Ottawa Restaurant report

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I. Introduction

A. Problem Bcakground

Ottawa is the capital of Canada, which is also a place full of diverse cultures. Recently, Ottawa has attracted many tourists and students with its unique scenery and quiet learning environment.

However, the number and diversity of existing restaurants cannot satisfy the rapidly growing population. Thus, many investors are preparing to invest in various restaurants to meet the growing demand.

B. Problem Description

A large restaurant chain is preparing to open its own store in Ottawa. The company needs to review the current restaurant location, and the category of these restaurants. Then, they can evaluate whether it is worth opening a restaurant in Ottawa. If they decide to open, where is the best location to start their first restaurant.

C. Project Goal

The project will analyze the distribution of the restaurants in Ottawa. Then come up with a report to show which neighborhood will be the best choice to start the first restaurant.

D. Target Audience

The restaurant company would be very interested in the analysis of restaurant distribution. Investors who are interested in investing a restaurant will also be the target audience.

II. Data

A. Data Description

As we need to analyze the restaurant distribution and explore various venues, the neighborhoods in the city of Ottawa need to be collected. First, we scrap the neighborhoods through Wikipedia page. Before we proceed to the next step, we need to clean up the obtained data. Then, we need acquire the corresponding coordinates of each neighborhood. The coordinates information will help us obtain more useful information for this project. After these steps, the data are organized in a format shown in Fig. 1:

B. Data Feature

To explore more information of Ottawa, using Foursquare api to explore the venues in each neighborhood of Ottawa. For each neighborhood, collecting the venue name and the venue category. The samples of collected data is shown in Fig. 2.

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	K1B	Ottawa	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500
1	K2B	Ottawa	Britannia /Whitehaven / Bayshore / Pinecrest	45.361676	-75.784503
2	K4B	Ottawa	Navan	45.429358	-75.470225
3	K1C	Ottawa	Orleans	45.427085	-75.545548
4	K2C	Ottawa	Queensway / Copeland Park / Central Park / Bel...	45.381048	-75.710576

Fig. 1. Sample of Ottawa neighborhoods.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500	Royal Oak	45.427109	-75.601272	Pub
1	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500	Pineview Golf course	45.423598	-75.598886	Golf Course
2	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500	Pineview Park	45.423603	-75.598869	Park
3	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500	Circle K	45.426962	-75.600981	Convenience Store
4	Blackburn Hamlet / Pine View / Sheffield Glen	45.424293	-75.598500	Pineview Pizza	45.427197	-75.601278	Pizza Place
5	Britannia /Whitehaven / Bayshore / Pinecrest	45.361676	-75.784503	Dairy Queen	45.363599	-75.790115	Ice Cream Shop
6	Britannia /Whitehaven / Bayshore / Pinecrest	45.361676	-75.784503	Biagio's Italian Kitchen	45.364543	-75.788269	Italian Restaurant
7	Britannia /Whitehaven / Bayshore / Pinecrest	45.361676	-75.784503	Wendy's	45.363739	-75.786848	Fast Food Restaurant

Fig. 2. Sample of Ottawa venues.

C. Data usage

The collected data will be used in the following way: 1. Explore the distribution of the restaurant and analyze the influence of the existing restaurants. 2. Show the influence area of each restaurant. According to this information, we can choose the locations which are not covered by the current restaurant as candidates. 3. Cluster these restaurants and analyze the restaurant category of each cluster. Then, according to the ranked restaurant category, the best restaurant type in each cluster can be selected.

III. METHOD

IV. CONCLUSION

In this paper, we proposed RAU, a lightweight attention module designed to enhance the fine-grained feature extraction ability of standard CNN architectures. The proposed RAU can help the model effectively extract discriminative features. By adding RAU to two popular standard CNN architectures, we proposed two VMMR model, ResNet50-RAU and VGG16-RAU. We conducted a wide range of experiments on three benchmark VMMR datasets, including the evaluation under different environmental conditions. The experimental results on these three challenging vehicle datasets demonstrate our models surpass the traditional VMMR models and the state-of-the-art deep learning-based VMMR models. Especially, our models have stable performance under different environmental conditions.

In addition, we proposed a one-stage VDFR model SSD-RAU to simultaneously detect and recognize the vehicle information. Our model achieves excellent fine-grained recognition performance and can be used in a real-time environment. We also conducted experiments on an object detection dataset, and the results demonstrate that SSD-RAU is also an excellent object detection model.