Weather and the Impact on High Street Retail

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Project overview

This project will explore the impact of weather on retail sales, both overall and stratified by product category

It will also focus on how these impacts change spatially, both within and between towns or cities, as well as between different retail platforms (e.g. out-of-town centres or online)

Aims

1) To determine what product categories are weather dependent and establish the type of relationship they present (positive/negative)

2) To examine the relationships between both weather forecasts and actual weather and the appropriate product categories

3) To examine change in consumer purchase behaviours – switch between shopping channels (physical store/online platform) – due to the weather and establish potential relationships between that switch and various demographic and spatial factors

Data

The data being used in this project comprises of two key data sets:
- Sales data from the partner company, a high street retail chain in the UK
- Meteorological data, forecast and actual, provided by the Met Office

Methods

This research will make use of advanced regression techniques such as random forest or boosted regression trees.

Exploratory research project

Short project undertaken as an internship alongside the partner company

Aim
- To determine which product categories are weather dependent and identify the nature of this relationship

Objectives
- Identify the product category sales that are most dependent on each weather condition
- Explore the nature of these relationships

Working with daily sales and weather data for 2017 in the North West of England

Results

For each of the 48 product categories, random forest regression models were run and used to evaluate the influence of each weather condition

The top weather dependent categories included:
- Skincare products
- Seasonal medicines
- Sun preps/summer accessories

The nature of these relationships could then be visualised using partial dependence plots

Example of the Premium Skincare category:

Partial dependence plots for Premium Own Brand Skincare