

# Interactive 3D Maps

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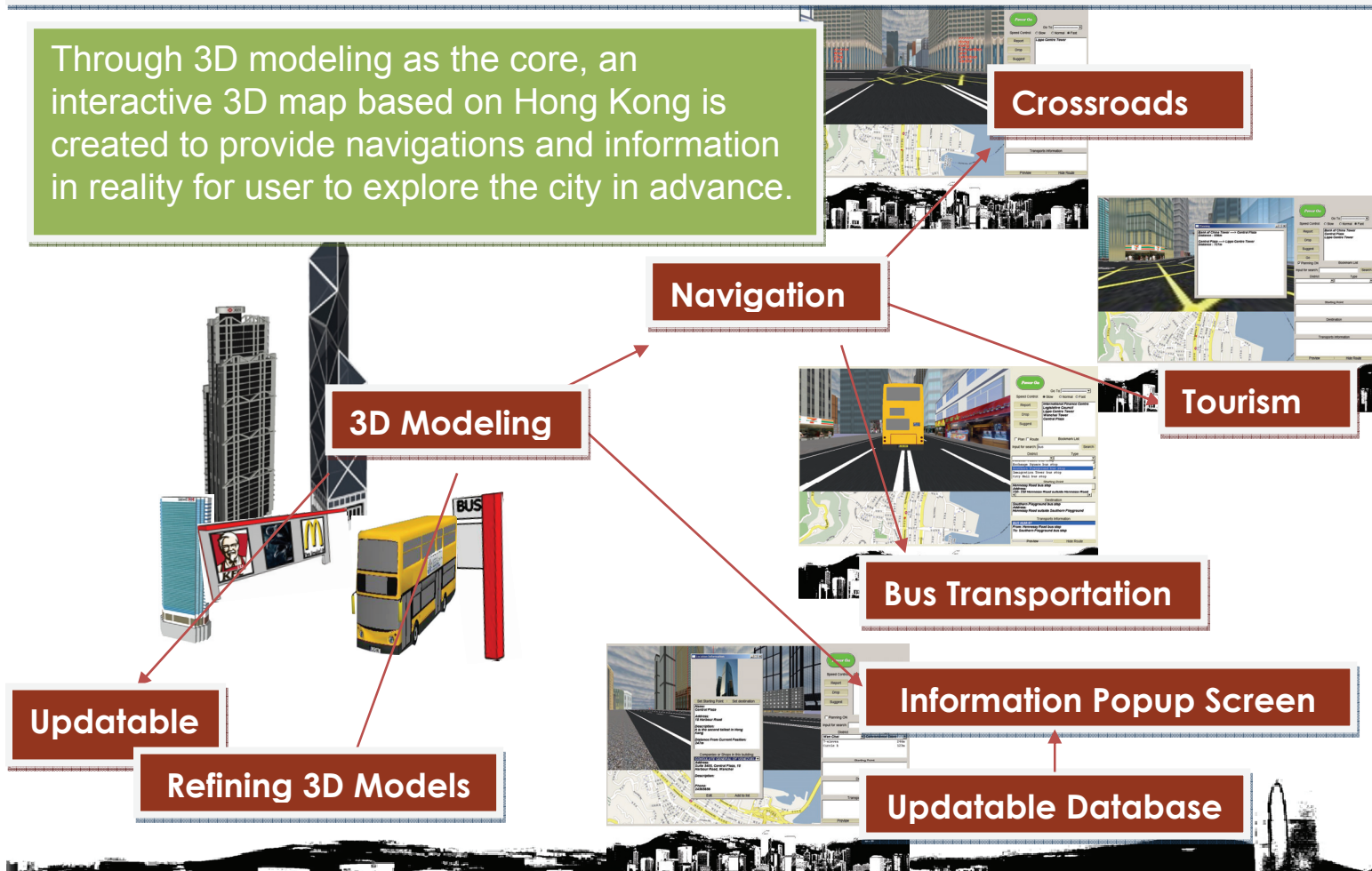
# Introduction

The road system is complicated for tourists. It is not easy for the tourists to find their interested place and go to their destinations efficiently with the 2D map.

Our project is develop to enable tourists or even locals to familiarize themselves in places of HK with complicated road systems, so that they can walk through the city by themselves with information provided from the interactive map on what buses to take, where to take and even the shops information in that location. This interactive 3D Map will become the virtual city map for tourists/locals to get most accurate information and real visualization before they travel in real.

## Interactive User Interface Overview

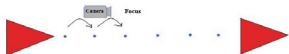
Through 3D modeling as the core, an interactive 3D map based on Hong Kong is created to provide navigations and information in reality for user to explore the city in advance.



Navigations on bus transportation and tourism planning provides user huge convenient in travelling the city with both information on transportation and shops information presented clearly, together with the interactive user interface, user can even customize the 3D map to his/her own favor.

# Implementation

## Bus Transportation Navigation



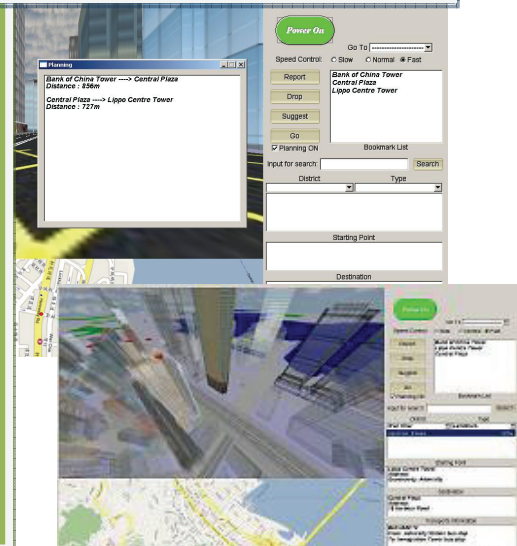
### Automatic Navigation on Bus Route

- System can suggest bus route between selected starting point and destination.
- A 3D Bus model can navigate through the chosen bus route, let user to view all environments during the bus route.
- To have a smooth navigation, the coordinates which passed by the bus are further divided into sub frames, and the camera will move frame by frame.
- In birdview mode, user can adjust the viewing angle to have a clear view of the bus route which is indicated by the red arrows.

## Tourist Planning Navigation

### User can generate a list of interested tourist spots for navigation

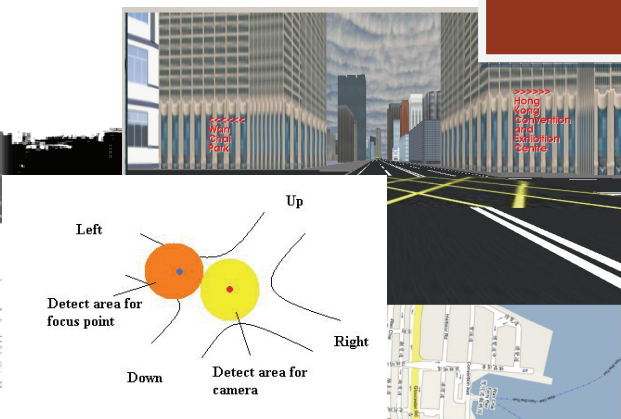
- Add the tourist spots to the list.
- System can suggest an optimal path by calculating the distance between each two points.
- Can automatic navigate follow the list one by one or pass through all at once, if it is a bus route, a bus will show, if not, no bus.
- A popup window showing the information.
- Specialize the marked tourist spots at birdview mode by transparent other building.



## Crossroads

### Show the major landmarks on left and right

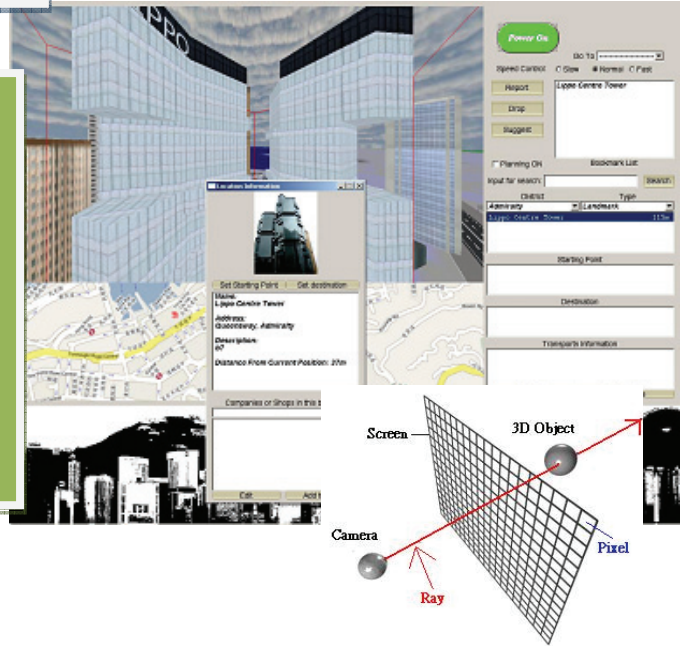
- Get the current position to determine which crossroad.
- Get the current focus position to determine the direction and the corresponding major landmark.



# Information in interactive UI

Users can obtain the information of place of interest.

- Detect the selected buildings, bus stops and shops by utilizing VTK Ray Casting function.
- The pop up information screen allows users to customize the information of the buildings.



## 3D Modeling



To increase the reality of the 3D Map, 30 new 3D buildings and some 3D models like bus, bus stops, shops, roads, and trees are added and refined according to the structure and design of the real world.

- DAE format modeling replacing the current PLY format modeling.
- Each 3D model with DAE format is able to refine the texture and key in photos taken in the real world.

## Results

A customized Hong Kong 3D Map is built with main functions of navigation in public transport, tourism and crossroad. Moreover, the user interface is built in an interactive way that user can always update or customized the 3D map with the support of updatable database.

