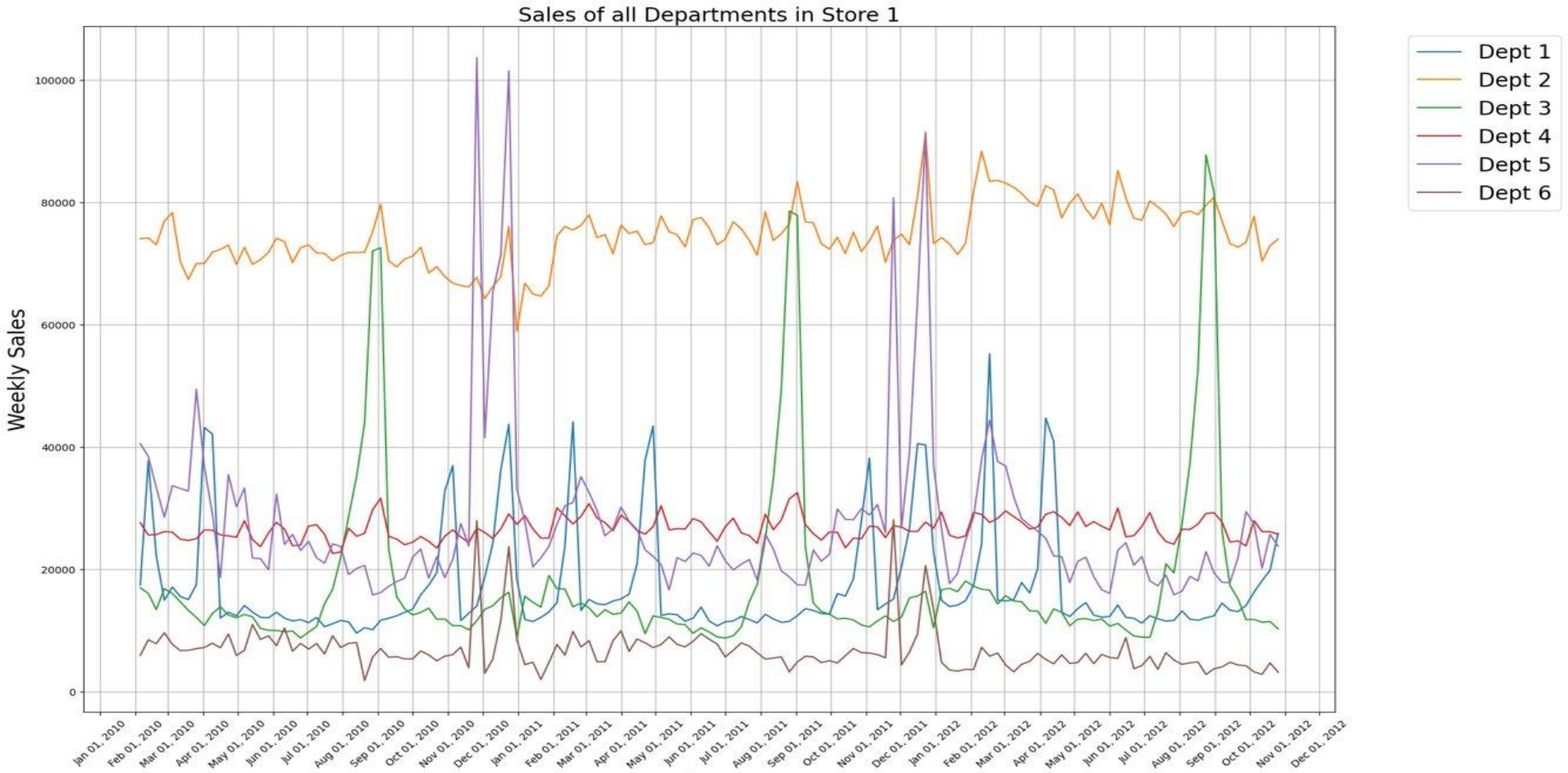
ICG SUMMER PROJECT

Group 2

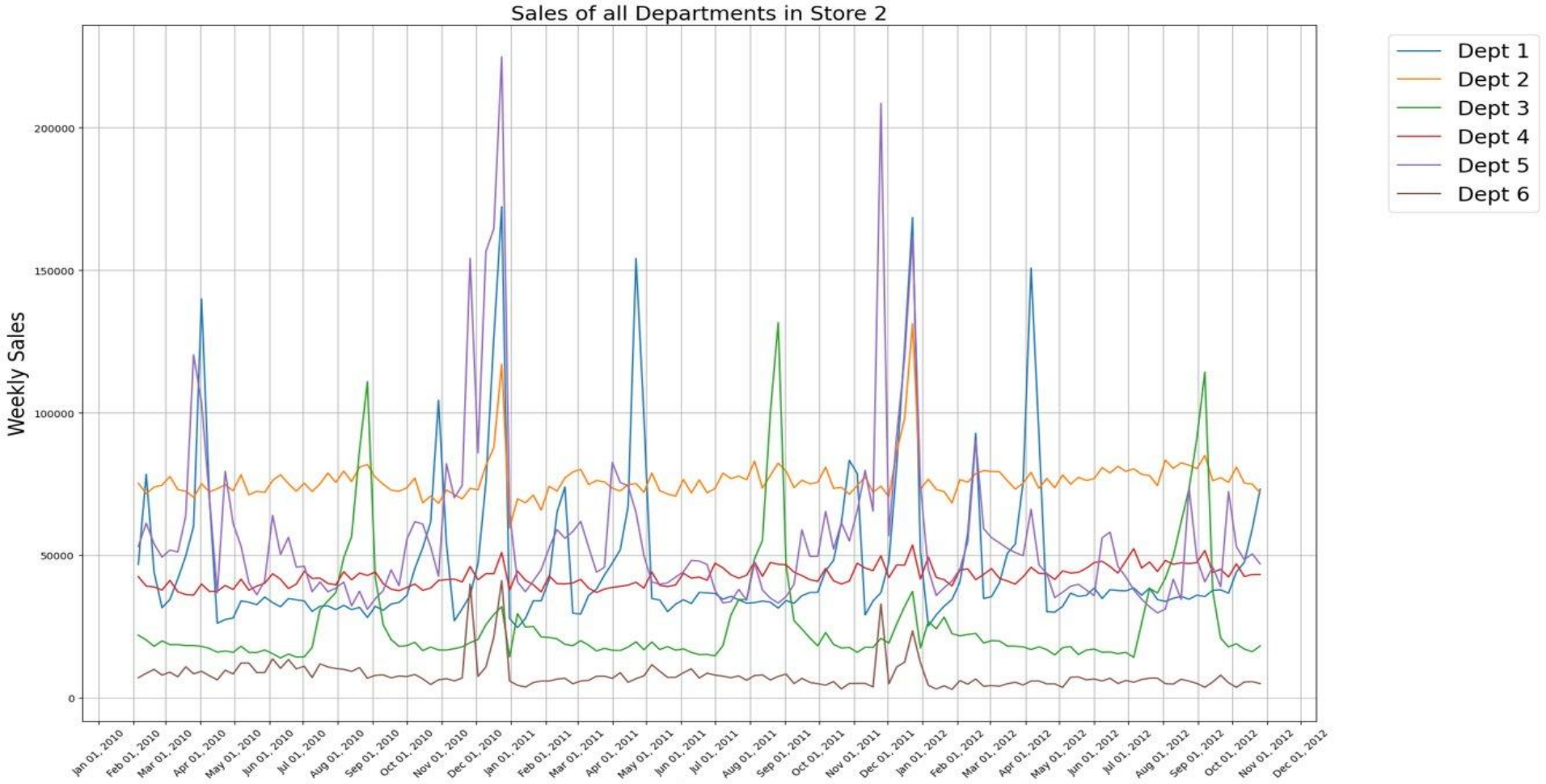
DATA ANALYSIS

STORE:D-MART

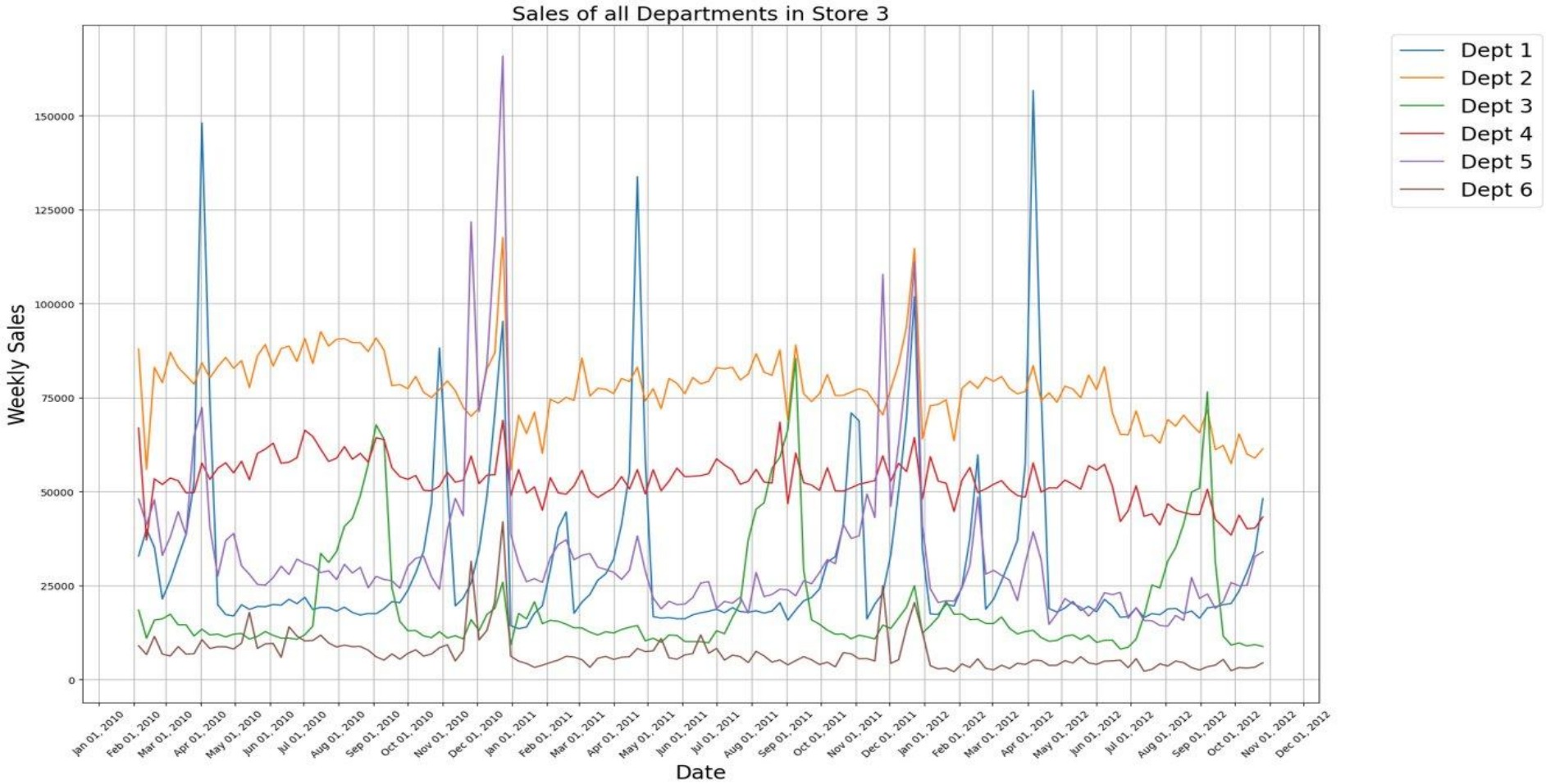
SALES OF ALL DEPARTMENTS IN STORE 1



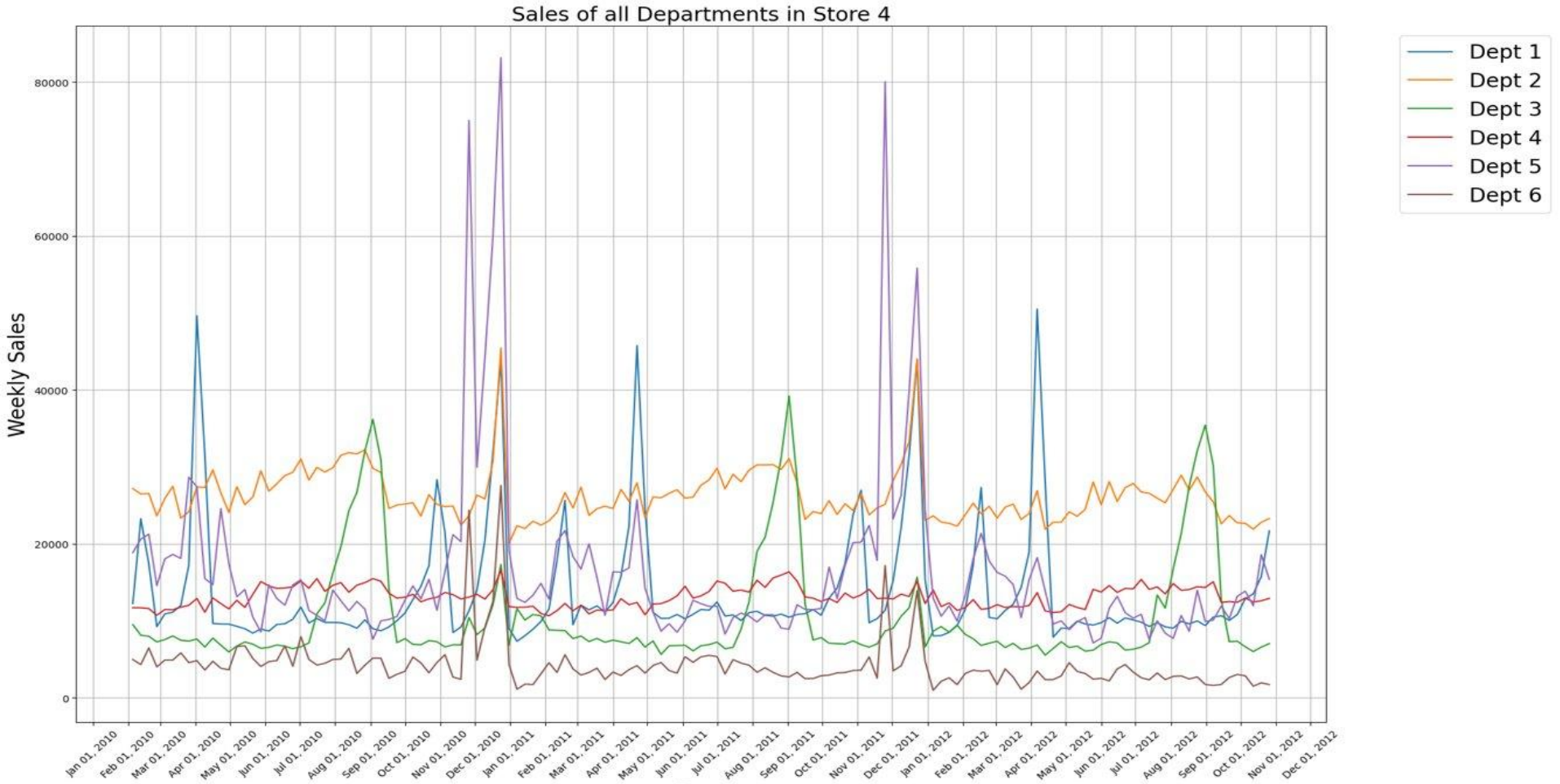
SALES OF ALL DEPARTMENTS IN STORE 2



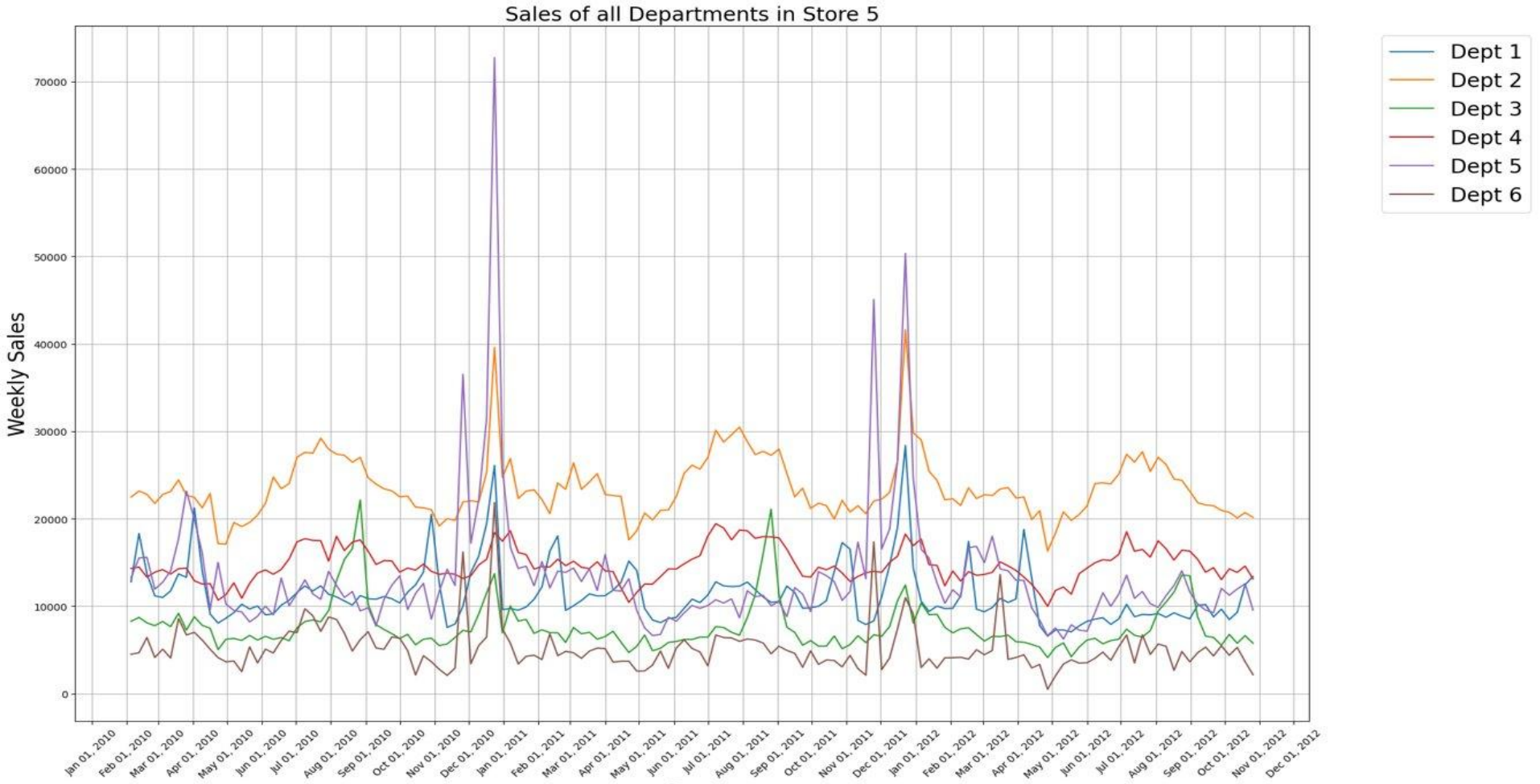
SALES OF ALL DEPARTMENTS IN STORE 3



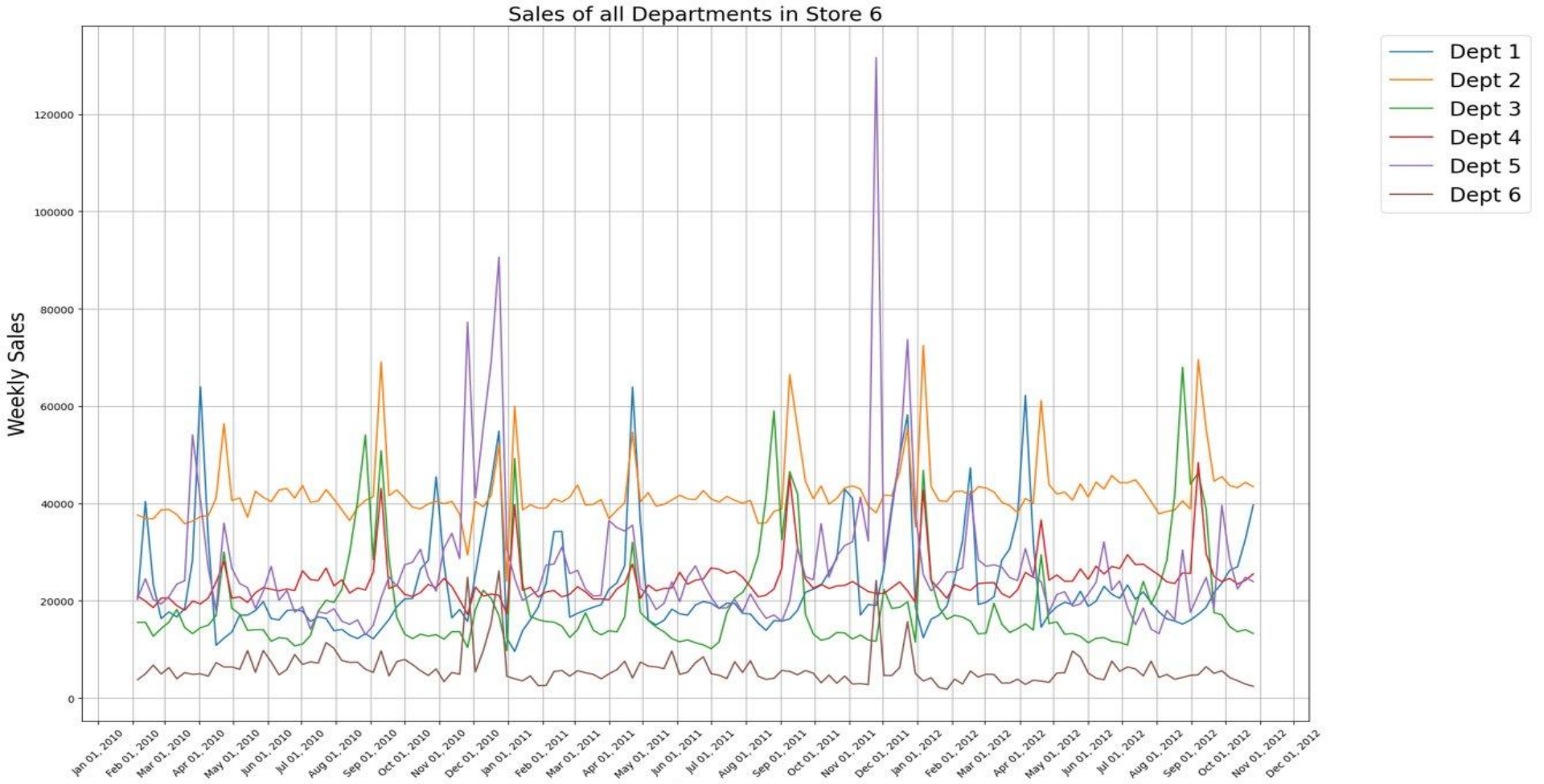
SALES OF ALL DEPARTMENTS IN STORE 4



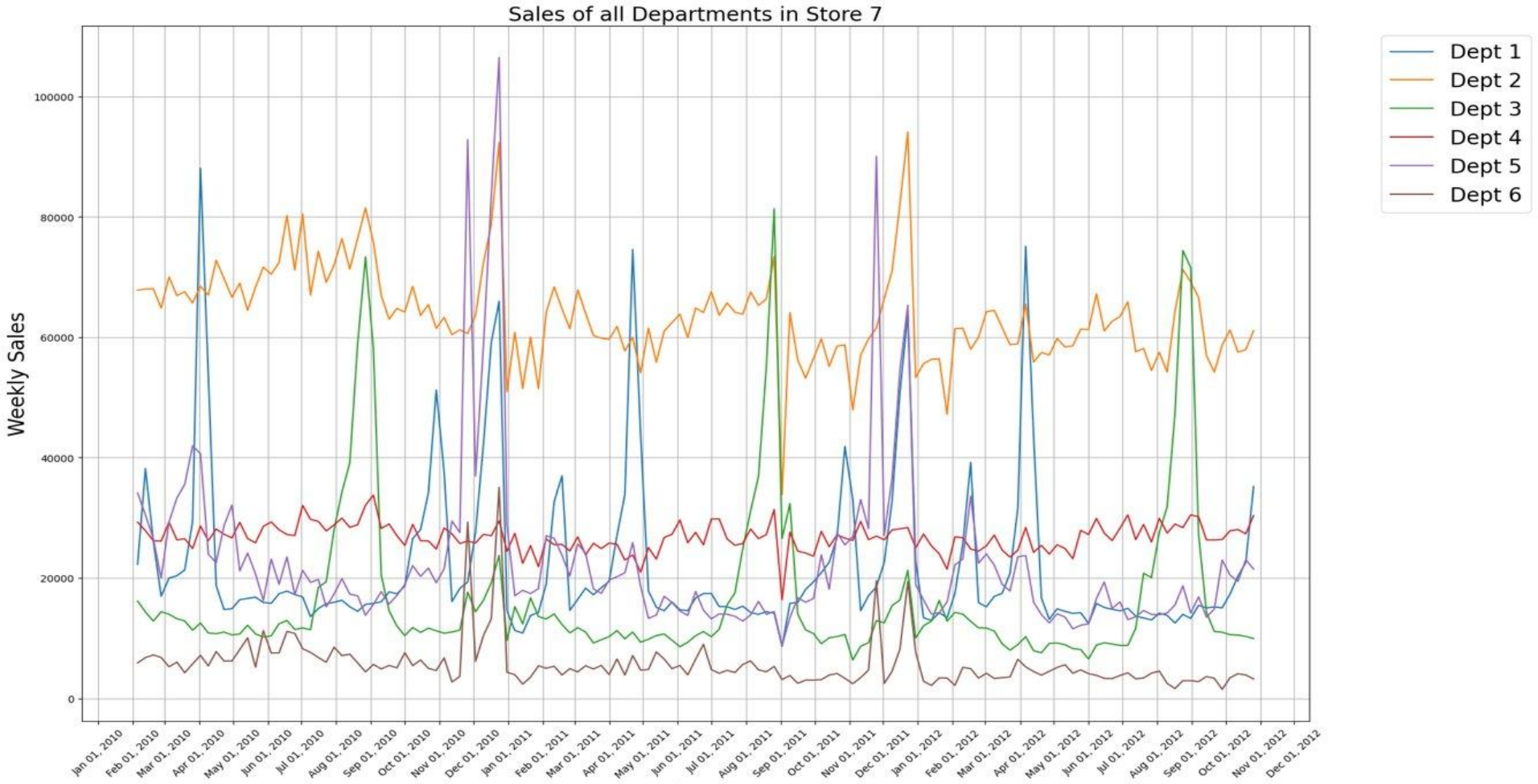
SALES OF ALL DEPARTMENTS IN STORE 5



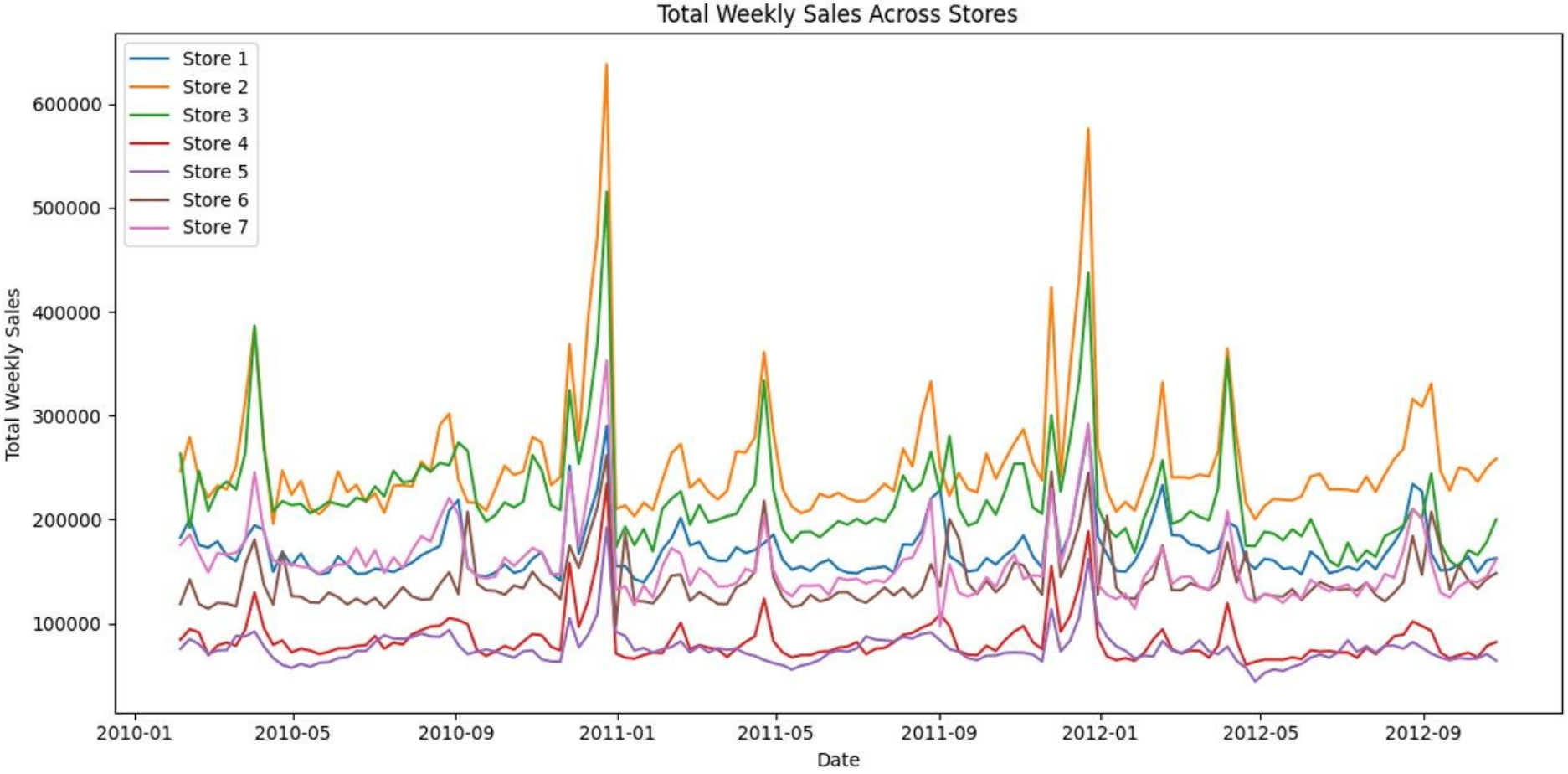
SALES OF ALL DEPARTMENTS IN STORE 6



SALES OF ALL DEPARTMENTS IN STORE 7



TOTAL WEEKLY SALES ACROSS STORES



Forecasting – Using LSTM

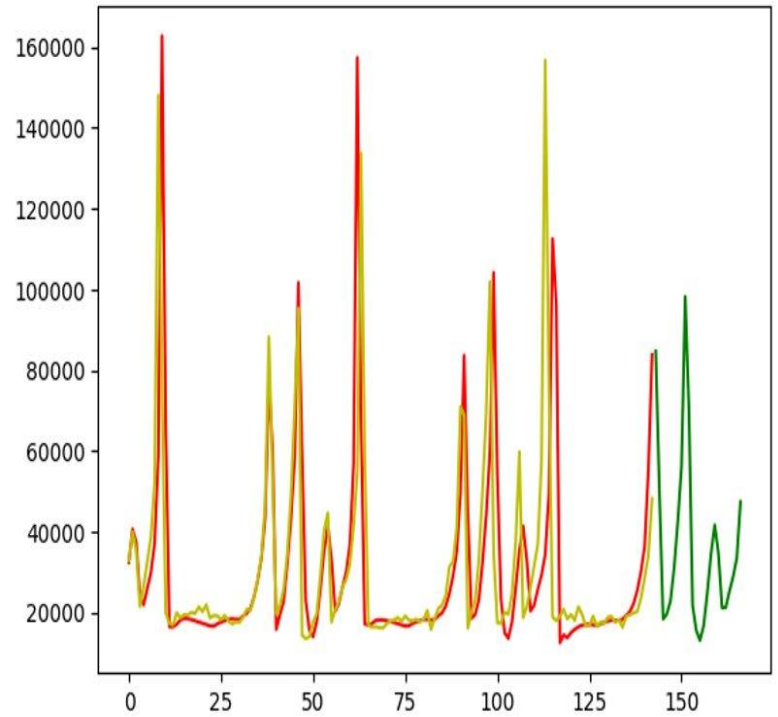
To forecast the data we had to first access the data of a department of a store since each variation was its own series.

After accessing we had to preprocess it, since the data did not have any null values that only left us with scaling the data.

The pattern of sale was annual so our model should use the past sales in a year to predict the result.

On trial and error we found that a simple LSTM model with two layers, 100 neurons each was able to sufficiently predict the sales for a majority of series.

EXAMPLE



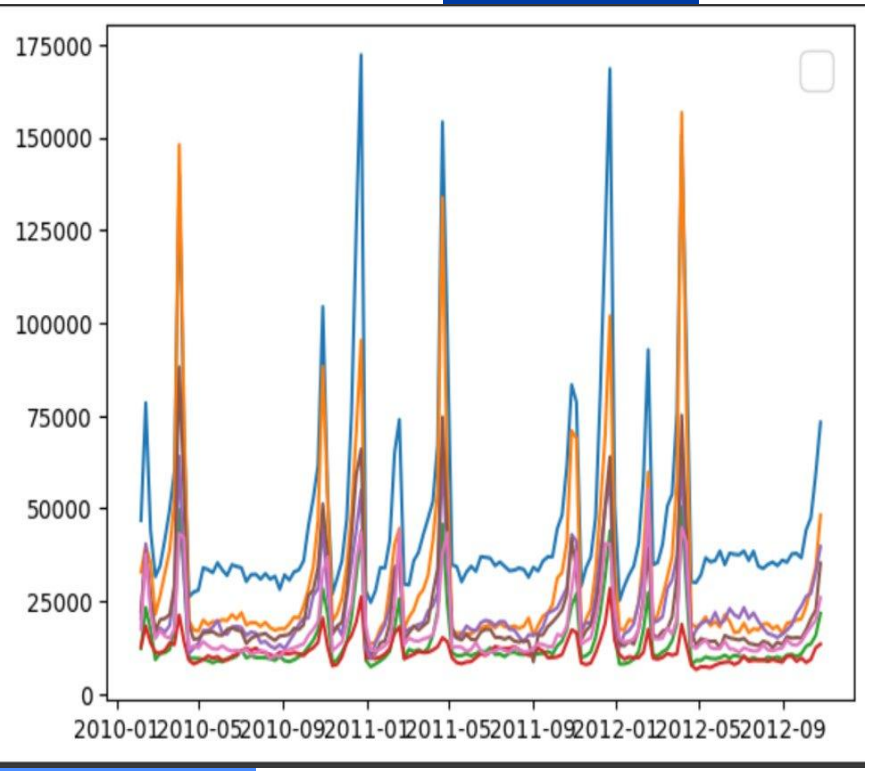
- Here is how our model for predicting sales for department 1 of store 3 looks
- Yellow represents the actual data
- Red represents sale predicted by the model from initial values as per data
- Green represents the Forecasts for next 6 months.

LIMITATIONS

- For each of department of a store we had to find the optimum number of epochs by trial and error leading to loss of time.
- Sometimes the model would give results but not replicate them the next time
- For some highly erratic series it would fail to produce any decent results or require a lot of time, like for department 2 of store 1.
- It requires a lot of computational power, about 20 minutes per command to give decent results.

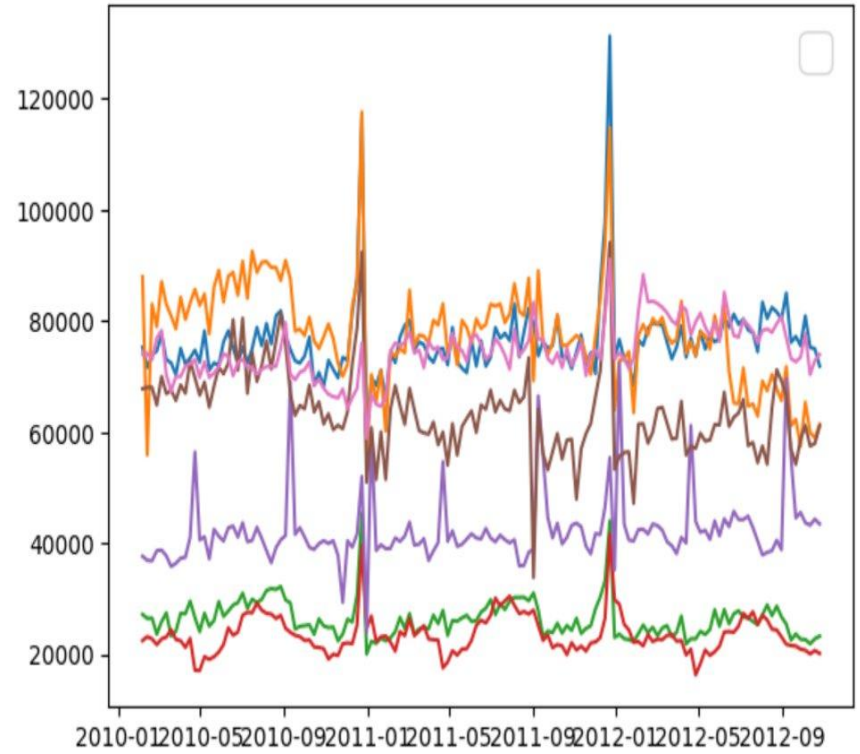

MANAGEMENT
CONSULTING

IDENTIFYING STORES AND DEPARTMENTS



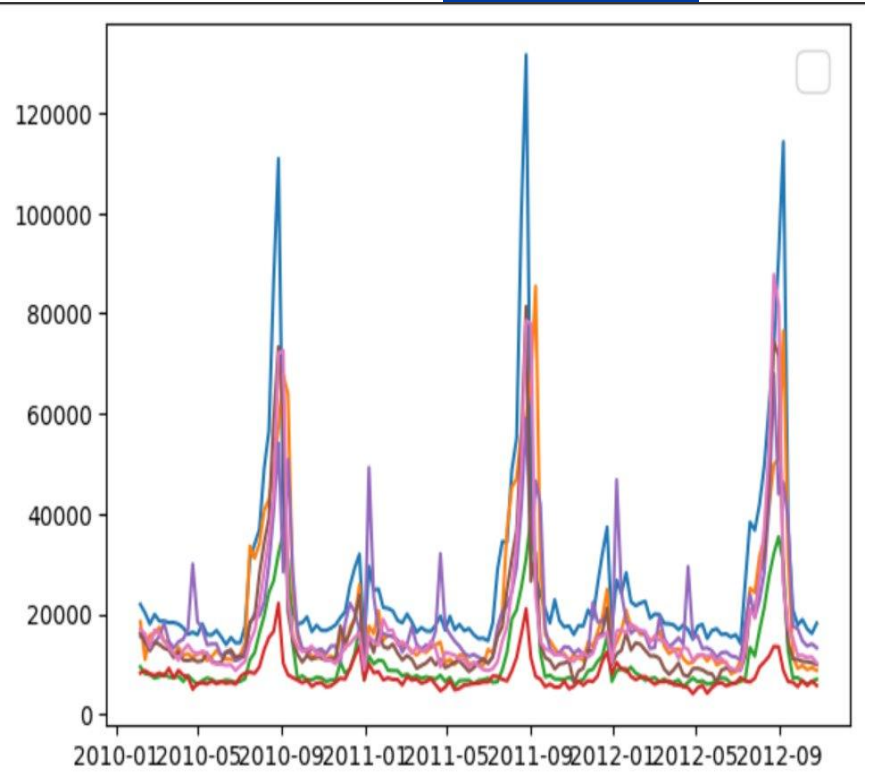
SALES OF DEPT 1 VS ALL STORES

This department shows peak just before the starting of summers and peak winters. This is usually the time when people buy clothes for that season. Thus department 1 represents clothes and apparel



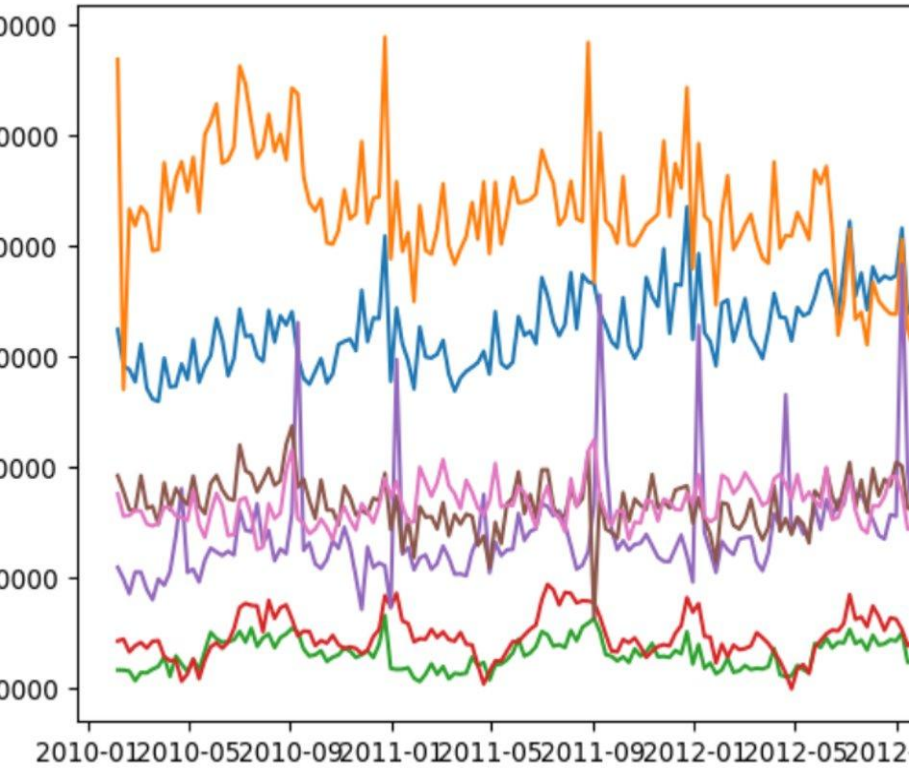
SALES OF DEPT 2 VS ALL STORES

Department 2 is electronic devices as there is a considerable variation in the number of people having an electronic gadgets thus the total number of sales is different in different cities



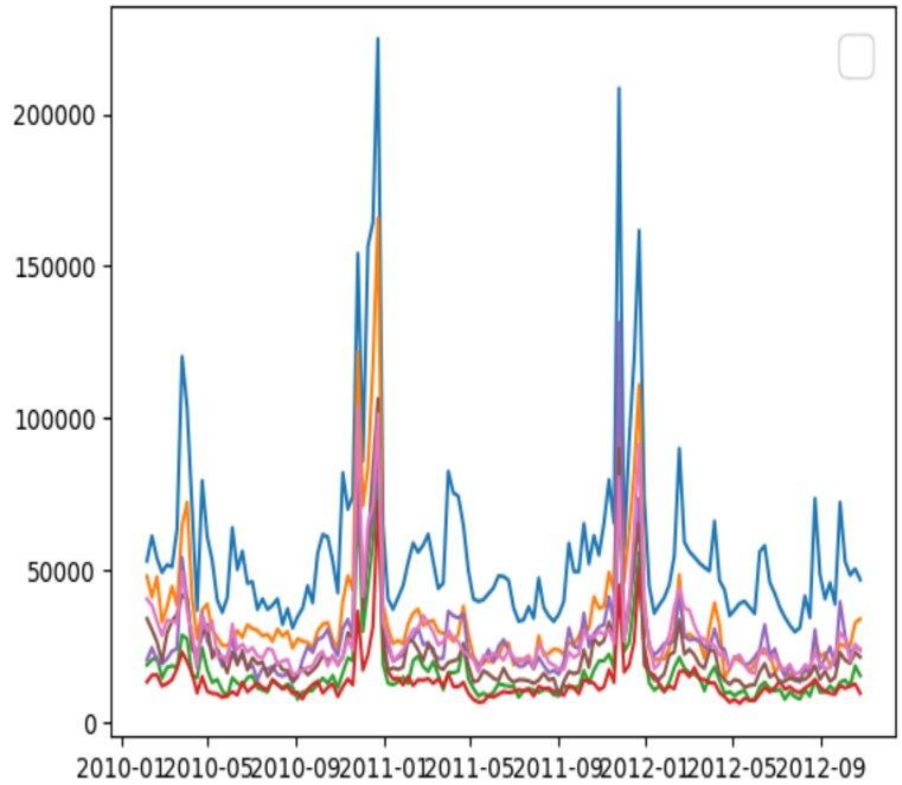
SALES OF DEPT 3 VS ALL STORES

This was the last department I decoded. I feel that department 3 represents furniture and the only reason I can think for the peaks in months around October is the festive season sale.



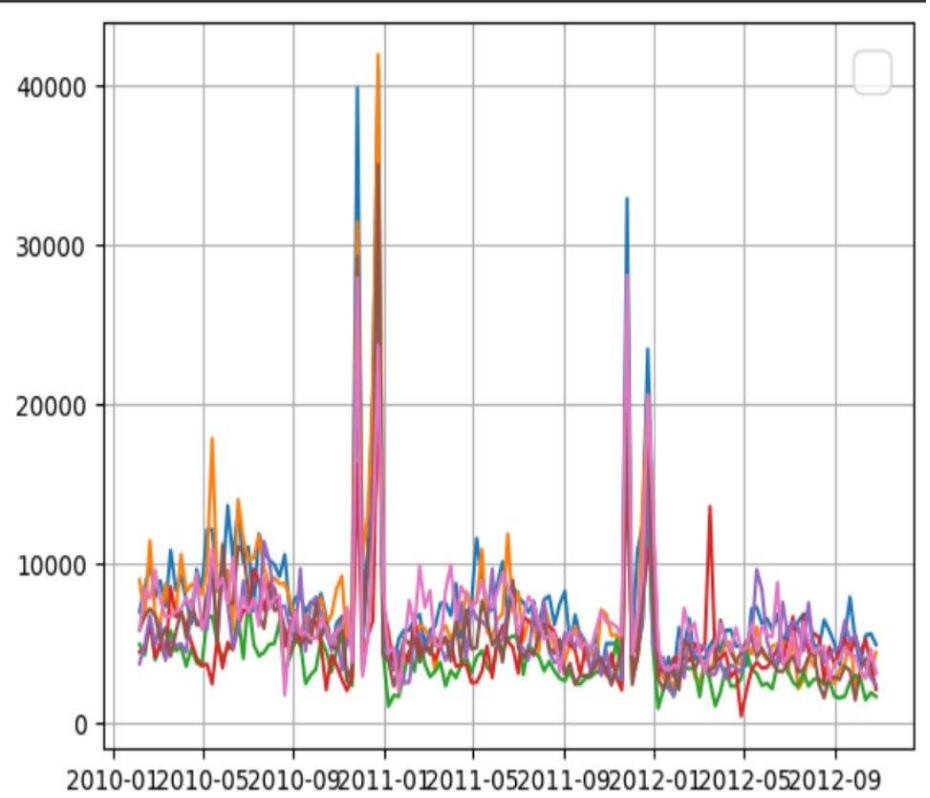
SALES OF DEPT 4 VS ALL STORES

Department 4 most likely represents grocery as the ratio of average sales is in quite agreement with ratio of population of the cities. This also helps us predict which store represents which city. For example Bombay has the highest population followed by Delhi and thus looking at the graph you can easily decode the cities



SALES OF DEPT 5 VS ALL STORES

This department represents books and stationaries as you can see some peaks around the month of march. This the time when an academic year comes to an end and students buy book sets and stationaries for the next year



SALES OF DEPT 6 VS ALL STORES

This department represents beverages as the sales are relatively high in summers. Due to extreme heat most of the people tend to buy cold drinks because of which sales of beverages are expected to increase and that is exactly what we witnessed here

DECODING STORES

- Store 1 (pink) is Bangalore
- Store 2 (blue) is Delhi
- Store 3 (orange) is Mumbai
- Store 4 (green) is Jaipur
- Store 5 (red) is Lucknow
- Store 6 (purple) is Indore
- Store 7 (brown) is Kolkata

Based on population figures and the number of internet users, the stores have been decoded using this information while examining the plots of groceries and electronics.

ANALYSING STORES AND INCREASING BUSINESS PERFORMANCE

THE STRATEGY

- We Will find the mean Weekly Sale of each Department among all the Stores and use it to compare each Department's performance for that particular store.
- To find the data we will use Python Pandas Module.
- Further We will give the desired techniques to increase the sales/business performance in the departments which are lagging behind.

Average Weekly Sales of each department at all stores:

• Clothes and Apparel	23827
• Electronics	53439
• Furniture	16742
• Grocery	28994
• Books and Stationary	29175
• Beverages	6163

Store 1: Bengaluru

- Mean Weekly Sale from each department
  1-Clothes and Apparel=17330
  2-Electronics=74494
  3-Furniture=17535
  4-Grocery=26673
  5-Books and Stationary=27756
  6-Beverages=6741
- Overall Mean Weekly average=28421
- Clearly,It can be seen that the sale of Electronics is excellent as compared to average sales at each store.
- However the sales of clothes and apparel is somewhat below compared to other cities which can be improved using techniques discussed in next slides.

Store 2: Delhi

- Mean Weekly Sale from each department
  1-Clothes and Apparel=47020
  2-Electronics=76339
  3-Furniture=26116
  4-Grocery=42563
  5-Books and Stationary=56786
  6-Beverages=6741
- Overall Mean Weekly average=42786
- Delhi is currently having the largest sales among all the 7 stores which is visible from its excellent sales in each department
- The sales in each department is almost double of the average sales of that department among the 7 stores
- So Delhi only needs to maintain its consistency and trust among the consumers.

Store 3: Mumbai

- Mean Weekly Sale from each department
  1-Clothes and Apparel=30611
  2-Electronics=77704
  3-Furniture=19418
  4-Grocery=52936
  5-Books and Stationary=33468
  6-Beverages=7016
- Overall Mean Weekly average=36859
- The Mumbai Outlet has the second largest sales among all the stores.

- The sales in each department is very good with grocery and furniture being exceptional.This shows that it has perfectly utilized the advantage of the high population of mumbai.
- However when compared to Delhi,Mumbai is lagging a lot in terms of Books and Stationary which is not expected as Mumbai is known to have a high youth population.

- So to attract more youth,The outlet can provide more discounts on the stationary items(for bundle of copies).It can increase the inventory of the items which are popular among the youth.

Store 4: Jaipur

- Mean Weekly Sale from each department
  1-Clothes and Apparel=13845
  2-Electronics=26317
  3-Furniture=10470
  4-Grocery=13082
  5-Books and Stationary=16465
  6-Beverages=4244
- Overall Mean Weekly average=14070
- The Sales of the Jaipur Store is pretty low as compared to average sales among all stores for each department.
- Although most of its economy is fuelled by tourism, Jaipur is also known for its luxury textile, gems, jewelry, readymade garments, and marbles industry.

- But the sales of Clothes and Apparel is about half of the average sale among all stores in this department suggesting that the outlet is not utilizing the true potential of the textile industry.
- So firstly Jaipur should focus on clothes and apparel department.For that the store can provide Seasonal and Festival Promotions,Ensure the quality and Uniqueness in design.
- The prime focus must be to gain the **TRUST OF CUSTOMERS** by allowing easy returns,quality trademarks.Implement **Loyalty Programs** that reward repeat customers with exclusive discounts, early access to new collections, or other perks to encourage them to return.

Store 5: Lucknow

- Mean Weekly Sale from each department
  1-Clothes and Apparel=11352
  2-Electronics=23549
  3-Furniture=7635
  4-Grocery=14748
  5-Books and Stationary=13494
  6-Beverages=5146
- Overall Mean Weekly average=12654
- The Lucknow Store is currently having the lowest Sales as compared to other Stores at every department.So there is a need of improving the sales in all departments

- Similar to Jaipur,Lucknow also has a rich heritage and is famous for the embroidery industry but the Lucknow store has failed to deliver in this segment.
- So the foremost work of the store should be to increase the sales in clothes and apparel industry.For that they can follow same steps like increasing discounts/offers,customer loyalty programs etc
- Further,Lucknow store can offer the famous Chikankari Embroidery for the consumers(for which the Lucknow city is famous).

Store 6: Indore

- Mean Weekly Sale from each department
  1-Clothes and Apparel=22801
  2-Electronics=42231
  3-Furniture=19278
  4-Grocery=23961
  5-Books and Stationary=27082
  6-Beverages=5944
- Overall Mean Weekly average=23550
- As visible from the data,The average mean sale in each department is pretty average or a little below average as compared to the other store.

- So First they need to Conduct surveys, collect feedback from customers, and analyze trends to identify popular styles, colors, and preferences to understand the market audience of Indore.For example Cotton handloom is very famous in Indore,So they could provide it for low cost.
- Further to boost sales they can perform Attractive Visual Merchandising,Seasonal and Festival Promotions,Social Media and Online Presence,Customer Loyalty Programs,In-store Events and Workshops.

Store 7: Kolkata

- Mean Weekly Sale from each department
  1-Clothes and Apparel=21988
  2-Electronics=63665
  3-Furniture=16392
  4-Grocery=26775
  5-Books and Stationary=22933
  6-Beverages=5664

- Overall Mean Weekly average=26236

- The Sales of the Kolkata Store is pretty average in each department except in the Electronics department in which the sales is very high as compared to the average electronic sales among all the stores.
- Similar business and marketing strategies that were implemented in Indore can also be implemented here like Attractive Visual Merchandising,Seasonal and Festival Promotions etc.

Thank You

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