Barclays BI (Problem Code 2)

Trend Analysis and Forecastination based on given data

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The problem

Problem Statement

Participants have to do the trend and forecasting analysis for all individual product category from given data and also create the **Generic framework** which can generate the trend (i.e. calculate different parameter like R square , MAE and RMSE and also the statement around when the significant change is being observed minimum 4 weeks also forecast the future data for each product category .

Training Dataset

Productcat	Date	Sales
ProdCat1	13/06/13	802
ProdCat1	14/06/13	671
ProdCat1	15/06/13	866
ProdCat1	18/06/13	602
ProdCat1	19/06/13	343
ProdCat1	20/06/13	377
ProdCat1	21/06/13	636
ProdCat1	22/06/13	1082
ProdCat1	25/06/13	888
ProdCat1	26/06/13	486
ProdCat1	27/06/13	930
ProdCat1	28/06/13	1008
ProdCat1	29/06/13	2106
ProdCat1	02/07/13	644
ProdCat1	03/07/13	547
ProdCat1	04/07/13	920
ProdCat1	05/07/13	689
ProdCat1	06/07/13	664
ProdCat1	09/07/13	724
ProdCat1	10/07/13	300
ProdCat1	11/07/13	439
ProdCat1	12/07/13	1238
ProdCat1	13/07/13	831
ProdCat1	16/07/13	950
ProdCat1	17/07/13	937
ProdCat1	18/07/13	590
ProdCat1	19/07/13	668

Cross Validation Dataset

Productcat	Date	Sales
ProdCat1	01/02/14	1203
ProdCat1	04/02/14	831
ProdCat1	05/02/14	796
ProdCat1	06/02/14	829
ProdCat1	07/02/14	974
ProdCat1	08/02/14	477
ProdCat1	11/02/14	581
ProdCat1	12/02/14	476
ProdCat1	13/02/14	588
ProdCat1	14/02/14	601
ProdCat1	15/02/14	491
ProdCat1	18/02/14	468
ProdCat1	19/02/14	495
ProdCat1	20/02/14	533
ProdCat1	21/02/14	849
ProdCat1	22/02/14	670
ProdCat1	25/02/14	615
ProdCat1	26/02/14	824
ProdCat1	27/02/14	709
ProdCat1	28/02/14	988
ProdCat2	01/02/14	529
ProdCat2	04/02/14	624
ProdCat2	05/02/14	477
ProdCat2	06/02/14	599
ProdCat2	07/02/14	720
ProdCat2	08/02/14	290
ProdCat2	11/02/14	354
ProdCat2	12/02/14	347
ProdCat2	13/02/14	493
ProdCat2	14/02/14	515
ProdCat2	15/02/14	376

Test Dataset

Productcat	Date	Sales
ProdCat1	01/03/14	
ProdCat1	04/03/14	
ProdCat1	05/03/14	
ProdCat1	06/03/14	
ProdCat1	07/03/14	
ProdCat1	08/03/14	
ProdCat1	11/03/14	
ProdCat1	12/03/14	
ProdCat1	13/03/14	
ProdCat1	14/03/14	
ProdCat1	15/03/14	
ProdCat1	18/03/14	
ProdCat1	19/03/14	
ProdCat1	20/03/14	
ProdCat1	21/03/14	
ProdCat1	22/03/14	
ProdCat1	25/03/14	
ProdCat1	26/03/14	
ProdCat1	27/03/14	
ProdCat1	28/03/14	
ProdCat1	29/03/14	
ProdCat2	01/03/14	
ProdCat2	04/03/14	
ProdCat2	05/03/14	
ProdCat2	06/03/14	
ProdCat2	07/03/14	
ProdCat2	08/03/14	
ProdCat2	11/03/14	
ProdCat2	12/03/14	
ProdCat2	13/03/14	
ProdCat2	14/03/14	
ProdCat2	15/03/14	
ProdCat2	18/03/14	
ProdCat2	19/03/14	
ProdCat2	20/03/14	
ProdCat2	21/03/14	

Challenges deep-dive

Challenge 1

Trend Analysis

This phase of the problem statement focuses on gathering conclusions out of the given timestamp based sales data.

Challenge 2

Commentary

This phase of the problem statement focuses on giving user the significant observed rise or fall over the weeks.

Challenge 3

Forecasting

This forms the final and most important phase of the problem statement which deals with observing the data points and have a far site into the future.

Solution

Solution consists of three phase :

1. Moving average based trend analysis.
2. Gathering important conclusions out of the trend analysis.
3. Forecasting using correlation based time series algorithm.

Implementation Steps

1. Trend Analysis

In this step we are calculating averages based on day, week and month. And presenting the user with the maximum and the minimum trend observed depending upon his choice.

2. Commentary

In this step we are looking for significant changes in the sales over a given span of time and providing users with the appropriate comments.
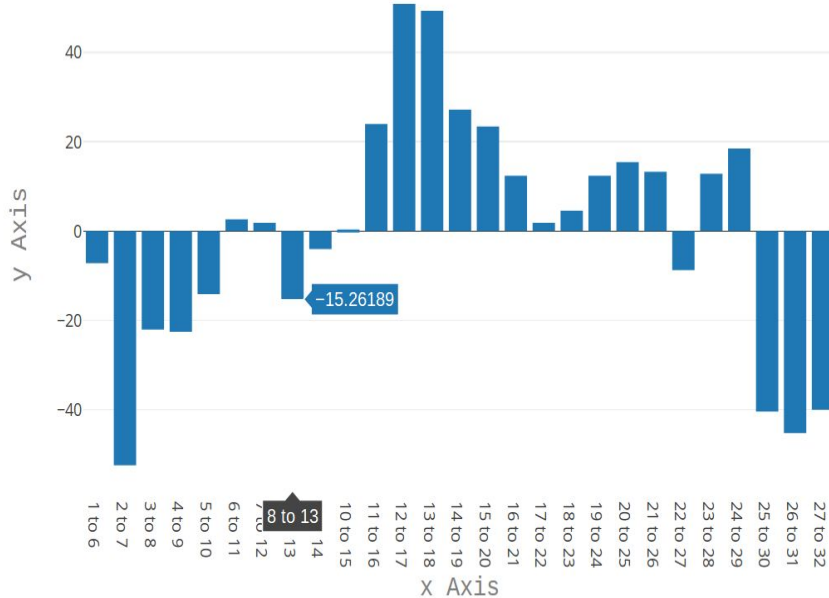
3. Forecasting

In this step we are observing the sales graph depending upon the timestamp and predicting sales of a future timestamp.

DEMO

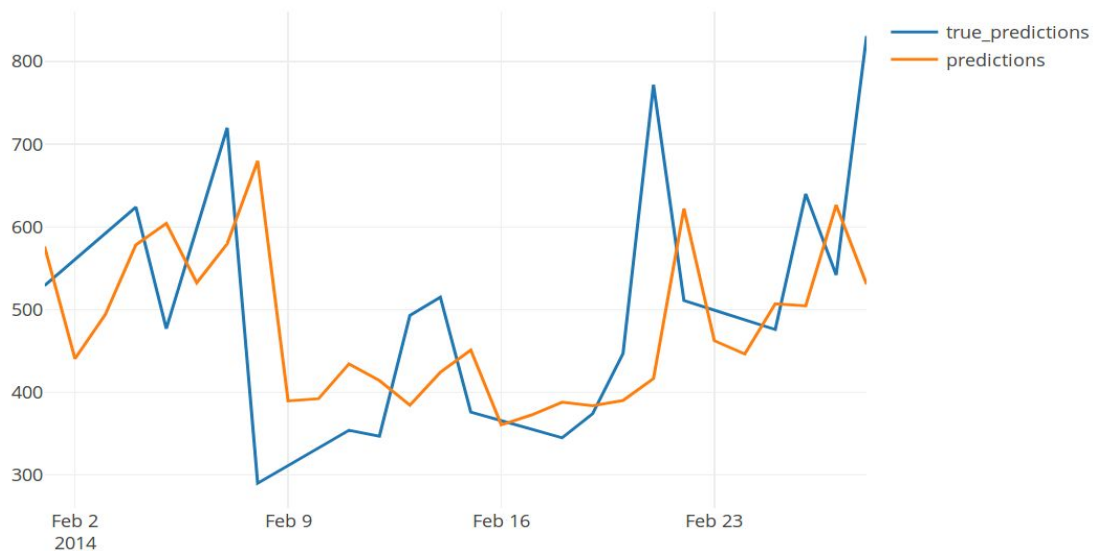# Commentary on Significant Changes

Output :

For ProdCat1,

Significant Change :

50% increase of sales over 5 weeks as observed on 17th week.

Also, there was a decrease of 52% of sales over 5 weeks as observed on 7th week.

Forecasting on Cross Validation Dataset

Forecasting on Test Dataset

Technology Stack

1. **Web Frameworks**
   a. Angular and Argon CSS
   b. Flask

2. **Languages**
   a . Javascript
   b . Python

3. **Python Statistics Framework**