BIG DATA ANALYTICS FOR TOURISM DESTINATION MANAGEMENT

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**Motivation**

- **Travel behavior** refer to the actual **travel activity** of people during their **trips** such as spatial and temporal **movement patterns** of tourists.

- For examples:
  - *Where* do tourists like to visit?
  - *When* do tourists visit?
  - *What* do tourists **like** or **dislike** at each of the **visited locations**?
  - *How* do tourists **travel** between places?
  - *What routes* do they usually take?
  - *What activities and events* do tourists like to participate in?
Motivation

- Such knowledge is valuable for:
  - Policy Marker, Government Departments, Business Managers:
    - Destination management
    - Product development
    - Attraction Development and Marketing
    - Tourism Impact management
  - Transportation Planners:
    - Traffic management
    - Transportation Development.
MOTIVATION

- Popular methods for capturing travel behavior: *Survey* and *opinion polls*

- Disadvantages:
  - Time consuming
  - Limited in terms of the number of responses
  - Limited in scale of the information captured.

*Unable to provide comprehensive understanding about the locations, time, interests, movement, etc.*
PROPOSED TECHNOLOGIES

- Many photo-capturing devices now have built-in global positioning systems (GPS) technology

- Geotagged photos, with embedded time and geographical information, are shared on social networking websites such as (but not limited to):
PROPOSED TECHNOLOGIES

- The geotagged photos have:
  - **GPS tag** \((\text{latitude}, \text{longitude})\)
  - Taken **Time Stamp** \((\text{Date, Month, Year, Hours, Minutes, Second})\)
  - **Textual Metadata** \((\text{tags, description, title, comments})\), reflecting what people are interested in.
  - The **Actual Photos**, provide insight into tourist’s own experience about the entities of interest.
  - **People’s Profile** \((\text{Where they come from?})\)

Allow for *comprehensive understanding* about tourist behavior without the need of actual engagement.
DEMONSTRATION – USING FLICKR DATA
LARGE SCALE STUDY OF HONG KONG

- Photo GPS information viewed on Google Earth.
  (approximately 29,443 photos from 2,100 users)
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- Area Of Interest Identifications using Clustering
DEMONSTRATION

- **Movement Trajectory** generated from geotagged photos.
Data Driven Approach

- **Data Collection:**
  - Big data sets from Social Network such as:
    - twitter
    - Instagram
    - facebook
    - Flickr
    - tripadvisor
    - Panoramio

- **Data Analysis:**
  - Develop processing techniques for textual data (*review comments*), visual data (*travel photos*), temporal data (*travel date and time*), location data (*GPS coordinates*), etc....
  - Discover Patterns using **quantitative data analysis** (*statistics, data mining*)
DEMONSTRATION

- Tourist traffic flow Analysis
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Actual Route Taken Analysis:
From Center Mong Kok to Time Square Tower
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- Time Analysis of Tourist Activity
DEMONSTRATION: LOCATION PREFERENCE USING GEOTAGGED PHOTOS FROM FLICKR

Photo Taken by Tourist in Melbourne CBD in July 2015
Demonstration: Location Preference Using Geotagged Photos From Flickr

- Preferred Location to Take sunset photos in Melbourne
Demonstration: Location Preference Using Geotagged Photos From Flickr

- Preferred Location to take Art photos in Melbourne CBD
DEMONSTRATION: OUTBOUND LOCATION PREFERENCE

- Top Visited Cities for Australian Travelers.
QUESTIONS