



Sales Forecasting Model Using SARIMAX Algorithm



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1. Introduction

NextGen Invent corporation is a leading global technology services provider. Our multi-disciplinary teams, Data Scientists, Change Agents, Strategists and Process Analysis framework are delivering Robotic Process Automation solution to its clients.

NGI in partnership with Automation Anywhere is delivering Stats/ML/AI/NLP/OR/Deep Learning models as ready to use Cloud Bots that are providing efficiencies across business processes, improved customer conversion rate and reduced churn rate.

1.1.Overview

Apply Sales Forecasting Model as a Cloud Bot to your workflow and automate your business processes. This Bot provides sales forecast for user-specified time periods for planning, production and other factors. Business can forecast growth, trends, patterns and seasonality, by analyzing the various combinations of input variables.

1.2.Use cases

- An organization looking to forecast Daily, Weekly, Monthly product sales while being cautious of seasonality.
- A Retail store planning inventory levels based on sales forecast based on seasonal variations



2. Requirements & Prerequisites

2.1. System Requirements

For the PC or server where the bot needs to run:

Device	Processor	RAM	Storage	Network
Machine	Intel Core i5 or higher	8GB or higher	16GB	1GbE
Bot Creator and Bot Runner	No additions to the machine requirements	No additions to the machine requirements	No additions to the machine requirements	No additions to the machine requirements

2.2. Prerequisites

Software's needed -

Automation Anywhere Plugin version	Excel Requirement Version
11.x	2013 version or higher



3. Getting Started

3.1.Skill Matrix

- This bot can not only handle data with a trend but also supports time series with a seasonal component and explicitly supports univariate time series data with a seasonal component
- The Bot takes in the CSV file and performs the SARIMAX and output the MS Excel

3.2.Installation Hierarchy

- Download the bot from Bot Store.
- Double click on the .msi file.
- On Welcome to Installation wizard, click Next to continue.
- Click I agree to the terms in the license agreement radio button to accept the agreement.
- Get/Copy the License key from Bot Store Downloads into License Key, click Next to continue.
- Click Install to begin the installation.
- Click Finish to complete the installation.
- To view the installation, go to 'My Tasks' folder on AAE Client to see bot files.

3.3.Configuration

Parameter	Type	Direction	Additional Info
Path	String	Input	Path of the CSV file Ex.: C:\~\sales data-set.csv
ColumnCount	Numeric	Input	Count of columns available in CSV file being provided with input data
InputColumnNames	String	Input	Name of columns being provided in CSV file. For example “Month”, "Sales"
InputColumnDataType	String	Input	Data Type of columns being provided in CSV file in the same order as column names. For example "Numeric", "String", in the current example 'string', 'Date', 'Numeric',
MissingNumberValueReplacement	String	Input	A value that can be used by Model in case CSV file has blank field/s or missing numerical value/s.



MissingDateValueReplacement	Date	Input	A value that can be used by Model incase CSV file has blank field or missing a Date value. This parameter should have value in the YYYY-MM-DD format. Ex: 2020-01-01
IgnoreColumns	String	Input	Names of the column that model shall ignore while estimating forecasting. For example 'Sno'

Input Sample: Retail Sales data of 105 months (1964-01-01 to 1972-09-01)

Sno	Month	Sale
1	1964-01-01	2815
2	1964-02-01	2672
3	1964-03-01	2755
4	1964-04-01	2721
5	1964-05-01	2946
6	1964-06-01	3036
7	1964-07-01	2282
8	1964-08-01	2212
9	1964-09-01	2922
10	1964-10-01	4301
11	1964-11-01	5764
12	1964-12-01	7312
13	1965-01-01	2541
14	1965-02-01	2475
15	1965-03-01	3031
16	1965-04-01	3266
17	1965-05-01	3776
18	1965-06-01	3230
19	1965-07-01	3028
20	1965-08-01	1759
21	1965-09-01	3595
22	1965-10-01	4474
23	1965-11-01	6838
24	1965-12-01	8357
25	1966-01-01	3113
26	1966-02-01	3006
27	1966-03-01	4047
28	1966-04-01	3523
29	1966-05-01	3937

*** Minimum data requirements for SARIMAX: The rule of thumb is that you should have at least 50 observations, preferably 100+ observations



Outputs:

1. Output: the result in the form of the Excel
2. Seasonal timeseries most suitable predictions with upper and lower limits

Output Sample:

Column1	Predicted_Value	lower Sales	upper Sales
01-10-1972	7493.505274	5204.970185	9782.040363
01-11-1972	10509.45207	8112.16439	12906.73975
01-12-1972	13255.18708	10757.16417	15753.20999
01-01-1973	4737.06823	2141.886775	7332.249684
01-02-1973	3830.652182	1141.647685	6519.656678
01-03-1973	4799.310339	2019.442997	7579.17768
01-04-1973	5574.740284	1934.773407	9214.707162
01-05-1973	6088.419029	2227.676216	9949.161842
01-06-1973	5972.562942	1918.72709	10026.39879
01-07-1973	5578.253596	1292.493988	9864.013205
01-08-1973	2480.345092	-2052.654985	7013.345169
01-09-1973	7012.186887	2279.665198	11744.70858



4. Logs

Error Handling In case of Errors, Error Logs & Screenshots are generated within Error Folder.

Each Bot folder contains the below hierarchy.

- 1 Error Folder

- 1.1 Logs

- 1.1.1 ErrorLogsMonth-Day-Year.txt: In case of any error, this file logs error message along with timestamp

- 1.2 Snapshots

- 1.2.1 Error SnapMonth-Day-Year-Hour-Minute-SecondMillisecond.png: In case of any error, this file captures screenshot of error.

Task Status of bot is set to failed in case of error.



5. Troubleshooting & Support

5.1 Support

Please Email bot.support@nextgeninvent.com for any support related questions.



Appendix A - Record of Changes

Version #	Date of Change	Author	Notes
V1	March 12 th 2020	Nextgen Invent Corporation	

Appendix B - Acronyms

#	Acronym	Description
1.	AA	Automation Anywhere
2.	API	Application Programming Interface
3.	RAM	Random Access Memory
4.	OS	Operating System

Appendix C - References

#	Topic	Reference Link
1.	Nextgen Invent Corporation	https://www.nextgeninvent.com/

