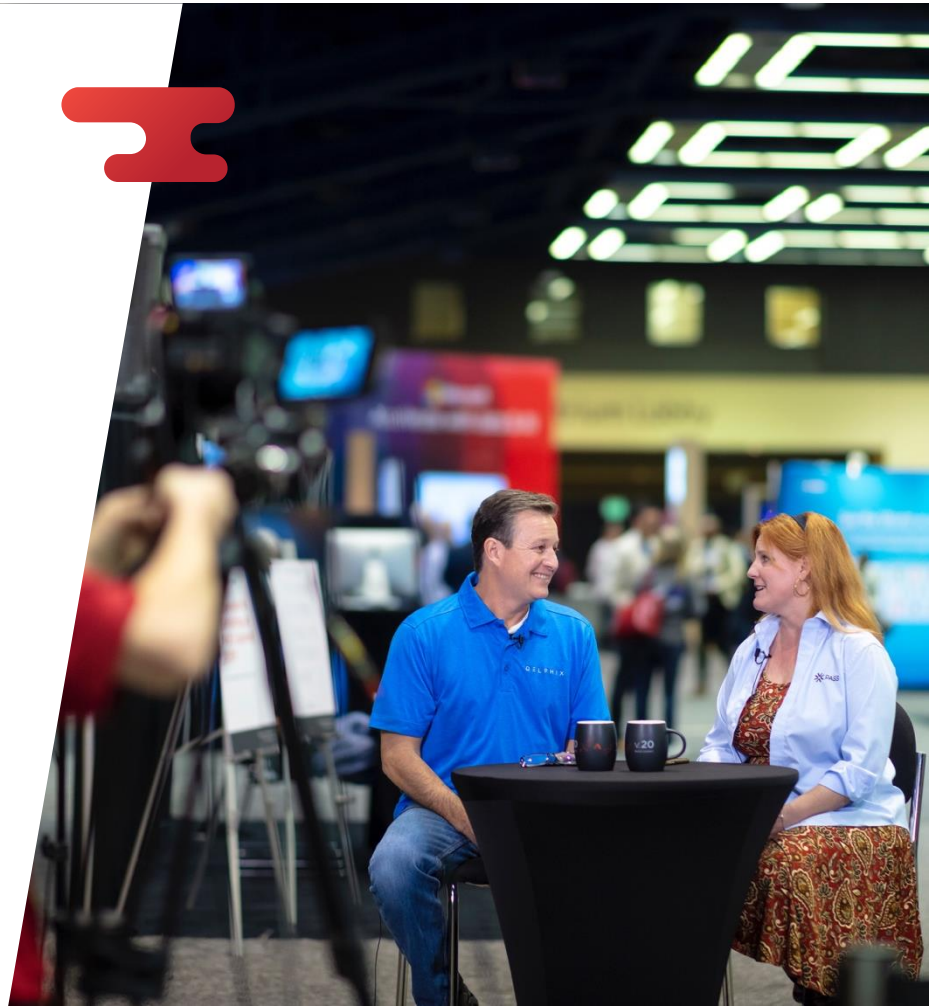
Commands completed successfully.
Total execution time: 00:00:00.0077552
(10 rows affected)
(10 rows affected)
Total execution time: 00:00:05.0466495

| | id | score |
|---|---|---|
| 1 | 1 | 0.968591690063477 |
| 2 | 2 | 0.874512791633606 |
| 3 | 3 | 0.777552127838135 |
| 4 | 4 | 0.146159082651138 |
| 5 | 5 | 0.981378853321075 |
| 6 | 6 | 0.895721793174744 |
| 7 | 7 | 0.99161958694458 |
| 8 | 8 | 0.0849390923976898 |
| 9 | 9 | 0.829785227775574 |
| 10 | 10 | 0.793441295623779 |

master 0 0 .: tpcxbb_1gb

DEMO

# Cognitive API (DEMO 6)










# Trollhunter, Don't forget the

https://tvtropes.org/pmwiki/pmwiki.php/Quotes/Trollhunters

[2]

```
drop table if exists quotes;

create table quotes (
    quoteid     int             identity(1,1) primary key clustered,
    character   varchar(128)    not null,
    quote       nvarchar(max)   not null,
    sentiment   float
);

insert into quotes (character, quote)
values
 ('The Magical Incantation that activates the Amulet', 'For the glory of Merlin, Daylight is mine to command!')
,('Strickler', 'Now, I think I know what has you so distraught, Jim.')
,('Jim', 'You do?')
,('Strickler', 'It''s like I told you yesterday, you have a lot on your shoulders. Too much, in my opinion, for someone your age. And I think that this opportu
,('Jim', 'Chess?')
,('Strickler', '...I think it''s causing you anxiety. I know you want to be there for your mother, but it''s as a great poet once wrote, ""Do what''s good for
,('Jim', 'Hey thanks for the advice. I like talking to you.')
,('Strickler', 'Always.')

,('Jim', 'So, the previous Trollhunter, what, retired?.')
,('AAARRRGGHH!!!', 'Was felled.')
,('Jim', 'Felled?')
,('AAARRRGGHH!!!', 'Means killed.')
,('Blinky', 'Turned to stone and smashed. Kanjigar the Courageous was his name. Brutally slain by a ruthless troll named Bular.')
```

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

[2]

```
64
65 ,('Magical Incantation that appears on the Amulet', 'For the doom of Gunmar, Eclipse is mine to command!')
66
67 ,('Blinky', 'Not a rock. Dwärkstone.')
68 ,('Jim', 'Dork-stone?')
69 ,('Blinky', 'Dwärkstone.')
70 ,('Claire', 'Dork-stone?')
71 ,('Aaarrrgghh!!!', 'Close enough.')
72 ,('Blinky', 'Dwärkstone is incredibly rare, highly volatile, and the only guaranteed way to expel a gruesome.')
73 ,('Toby', 'All I''m hearing is ""dork-stone.""')
74
75 ,('Otto', 'And once the vicious one realizes he has no further use for an old, blind troll… I– Well.. [Does the Throat-Slitting Gesture.]')
76 ,('Dictatious', '…well, what? You know I can''t see.')
77 ,('Otto', 'Oh. I moves my thumb across my throat. It is, as we say, a killing motion.')
78
79 ,('Claire', 'Let''s try "good cop, bad cop."')
80 ,('Blinky', 'I think I know where you're going with this. I shall play this game.[Claire knocks on door] Open up, RotGut, or I''ll kick down this door! [RotGut
81 ,('Gut', 'Ailment or curse?')
82 ,('Claire', 'Neither, you two-headed dirtbag! We need information. Gunmar's got a mole down here, and you''re gonna tell us who it is!')
83 ,('Rot', 'Why is she being so mean to us, Gut?')
84 ,('Gut', 'We don''t share this sort of thing. Salesman-client confidentiality.')
85 ,('Claire', 'Oh, you wanna obstruct official Trollhunting business? Is that what you wanna do? Now you''ve done it! I feel my anger rising. I can''t control it
86 ,('Blinky', 'Ahem. [Blinky shouts and pulls out a live dwärkstone.] If you don''t tell us what we need to know this instant, I''m turning us all into a smoking
87 ,('Gut', 'Are you insane? You''re gonna kill us all!')
88 ,('Claire', 'Whoa whoa, Blinky, what are you doing?')
89 ,('Blinky', 'I''m buying baby. I''m buying the farm if they don''t start talking!')
90 ,('Claire', 'Wait, I thought I was the bad cop.')
91 ,('Blinky', 'I thought I was the bad cop. Your performance felt a little ho-hum.')
92 ,('Draal', 'It has been my honor ... fleshbag.')
93 ;
```

(72 rows affected)

Total execution time: 00:00:00.017

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Trollhunters.ipynb - Hiram (Workspace) - Azure Data Studio

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

```
drop view if exists JsonQuotes
go
create view JsonQuotes
as
select (
    select  top(select cast(count(*)*.8 as int) from Quotes)
            quoteid as id,
            'en' as language,
            Quote as text
    from    Quotes
    for json path, root('documents')
) as documents
go
exec sp_execute_external_script @language = N'Python'
    ,@script = N'DocOut = DocIn'
    ,@input_data_1 = N'select * from JsonQuotes;'
    ,@input_data_1_name  = N'DocIn'
    ,@output_data_1_name =  N'DocOut'
with result sets ((DocOut varchar(max)));
go
```

Commands completed successfully.

Commands completed successfully.

(1 row affected)

Total execution time: 00:00:00.320

| | DocOut |
|---|---|
| 1 | {"documents":[{"id":1,"language":"en","text":"For the glory of Merlin, Daylight is mine to command!"},{"id":2,"language":"en","text":"Now, I think I k… |

master 0 0

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

# Trollhunter, Don't forget the

https://repl.it/languages/python3

[17]

```
create or alter proc GetCognitiveAPIQuoteSentiment
as
    set nocount on;
    declare @py nvarchar(max);

    set @py = N'import requests, pprint as pr
from pandas.io.json import json_normalize

subscription_key = "mykey"
text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.0/"
sentiment_url = text_analytics_base_url + "sentiment"

df = jsondocs

headers  = {"Ocp-Apim-Subscription-Key": subscription_key, "content-type": "application/json"}
response = requests.post(sentiment_url, headers = headers, data = df.iloc[0][0].encode())

rds = response.json()
df2 = json_normalize(rds, "documents")

pr.pprint(rds)
print(type(df2),df2,sep="\n")
';

    drop table if exists apiresults;
    create table apiresults (id int, score float);
```

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Trollhunters.ipynb - Hiram (Workspace) - Azure Data Studio

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

[17]

```
14
15 headers  = {"Ocp-Apim-Subscription-Key": subscription_key, "content-type": "application/json"}
16 response = requests.post(sentiment_url, headers = headers, data = df.iloc[0][0].encode())
17
18 rds = response.json()
19 df2 = json_normalize(rds, "documents")
20
21 pr.pprint(rds)
22 print(type(df2),df2,sep="\n")
23 ';
24
25     drop table if exists apiresults;
26     create table apiresults (id int, score float);
27
28     insert into apiresults
29     exec sp_execute_external_script @language = N'Python'
30         ,@script = @py
31         ,@input_data_1 = N'select * from JsonQuotes'
32         ,@input_data_1_name = N'jsondocs'
33         ,@output_data_1_name =  N'df2'
34     select * from apiresults;
35
36     update  q
37         set q.Sentiment = a.Score
38     from    Quotes q
39     inner join apiresults a
40         on q.quoteid = a.id
41     where   q.Sentiment is null;
42 go
43
44 exec GetCognitiveAPIQuoteSentiment;
45
46 select * from Quotes;
```

Commands completed successfully.

master 0 0

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

Commands completed successfully.

(72 rows affected)

Total execution time: 00:00:01.279

| | id | score |
|---|---|---|
| 1 | 1 | 0.5 |
| 2 | 2 | 0.127195328474045 |
| 3 | 3 | 0.833639144897461 |
| 4 | 4 | 0.951666951179504 |
| 5 | 5 | 0.752673923969269 |
| 6 | 6 | 0.155267655849457 |
| 7 | 7 | 0.99489951133728 |
| 8 | 8 | 0.202319025993347 |
| 9 | 9 | 0.707312762737274 |
| 10 | 10 | 0.770378530025482 |
| 11 | 11 | 0.752673923969269 |
| 12 | 12 | 0.0333146154880524 |
| 13 | 13 | 0.126827985048294 |
| 14 | 14 | 0.751771688461304 |
| 15 | 15 | 0.959390044212341 |
| 16 | 16 | 0.734701573848724 |
| 17 | 17 | 0.833906531333923 |
| 18 | 18 | 0.862226605415344 |
| 19 | 19 | 0.926859736442566 |

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

| | quoteid | character | quote | sentiment |
|---|---|---|---|---|
| 1 | 1 | The Magical Incantation that… | For the glory of Merlin, Day… | 0.5 |
| 2 | 2 | Strickler | Now, I think I know what has… | 0.127195328474045 |
| 3 | 3 | Jim | You do? | 0.833639144897461 |
| 4 | 4 | Strickler | It's like I told you yesterd… | 0.951666951179504 |
| 5 | 5 | Jim | Chess? | 0.752673923969269 |
| 6 | 6 | Strickler | ...I think it's causing you … | 0.155267655849457 |
| 7 | 7 | Jim | Hey thanks for the advice. I… | 0.99489951133728 |
| 8 | 8 | Strickler | Always. | 0.202319025993347 |
| 9 | 9 | Jim | So, the previous Trollhunter… | 0.707312762737274 |
| 10 | 10 | AAARRRGGHH!!! | Was felled. | 0.770378530025482 |
| 11 | 11 | Jim | Felled? | 0.752673923969269 |
| 12 | 12 | AAARRRGGHH!!! | Means killed. | 0.0333146154880524 |
| 13 | 13 | Blinky | Turned to stone and smashed.… | 0.126827985048294 |
| 14 | 14 | Tobes | Don't worry dude. This Bular… | 0.751771688461304 |
| 15 | 15 | Blinky | The evidence does not sugges… | 0.959390044212341 |
| 16 | 16 | Jim | Then the other guy, he was j… | 0.734701573848724 |
| 17 | 17 | Blinky | Doubtful. Kanjigar was perha… | 0.833906531333923 |
| 18 | 18 | Jim | But not the best, I'm bettin… | 0.862226605415344 |
| 19 | 19 | Blinky | Oh, the very best. Many song… | 0.926859736442566 |
| 20 | 20 | Blinky | Destiny is a gift. Some go t… | 0.780210077762604 |

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Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

```
1 select  avg(sentiment) as AvgSentimtment, character
2 from    quotes
3 where   sentiment is not null
4 group by character
5 order by AvgSentimtment desc
```

(14 rows affected)

Total execution time: 00:00:00.026

| | AvgSentimtment | character |
|---|---|---|
| 1 | 0.865543842315674 | Claire |
| 2 | 0.751771688461304 | Tobes |
| 3 | 0.647038959539854 | Jim |
| 4 | 0.597320705652237 | Blinky |
| 5 | 0.563405146201452 | Toby |
| 6 | 0.529540811266218 | AAARRRGGHH!!! |
| 7 | 0.5 | Barbara Lake |
| 8 | 0.5 | The Magical Incantation that… |
| 9 | 0.359112240374088 | Strickler |
| 10 | 0.255251032114029 | Vendel |
| 11 | 0.189253866672516 | Vendal |
| 12 | 0.143676519393921 | Magical Incantation that app… |
| 13 | 0.127677083015442 | Dictatious |
| 14 | 0.07220658659935 | Otto |

master 0 0

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

# Schema

[8]

```
drop table if exists models;
create table models (
    ModelID         int             identity(1,1) primary key clustered,
    Language        varchar(30)     not null default('Python'),
    Name            nvarchar(30)    not null,
    Model           varbinary(max)  ,
    CreatedOn       datetime        default(getdate()),
    CreatedBy       nvarchar(500)   default(suser_sname())
);
go

drop view if exists QuotesForTraining;
go
create or alter view QuotesForTraining
as
    select  top(select cast(count(*)*1 as int) from Quotes) --because where clause!
            quote,
            case
                when sentiment <.1 then 0
                when sentiment >=.1 and sentiment <.2 then 1
                when sentiment >=.2 and sentiment <.3 then 2
                when sentiment >=.3 and sentiment <.4 then 3
                when sentiment >=.4 and sentiment <.5 then 4
                when sentiment >=.5 and sentiment <.6 then 5
                when sentiment >=.6 and sentiment <.7 then 6
                when sentiment >=.7 and sentiment <.8 then 7
                when sentiment >=.8 and sentiment <.9 then 8
                when sentiment >=.9 and sentiment <1 then 9
                when sentiment >=1 then 10
                else null
```

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

```
13 go
14 create or alter view QuotesForTraining
15 as
16     select  top(select cast(count(*)*1 as int) from Quotes) --because where clause!
17             quote,
18             case
19                 when sentiment <.1 then 0
20                 when sentiment >=.1 and sentiment <.2 then 1
21                 when sentiment >=.2 and sentiment <.3 then 2
22                 when sentiment >=.3 and sentiment <.4 then 3
23                 when sentiment >=.4 and sentiment <.5 then 4
24                 when sentiment >=.5 and sentiment <.6 then 5
25                 when sentiment >=.6 and sentiment <.7 then 6
26                 when sentiment >=.7 and sentiment <.8 then 7
27                 when sentiment >=.8 and sentiment <.9 then 8
28                 when sentiment >=.9 and sentiment <1 then 9
29                 when sentiment >=1 then 10
30                 else null
31             end as tag
32     from    quotes
33     where sentiment is not null
34     --order by tag;
35 go
36
37 drop view if exists QuotesForTesting;
38 go
39 create or alter view QuotesForTesting
40 as
41     select  top(select cast(count(*)*.2 as int) from Quotes)
42             quote,
43             null as tag
44     from    quotes
45     where sentiment is null;
46
```

Commands completed successfully.

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code | Text | Kernel: SQL | Attach To: Select Connection | Not Trusted | Run Cells | Clear Results | Schedule Notebook

```
create or alter proc GetTrollhunterModel (
    @Name nvarchar(30) = 'TrollhunterRealtime',
    @Languange varchar(30) = 'Python'
)
as
    declare @model varbinary(max), @train_script nvarchar(max), @Svr varchar(128) = @@servername, @Db nvarchar(128) = db_name();
    delete top(1) from models where name = @Name and language = @Languange;

    --The Python script we want to execute
    set @train_script = N'
from microsoftml import rx_logistic_regression, featurize_text, n_gram
from revoscalepy import rx_serialize_model, RxOdbcData, rx_write_object, RxInSqlServer, rx_set_compute_context, RxLocalSeq

connection_string = "Driver=SQL Server;Server='+@Svr+';Database='+@Db+';Trusted_Connection=true;"
dest = RxOdbcData(connection_string, table = "models")

training_data["tag"] = training_data["tag"].astype("category")

modelpy = rx_logistic_regression(formula = "tag ~ features",
                                 data = training_data,
                                 method = "multiClass",
                                 ml_transforms=[featurize_text(language="English",
                                                               cols=dict(features="quote"),
                                                               word_feature_extractor=n_gram(2, weighting="TfIdf"))],
                                 train_threads=1)

modelbin = rx_serialize_model(modelpy, realtime_scoring_only = True)
rx_write_object(dest, key_name="Name", key="'+@Name+'", value_name="Model", value=modelbin, serialize=False, compress=None, overwrite=False)'; --overwrite=fals

    exec sp_execute_external_script @language = N'Python'
        ,@script = @train_script
        ,@input_data_1 = N'select * from QuotesForTraining'
        ,@input_data_1_name = N'training_data'
go
```

File Edit View Help

Trollhunters.ipynb - Hiram (Workspace) - Azure Data Studio

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

```
32          ,@input_data_1 = N'select * from QuotesForTraining'
33          ,@input_data_1_name = N'training_data'
34  go
35
36  exec  GetTrollhunterModel; --00:00:02.919 home desktop.
37
38  select *, datalength(model) as Datalen from dbo.models;
```

Commands completed successfully.

(1 row affected)

STDERR message(s) from external script: C:\Program Files\Microsoft SQL Server\MSSQL15.MSSQLSERVER\PYTHON_SERVICES\lib\site-packages\revoscalepy\RxSerializable.py:163: FutureWarning: Method .as_matrix will be removed in a future version. Use .values instead. ret[column_name] = np.array([x + 1 for x in dataframe[i].cat.codes.as_matrix().tolist()]).astype(np.int32)

STDOUT message(s) from external script: Beginning processing data. Rows Read: 57, Read Time: 0, Transform Time: 0 Beginning processing data. Beginning processing data. Rows Read: 57, Read Time: 0, Transform Time: 0 Beginning processing data. Not adding a normalizer. Beginning processing data. Rows Read: 57, Read Time: 0, Transform Time: 0 Beginning processing data. Beginning optimization num vars: 7098 improvement criterion: Mean Improvement Warning: Premature convergence occurred. The OptimizationTolerance may be set too small. ro equals zero. Is your function linear? L1 regularization selected 7 of 7098 weights. Not training a calibrator because it is not needed. Elapsed time: 00:00:01.4911851 Elapsed time: 00:00:00.2200052 Rows Read: 1, Total Rows Processed: 1 Total Rows written: 1, Total time: 0.001 , Total Chunk Time: 0.045 seconds

(1 row affected)

Total execution time: 00:00:07.099

| | ModelID | Language | Name | Model | CreatedOn | CreatedBy | Datalen |
|---|---|---|---|---|---|---|---|
| 1 | 3 | Python | TrollhunterRealtime | 0x626C6F62BC23F8E3ABB42D41C2… | 2019-08-19 00:31:56.843 | UPCIC\hfleitas | 19017 |

Finish

master 0 0

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

# Finish

[12]

```
select * from QuotesForTesting;
declare @model_bin varbinary(max)=null
select  @model_bin = model from models where name = 'TrollhunterRealtime';

if @model_bin is not null
begin
exec sp_rxPredict
    @model = @model_bin,
    @inputData = N'select quote, cast(tag as varchar(1)) as tag from QuotesForTesting'

    if object_id('tempdb.dbo.#upv') is not null drop table #upv;
    create table #upv (
        predictedlabel varchar(1),
        score0 float,
        score1 float,
        score2 float,
        -- score3 float,
        -- score4 float,
        score5 float,
        -- score6 float,
        score7 float,
        score8 float,
        score9 float
    )
    insert into #upv
    exec sp_rxPredict
        @model = @model_bin,
        @inputData = N'select quote, cast(tag as varchar(1)) as tag from QuotesForTesting'

```

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

[12]

```
        score2 float,
        -- score3 float,
        -- score4 float,
        score5 float,
        -- score6 float,
        score7 float,
        score8 float,
        score9 float
    )
    insert into #upv
    exec sp_rxPredict
        @model = @model_bin,
        @inputData = N'select quote, cast(tag as varchar(1)) as tag from QuotesForTesting'

    select  PredictedLabel, Score, Prediction
    from    #upv
    unpivot (
        Prediction
        for Score in (
            score0,
            score1,
            score2,
            -- score3,
            -- score4,
            score5,
            -- score6,
            score7,
            score8,
            score9
        )
    ) as scoreunpivot
    group by PredictedLabel, Score, Prediction
    order by Prediction desc
end;
```

(14 rows affected)

Trollhunters.ipynb

20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

| | PredictedLabel | Score.0 | Score.1 | Score.2 | Score.5 | Score.7 | Score.8 | Score.9 |
|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 2 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 3 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 4 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 5 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 6 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 7 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 8 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 9 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 10 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 11 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 12 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 13 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 14 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |

| | PredictedLabel | Score | Prediction |
|---|---|---|---|
| 1 | 7 | score7 | 0.263157486915588 |
| 2 | 7 | score1 | 0.210526421666145 |
| 3 | 7 | score8 | 0.157895624637604 |
| 4 | 7 | score9 | 0.105262860655785 |
| 5 | 7 | score0 | 0.105262331664562 |

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20190608-SQLSaturdaySFL864 > SentimentPrediction > PASSInsights201908-Dev > Trollhunters.ipynb

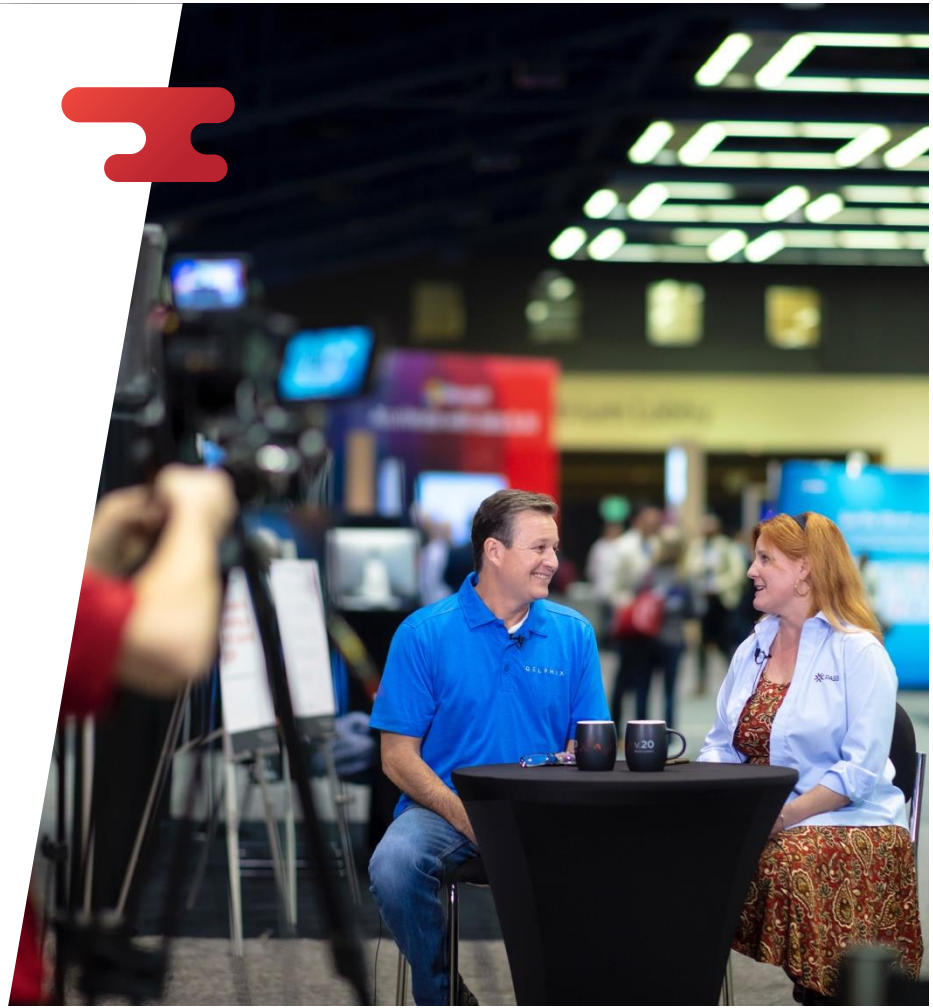
Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results Schedule Notebook

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 3 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 4 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 5 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 6 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 7 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 8 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 9 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 10 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 11 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 12 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 13 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |
| 14 | 7 | 0.1052623 | 0.2105264 | 0.07017536 | 0.08772001 | 0.2631575 | 0.1578956 | 0.1052629 |

| | PredictedLabel | Score | Prediction |
|---|---|---|---|
| 1 | 7 | score7 | 0.263157486915588 |
| 2 | 7 | score1 | 0.210526421666145 |
| 3 | 7 | score8 | 0.157895624637604 |
| 4 | 7 | score9 | 0.105262860655785 |
| 5 | 7 | score0 | 0.105262331664562 |
| 6 | 7 | score5 | 0.087720014154911 |
| 7 | 7 | score2 | 0.0701753571629524 |

DEMO

# PDF (DEMO 7)



~~SECRET//ORCON/NOFORN~~

**UNCLASSIFIED**

[PkgNumberShort]

Declassified by order of the President

September 24, 2019

# DEMO 7

Get Cognitive API

~~EYES ONLY~~
~~DO NOT COPY~~

MEMORANDUM OF TELEPHONE CONVERSATION

SUBJECT: ~~(C)~~ Telephone Conversation with President Zelenskyy of Ukraine

PARTICIPANTS: President Zelenskyy of Ukraine

Notetakers: The White House Situation Room

DATE, TIME AND PLACE: July 25, 2019, 9:03 - 9:33 a.m. EDT
Residence

TrumpUkraine.ipynb ●

20190608-SQLSaturdaySFL864 > Pixies > TrumpUkraine.ipynb

Code | Text | Kernel: SQL | Attach To: Select Connection | Not Trusted | Run Cells | Clear Results

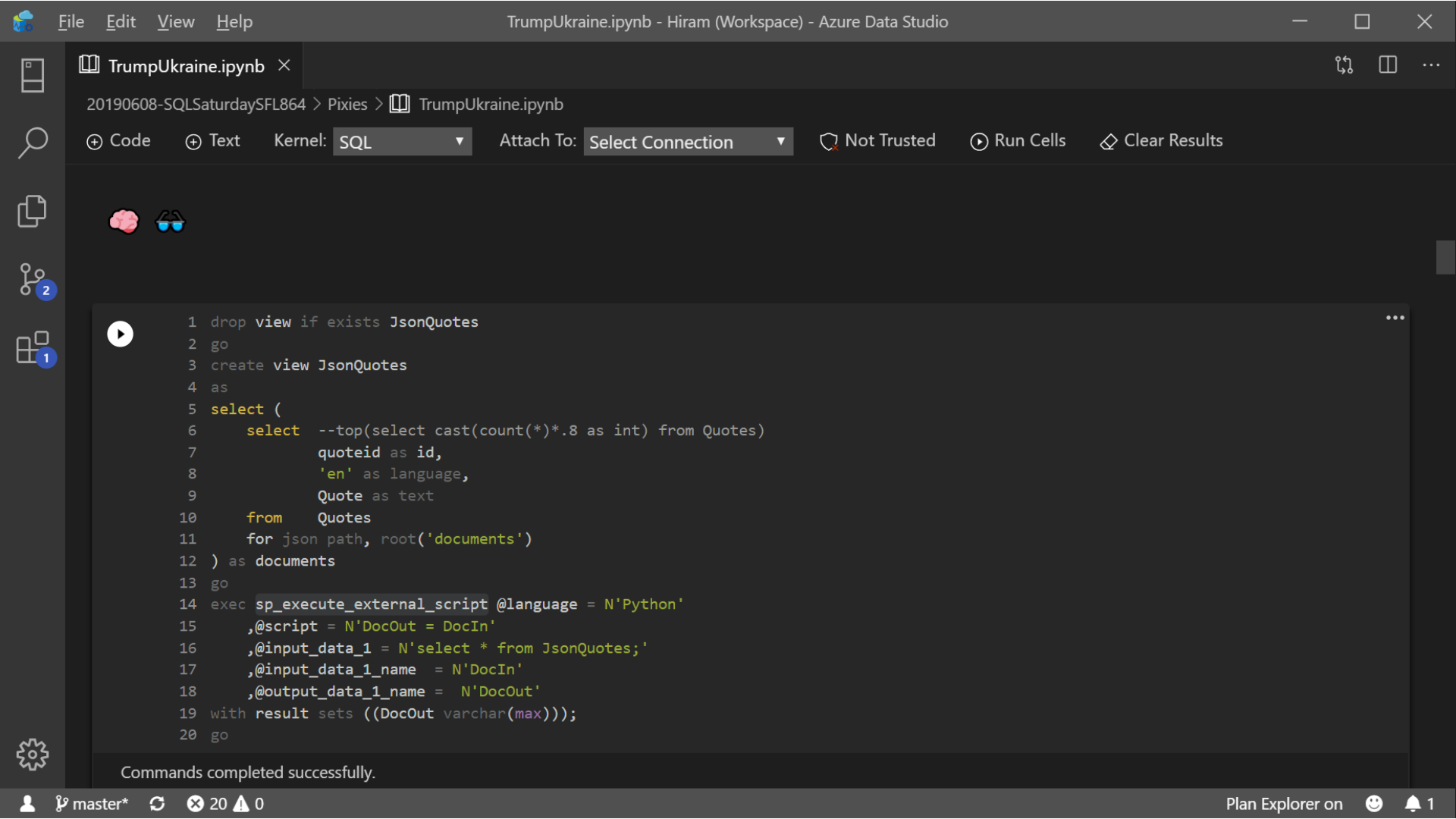
# Mr. President, Don't forget the

https://www.whitehouse.gov/wp-content/uploads/2019/09/Unclassified09.2019.pdf

[5]

```
drop table if exists quotes;

create table quotes (
    quoteid     int             identity(1,1) primary key clustered,
    character   varchar(128)    not null,
    quote       nvarchar(max)   not null,
    sentiment   float
);

insert into quotes (character, quote)
values
 ('The President', 'Congratulations on a great victory. We all watched from the United States and you did a terrific.job. The way.you came from behind, -somebody who wasn''t given much of a chance, and
,('President Zelenskyy', 'You are absolutely right Mr. Presideht. We did win big and we worked hard for this. We worked a lot but I would like to confess to you that I had an opportunity to learn from y
,('The President', '[laughter] That''s a very good idea. I think your country is very happy about that.')
,('President Zelenskyy', 'Well yes, to tell you the truth, we are trying to work hard because we wanted to drain the swamp here in our country. We brought in many many new people. Not the old politician
,('The President', 'Well it''s very nice of you to say that. I will say that we do a lot for Ukraine. We spend a lot of effort and a lot of time. Much more than the European countries are doing and they
,('President Zelenskyy', 'Yes you are-absolutely right. Not only 100 percent, but actually 1000 percent and I can tell you the following; I did talk to Angela Merkel and I did meet with her. I also met
,('The President','I would like you to do us a favor though because our country has been through a lot and Ukraine knows a lot about it. I would like you to find out what happened with this whole situat
,('President Zelenskyy','Yes it is very important for me and everything that you just mentioned earlier. For me as a President, it is very important and we are open for any future cooperation. We are re
,('The President','Good because I heard you had a prosecutor who was very good and he was shut down and that''s really unfair. A lot of people are talking about that, the way they shut your very good pr
,('President Zelenskyy','I wanted to tell you about the prosecutor. First of all I understand and I''m knowledgeable about the situation. Since we have won the absolute majority in our Parliament, the n
,('The President','Well, she''s going to go through some things. I will have Mr. Giuliani give you a call and I am also going to have Attorney General Barr call and we will get to the bottom of it. I''m
,('President Zelenskyy','I would like to tell you that I also have quite a few Ukrainian friends that live the United States. Actually last time I traveled to the United States, I stayed in New York nea
,('The President','Good. Well, thank you very much and I appreciate that. I will tell Rudy and Attorney General Barr to call. Thank you. Whenever you would like to come to the White House, feel free to
,('President Zelenskyy','Thank you very much. I would be very happy to come and would be happy to meet with you personally and get to know you better. I am looking forward to our meeting and I also woul
,('The President','Okay, we can work that out. I look forward a to seeing you in Washington and maybe in Poland because I think we are going to be there at that time.')
,('President Zelenskyy','Thank you very much Mr. President.')
,('The President','Congratulations on a fantastic job you''ve done. The whole world was watching. I''m not sure it was so much of an upset but congratulations.')
,('President Zelenskyy','Thank you Mr. President bye-bye.')

;
```

(18 rows affected)


File Edit View Help
TrumpUkraine.ipynb - Hiram (Workspace) - Azure Data Studio
TrumpUkraine.ipynb
20190608-SQLSaturdaySFL864 > Pixies > TrumpUkraine.ipynb
Code
Text
Kernel: SQL
Attach To: Select Connection
Not Trusted
Run Cells
Clear Results
drop view if exists JsonQuotes
go
create view JsonQuotes
as
select (
select --top(select cast(count(*)*.8 as int) from Quotes)
quoteid as id,
'en' as language,
Quote as text
from Quotes
for json path, root('documents')
) as documents
go
exec sp_execute_external_script @language = N'Python'
,@script = N'DocOut = DocIn'
,@input_data_1 = N'select * from JsonQuotes;'
,@input_data_1_name = N'DocIn'
,@output_data_1_name = N'DocOut'
with result sets ((DocOut varchar(max)));
go
Commands completed successfully.
master*
20 0
Plan Explorer on
1

TrumpUkraine.ipynb

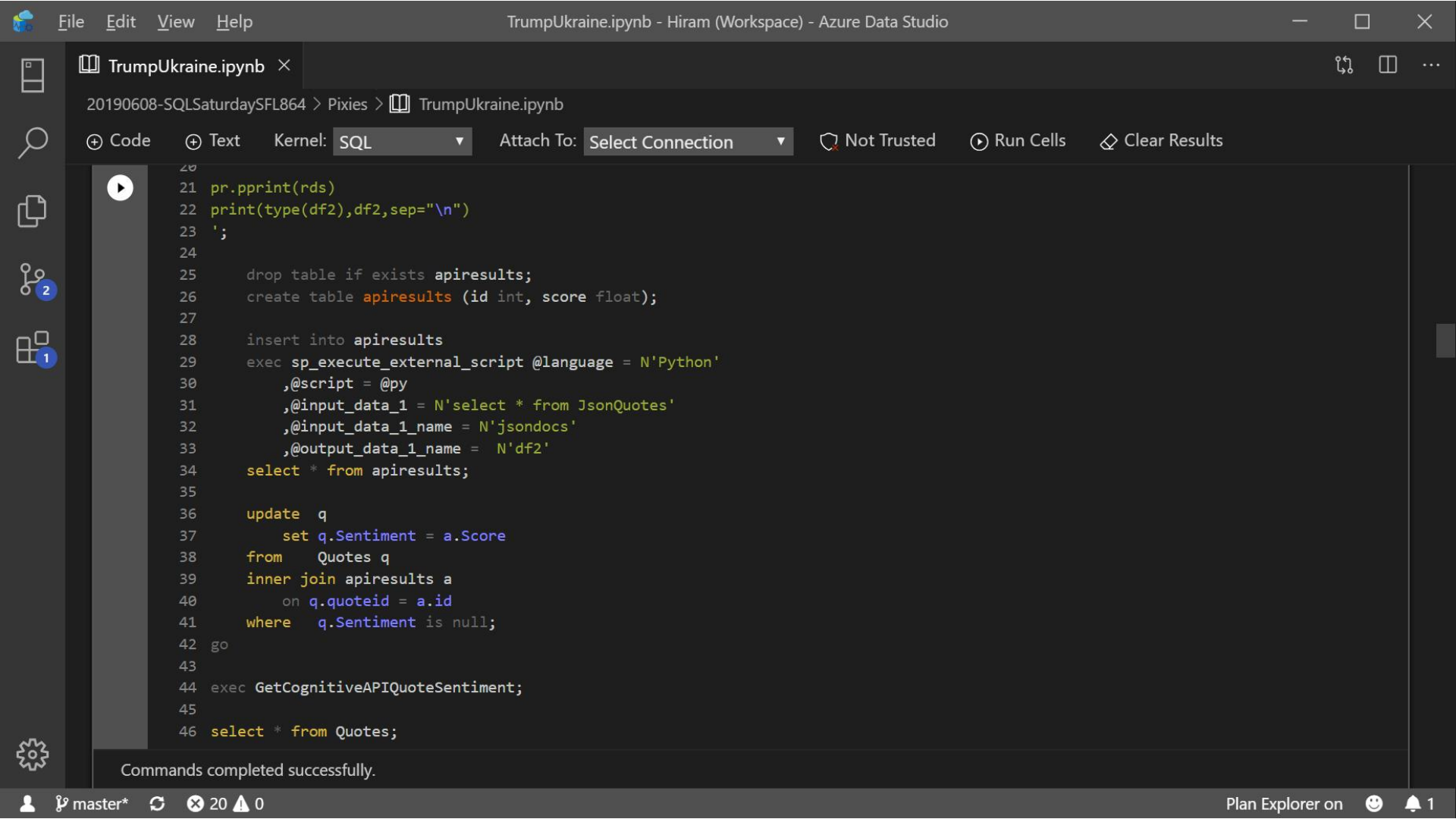
20190608-SQLSaturdaySFL864 > Pixies > TrumpUkraine.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results

# Mr. President, Don't forget the

https://repl.it/languages/python3

```
create or alter proc GetCognitiveAPIQuoteSentiment
as
    set nocount on;
    declare @py nvarchar(max);

    set @py = N'import requests, pprint as pr
from pandas.io.json import json_normalize

subscription_key = "mykey"
text_analytics_base_url = "https://eastus2.api.cognitive.microsoft.com/text/analytics/v2.1/"
sentiment_url = text_analytics_base_url + "sentiment"

df = jsondocs

headers  = {"Ocp-Apim-Subscription-Key": subscription_key, "content-type": "application/json"}
response = requests.post(sentiment_url, headers = headers, data = df.iloc[0][0].encode())

rds = response.json()
df2 = json_normalize(rds, "documents")

pr.pprint(rds)
```


File Edit View Help
TrumpUkraine.ipynb - Hiram (Workspace) - Azure Data Studio
TrumpUkraine.ipynb
20190608-SQLSaturdaySFL864 > Pixies > TrumpUkraine.ipynb
Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results
pr.pprint(rds)
print(type(df2),df2,sep="\n")
';
drop table if exists apiresults;
create table apiresults (id int, score float);
insert into apiresults
exec sp_execute_external_script @language = N'Python'
,@script = @py
,@input_data_1 = N'select * from JsonQuotes'
,@input_data_1_name = N'jsondocs'
,@output_data_1_name = N'df2'
select * from apiresults;
update q
set q.Sentiment = a.Score
from Quotes q
inner join apiresults a
on q.quoteid = a.id
where q.Sentiment is null;
go
exec GetCognitiveAPIQuoteSentiment;
select * from Quotes;
Commands completed successfully.
master* 20 0
Plan Explorer on
1

TrumpUkraine.ipynb

20190608-SQLSaturdaySFL864 > Pixies > TrumpUkraine.ipynb

Code Text Kernel: SQL Attach To: Select Connection Not Trusted Run Cells Clear Results

## Here's an idea.

```
1 select  avg(sentiment) as AvgSentimtment, character
2 from    quotes
3 where   sentiment is not null
4 group by character
5 order by AvgSentimtment desc
```

(2 rows affected)

Total execution time: 00:00:00.015

| | AvgSentimtment | character |
|---|---|---|
| 1 | 0.929387278027005 | President Zelenskyy |
| 2 | 0.831812553935581 | The President |

## Schema

# Summary

1. Add ML Features *exe components*
2. Grant Access *users, groups, add login & user*
3. Config *external scripts enabled, working directory*
4. Install Pre-Trained Open Source Models *PowerShell, RSetup.exe*

# Summary

5. Code in Python & T-SQL *Visual Studio, SSMS, ADS*
6. Python Profiling *Visual Studio, Execution Plan, CPU*
7. Real-time scoring *rx_serialize_model, realtime_scoring_only = True*
8. Review Sentiment Results *sp_rxPredict wins!*

# Summary

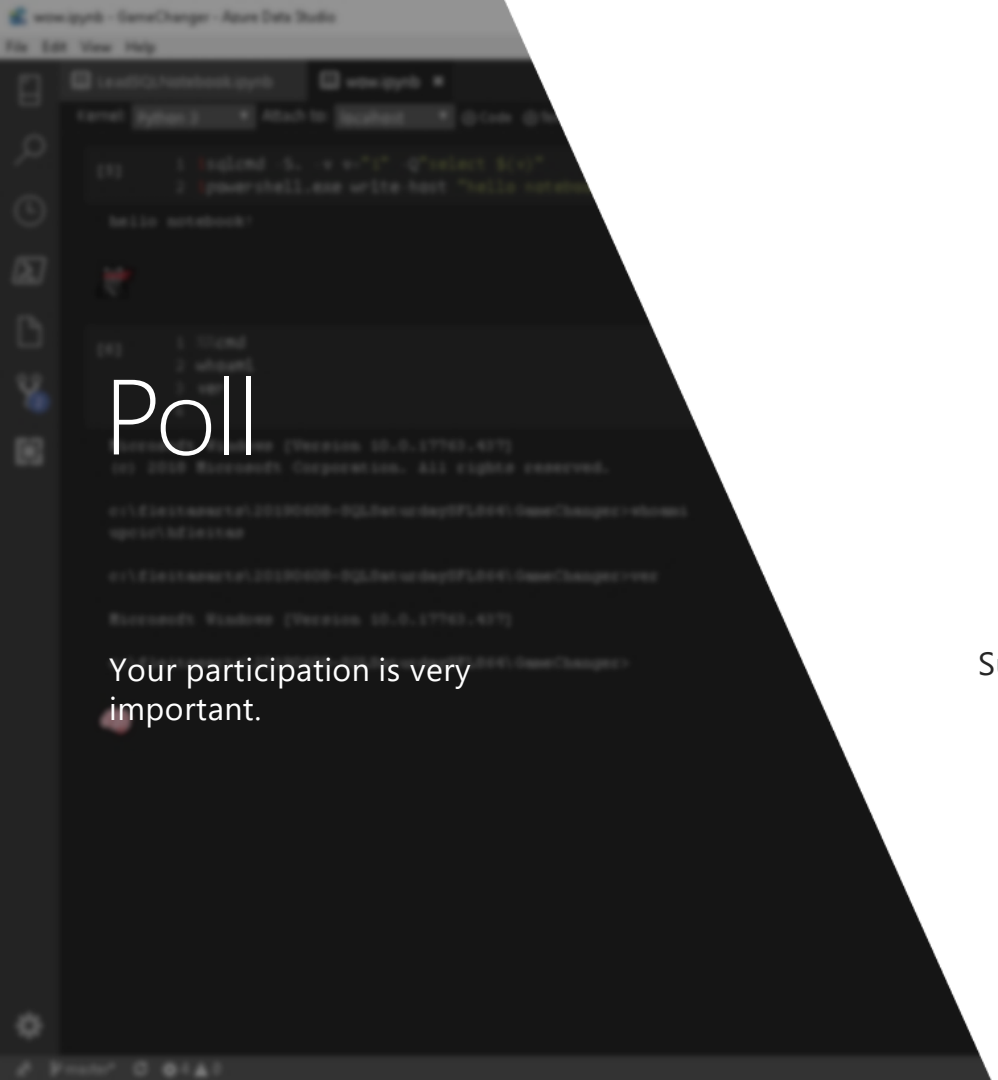
7. Azure Data Studio Notebook *kernels*
8. Azure Cognitive Text Analytics API *requests, JSON*
9. For JSON Path
10. GetCognitiviveAPI
11. Resources

# Resources

1. fleitasarts.com
2. github.com/hfleitas/seattle19
3. netflix.com/trollhunters
4. SQL Server ML Services: Tutorials
5. Interactive deep learning: Learn alert
6. aka.ms/sqlworkshops
7. ailab.microsoft.com

# Resources

8. SQL Server R Services: Samples
9. Components for Python: Interaction
10. Pre-Trained ML Models: Install
11. Threading ML: Logistic Regression
12. Azure SQL ML Preview: Sign up
13. aka.ms/ss19



# Poll

Your participation is very important.

This is the link:

# bit.ly/passml19

Submit your feedback by the end of this presentation.

PASS

# Session Evaluations

**Submit by 5pm Friday, November 15th to win prizes.**

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# Thank You

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