

BranchPulse: Automated Review Scraper and Sentiment Analyzer for UCO Bank Branches Across India

# Objective: To design and implement a highly scalable, automated system that seamlessly collects, analyses, and categorizes customer reviews from all UCO Bank branches across India. This solution is built to:

1. Efficiently gather branch URLs from Google Maps using robust web automation.
2. Extract customer reviews, ensuring comprehensive data collection from each branch.
3. Apply advanced Natural Language Processing (NLP) techniques for language translation, sentiment analysis, and topic categorization.
4. Transform raw review data into structured, actionable insights to support UCO Bank’s customer satisfaction, marketing strategies, and service quality improvements.

# Technologies Used:

* **Python (Core Programming Language)**
* **Selenium WebDriver (Web Automation)**
* **Webdriver Manager (ChromeDriver Management)**
* **Google Maps (Data Source)**
* **JSON, CSV (Data Storage)**
* **SentenceTransformer (Topic Categorization)**
* **XLM-Roberta (Sentiment Analysis)**
* **NLLB-200 (Language Translation)**
* **Torch, Transformers (Deep Learning Models**

# Technical Overview:

# Branch URL Extraction:

# Uses Selenium WebDriver to automate searches for UCO Bank branches on Google Maps across all Indian states.

# Dynamically scrolls and captures all visible branch URLs using optimized XPath and CSS selectors.

# Employs WebDriverManager for seamless ChromeDriver management, ensuring compatibility.

# Saves extracted URLs in JSON and CSV formats for flexible data access.

# Review Extraction:

# Loads URLs from the saved branch list and navigates to the review section of each branch’s Google Maps page.

# Utilizes multiple robust scrolling techniques (JavaScript, XPath-based scrolling, and scroll into view) to ensure complete review loading.

# Extracts reviewer details (name, review text, rating, date) while filtering out irrelevant content (owner responses).

# Applies error handling to bypass captcha blocks and avoid stale element errors.

# Saves the structured review data in JSON and CSV formats.

# Sentiment Analysis & Topic Categorization:

# Translates non-English reviews to English using the NLLB-200 model, ensuring all reviews are uniformly analyzed.

# Categorizes each review into predefined topics (Customer Service, Account Management, Digital Banking, etc.) using SentenceTransformer, ensuring context-aware classification.

# Analyzes sentiment (positive, neutral, negative) using XLM-Roberta with probability scores, making sentiment analysis precise and reliable.

# Automatically detects and handles mixed-script and multi-language reviews, maintaining analysis accuracy.

# Compiles the processed reviews with sentiment and topic details into a final structured CSV.

# Model Output

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Address** | **URL** | **Reviewer** | **Review Rating** | **Review Text** | **Translated Review** | **Topic Categorisation** | **Topic Confidence** | **Sentiment** | **Sentiment Score** |
| 123 Main Street, Delhi | https://www.google.com/maps/place/UCO+Bank/data... | Rahul Sharma | 5 stars | Excellent service by staff! | Excellent service by staff! | Customer Service | 0.951 | positive | 0.98 |
| 456 MG Road, Mumbai | https://www.google.com/maps/place/UCO+Bank/data... | Priya Mehta | 1 star | Long waiting time at the branch. | Long waiting time at the branch. | Branch Facilities | 0.812 | negative | 0.89 |

# Conclusion

**BranchPulse is a robust, scalable, and intelligent solution designed to transform customer feedback into actionable insights. By leveraging advanced web automation and state-of-the-art Natural Language Processing (NLP) models, it provides UCO Bank with a deep understanding of customer sentiment and service quality across all branches in India.**

**With real-time data extraction, accurate sentiment classification, and context-aware topic categorization, BranchPulse empowers UCO Bank to:**

* **Enhance customer satisfaction by identifying pain points and service gaps.**
* **Optimize branch operations and staff performance.**
* **Drive data-driven decision-making for customer experience improvement.**
* **Monitor customer sentiment trends across regions.**

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