

Enhancing Information Discovery in the Green Deck Digital Collection with AI Technology

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Agenda

- Green Deck Digital Collection
 - Overview of Green Deck Project Development
 - Need of the Green Deck Digital Collection
 - Challenges in the content discovery
- Incorporating AI tools to enhance information discovery
 - How Gen-AI can address the challenges
 - Integrate RAG System into the Green Deck Digital Collection
 - Evaluate different LLMs to suite this Collection

Overview of Green Deck Project Development



2012
Green Deck idea
initiated by The Hong
Kong Polytechnic
University



建議在紅磡海底隧道收費廣場興建綠化平台
Proposed Green Deck over Cross-Harbour Tunnel Toll Plaza

2014
Preliminary Feasibility
Study on the proposed
Green Deck

2013-2023
Community
engagement activities



2015



2022

2019
The Green Deck project
was included in the
HKSAR Chief Executive's
Community Projects
List

2020-2023
Funding by Hong Kong
Jockey Club on a
project development
study into the
construction of a green
deck



2021

2023
HKSAR 2023 Policy
Address will consider
adopting parts of
PolyU's Green Deck
proposal for Hung Hom
revitalization.



2023

Green Deck Project Progress

Green Deck Project (2012)

- Engage stakeholders in the community through research, meetings, forums, exhibitions, and competitions to refine and promote the idea between 2013 and 2023.

Sustainability & Revitalisation

- Propose a multi-functional green deck over the Cross Harbour Tunnel Toll Plaza. Aim to create a sustainable and vibrant urban space.

Recognition & Progress

- Consider incorporating parts of the PolyU's Green Deck proposal in the Hung Hom revitalization plan in HKSAR's 2023 Policy Address.



Existing Condition



Proposed Green Deck


Need for the Green Deck Digital Collection

- According to the Project Director, the professional bodies and public are interested in learning how a community-led initiative can make influence on government policy and project adoption.
- After collecting related project materials, Green Deck Digital Collection portal has been established to provide the public with diverse resources to understand the project's development and impact.



Community Engagement Activities

[HOME](#) [RESOURCE](#) [TIMELINE](#) **[COMMUNITY ENGAGEMENT](#)** [MAP](#) [ABOUT](#)

Enter keywords 


Community Engagement

Discover the key community engagement activities and initiatives undertaken throughout the Green Deck Project Development Study.

[2013 to 2023](#) Year ▾

2023

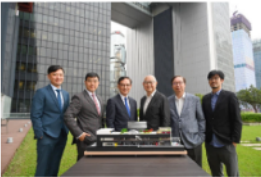
Focus Group Sessions with Green Groups and Business and Tourism Sectors
Date: 2023-06-21

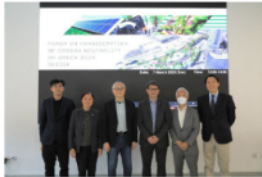
**Green Deck - A Catalyst for a Green & Vibrant Community**
Date: 2023-06-08

Exhibition cum Forum of Green Deck for PolyU staff and students
Date: 2023-05-09

Kowloon City District Council (CRDFMC) Meeting
Date: 2023-04-27

Professional Forum on Technical Challenges of Constructing a Green Deck at the CHT Toll Plaza
Date: 2023-04-13

**Meeting with Legislative Council**
Date: 2023-03-23

**Forum on consideration of Carbon Neutrality on Green Deck Design**
Date: 2023-03-07

3rd Meeting with MTR Corporation
Date: 2023-03-01


Timeline: List Events By Date

[HOME](#) [RESOURCE](#) [TIMELINE](#) [COMMUNITY ENGAGEMENT](#) [MAP](#) [ABOUT](#)

[Q](#)

Project Development Timeline

Take a look at the journey of the Green Deck Project Development Study, showcasing the resources created over time.



Turning Grey to Green: The Green Deck Project Development Study

Ventilation

A framework

Renewable

Green Deck

紅磡碼頭

增加綠化

綠化紅磡碼頭

Propose

MARCH APRIL MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. 2015 FEB. MARCH APRIL MAY JUNE JULY AUG. SEPT. 2016

2012 to 2025 [Year](#)

2025

立法會發展事務委員會：紅磡站
周邊和海濱一帶用地的初步發展建
議
Date: 2025-04-29
Category: Information and Media Coverage

紅磡站周邊和海濱一帶用地的初步
發展建議(電腦投影片簡介資料)
Date: 2025-04-29
Category: Information and Media Coverage

Legislative Council Panel on
Development: Preliminary
development proposal of sites
around Hung Hom Station and
waterfront areas
Date: 2025-04-29
Category: Information and Media Coverage

紅磡站周邊擬打造成海濱新地標，
前碼頭用地發展綜合娛樂商業設施
Date: 2025-04-25
Category: Information and Media Coverage

政府漁港研究將紅磡站臨海及前
碼頭用地打造成海濱新地標
Date: 2025-03-10
Category: Information and Media Coverage

2024

紅磡收費廣場的規劃 - 議員與詢的
口頭答覆 (Q4)
Date: 2024-12-04
Category: Information and Media Coverage

Planning of the Cross Harbour
Tunnel Toll Plaza - oral answers
to questions (Q4)
Date: 2024-12-04
Category: Information and Media Coverage

活化紅磡站及周邊用地：政府：港
鐵年底提交重新規劃研究報告，最
快明年上半年公布
Date: 2024-12-04
Category: Information and Media Coverage

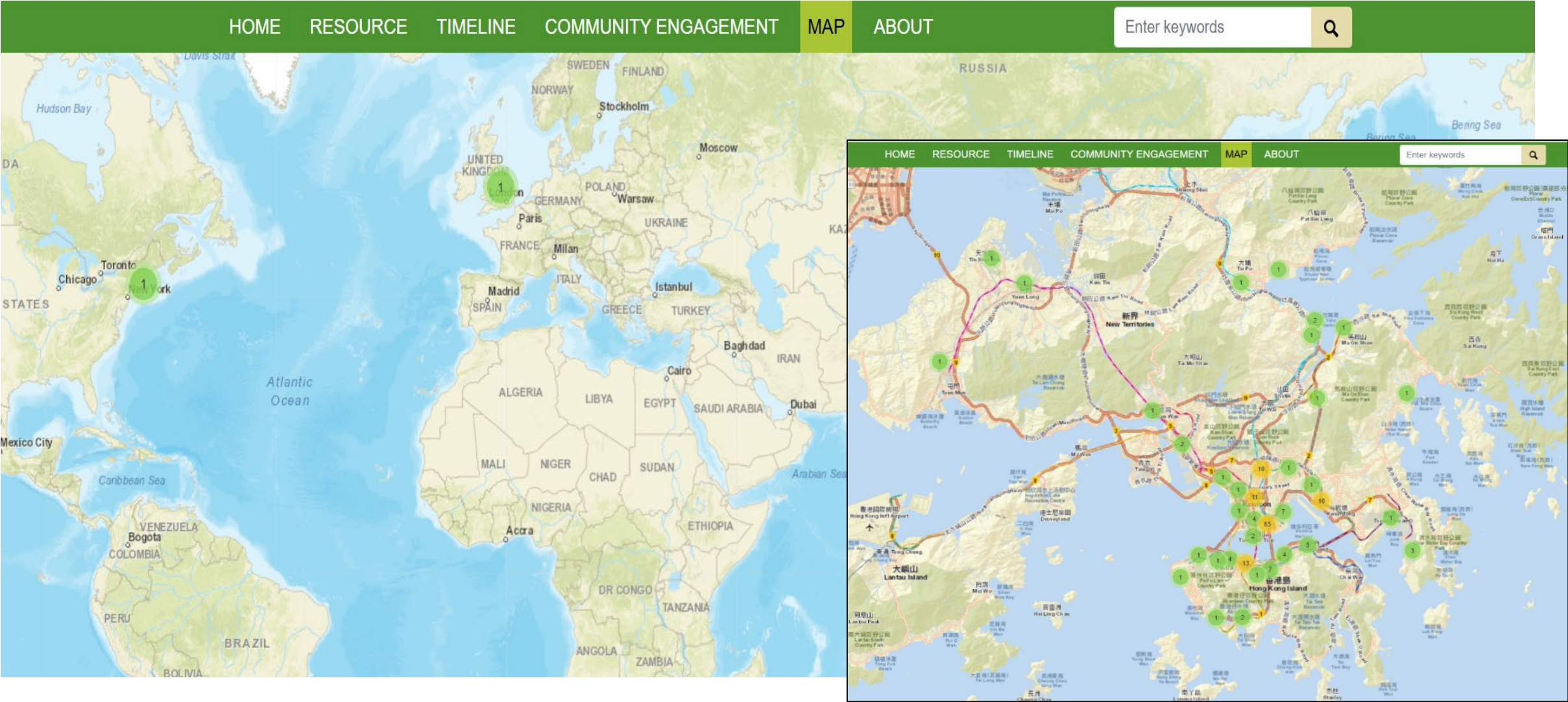
Sharing of the Green Deck
experience: a dream that makes
its way to policy formulation
Date: 2024-07-04
Category: Forum and Seminar

COST VS BENEFIT OF THE GREEN
DECK DEVELOPMENT
Date: 2024-07-04
Category: Information and Media Coverage

Survey on Public
Support to Green
Deck Project
Date: 2024-07-04
Category: Information and Media Coverage

Sharing of the Green Deck
experience: a dream that makes
its way to policy formulation
Date: 2024-07-04
Category: Forum and Seminar

Locations of Community Engagement Activity



Resources in the Green Deck Digital Collection

Text file:

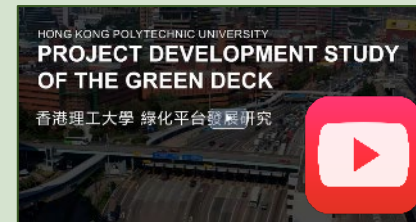
- Formal Reports
- Research Papers
- Newspaper articles (links only due to copyright restriction)

Multimedia formats:

- Exhibition Panels
- Forum Presentation Recordings
- Photos
- PowerPoint Presentations
- Promotional Flyers
- Videos

How can we extract meaningful information from the following file format?

Full-text



Challenges in the content discovery

- Limitation of traditional metadata-based searches may not fully meet the needs of users seeking in-depth understanding and detailed insights about the project.
- Extracting the details from the reports and research papers, and a wide range of information, including **multimedia, PPTs, forum recordings, flyers, and posters.**
- Multiple language support and natural language search are essential.



Incorporating *AI* tools to enhance
information discovery

How Gen-AI can address the challenges



AI-Driven Data Search

The project employs AI technology to perform in-depth searches across various formats, improving accessibility to information.

Transforming Archived Materials

Archived materials are transformed into supervised training content for AI, ensuring reliability and precision in responses.

Generative AI Refinement

Generative AI tools are utilized to refine fragmented information into comprehensive content, enhancing search result quality.

Integrate RAG System into the Green Deck Digital Collection



Retrieval-Augmented Generation

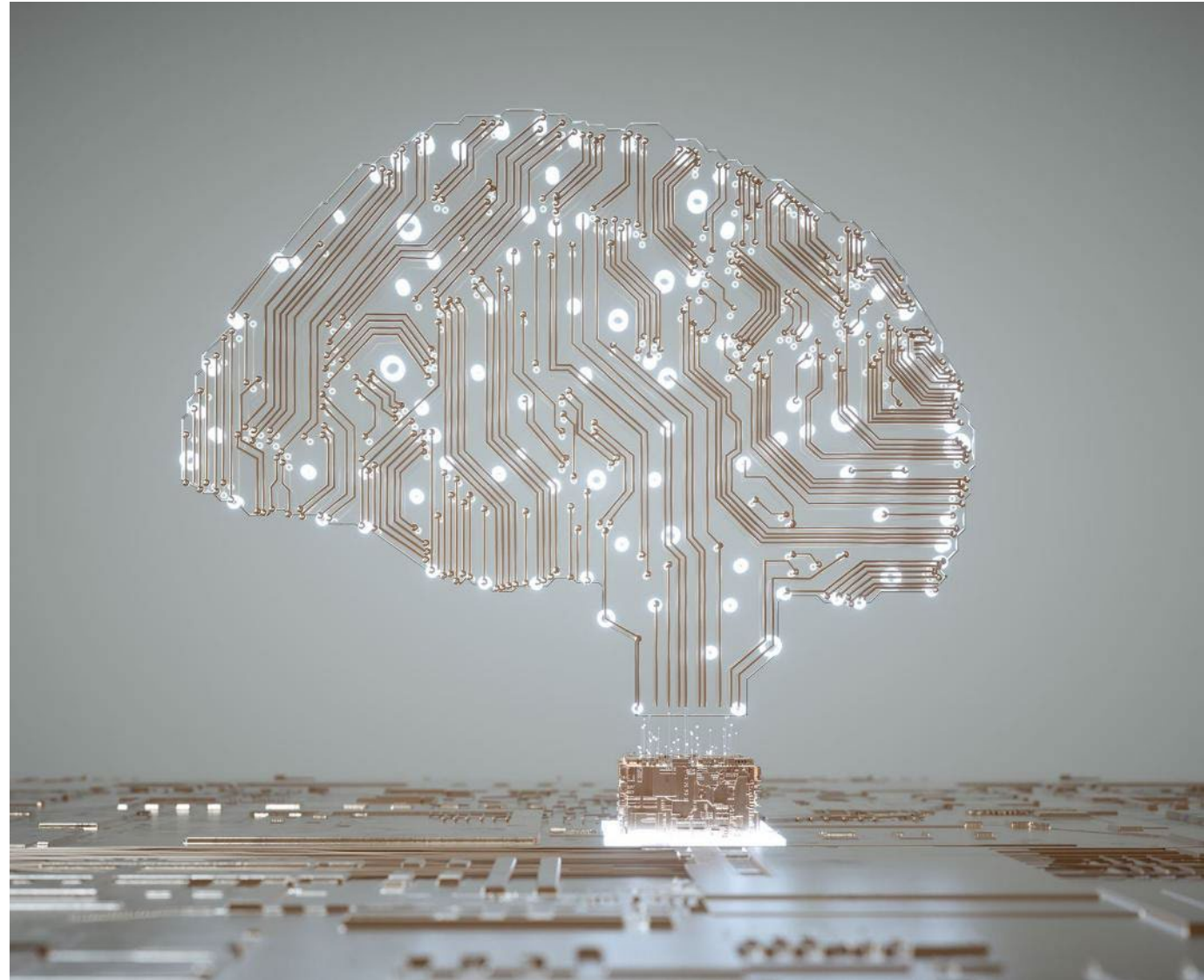
The project will incorporate a Retrieval-Augmented Generation system to enhance the functionality of the chatbot, providing better responses.

Interactive User Experience

An AI search will be created to facilitate interactive user queries, improving user engagement and insight discovery.

Limitations of LLMs in Domain-Specific AI Search

- LLMs lack access to specialized domain-specific datasets.
- Real-time information is unavailable for LLMs.
- Limited ability to update knowledge dynamically.
- Potential inaccuracies due to outdated or generic data.

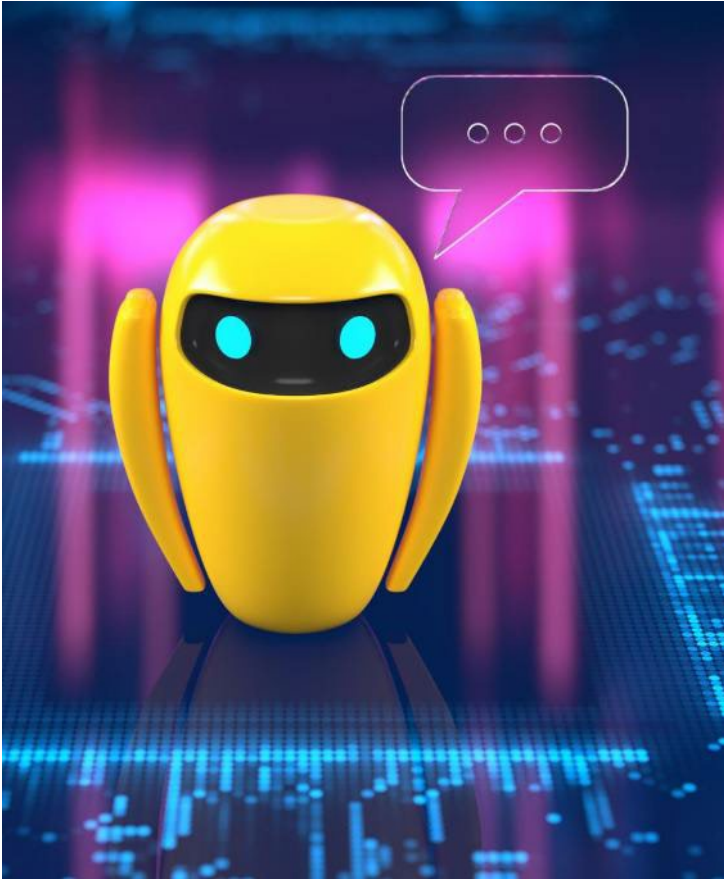


Architecture of Retrieval-Augmented Generation (RAG) System

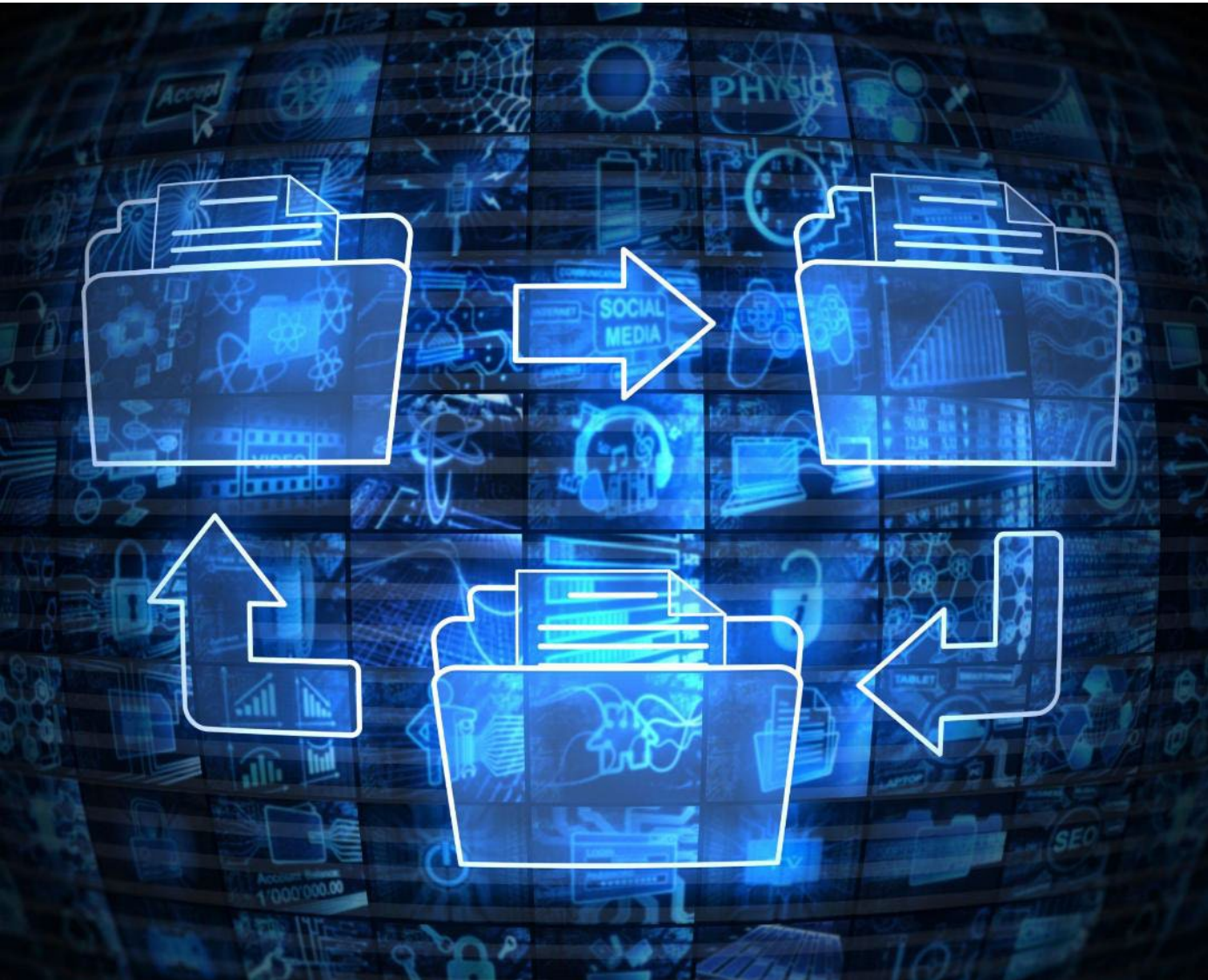
- Combines a retriever module with a generative language model for enhanced responses.
- Generative model synthesizes retrieved information into coherent, context-aware answers.
- Modular design allows integration with various data sources and LLM architectures.



Advantages of RAG System



- Enhances information retrieval by combining real-time data with AI generation.
- Improves accuracy and relevance of responses through dynamic content access.
- Supports complex queries by integrating external knowledge bases.
- Facilitates user engagement with interactive and context-aware conversations.
- Enables continuous learning and adapts to evolving user needs.



Challenges of RAG system with Multimedia Content

- RAG systems struggle to process non-text multimedia data effectively.
- Limited ability to interpret images, audio, and video content.
- Difficulty integrating diverse media formats into retrieval mechanisms.
- Potential loss of context and semantic richness from multimedia sources.
- Need for multimodal AI advancements to enhance chatbot responses.

Development of RAG System for Multimedia Content

- Generate a concise, structured summary of the entire project using AI
- Interpret multimedia content with the project summary using AI
- Enrich multimedia content
- Seamless fusion of text and multimedia information for accurate responses
- Continuously evaluate and refine system performance with real user interactions.

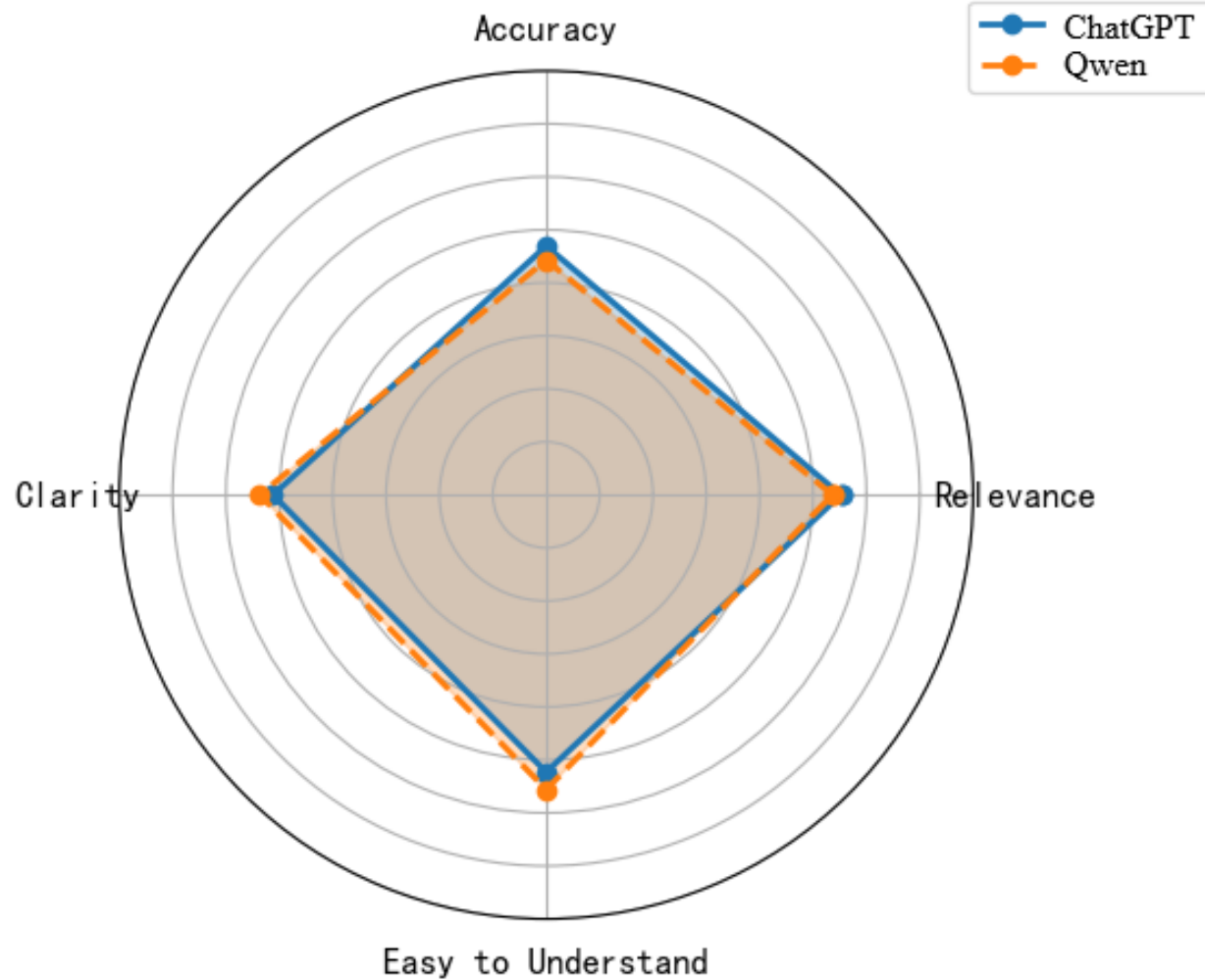


Evaluate different LLMs to suite this Collection



- Two chatbots powered by OpenAI ChatGPT and Alibaba Qwen.
- Evaluation based on 20 Short questions and 12 Long questions in English and Chinese.
- Responses rated on relevance, accuracy, clarity, and understanding.
- Reviewers are blinded to chatbot identities for unbiased scoring.

Average Performance Across All Questions



Chatbot Comparison Results & Findings

- Overall performance across all criteria is nearly identical
- ChatGPT and Qwen both perform similarly in English question
- Qwen is consistently favored for Chinese response
- Near-identical high performance – LLMs are reliably deliver stability, capability and production readiness

QWen

VS

ChatGPT

What is the estimated cost of constructing the green deck at the Hung Hom Cross Harbour Tunnel Toll Plaza?

The estimated cost of constructing the Green Deck at the Hung Hom Cross Harbour Tunnel Toll Plaza is summarized as follows based on the provided context:

Source	Estimated Cost	Notes
Context (Initial Estimate)	HK\$5 billion	Based on 1st Quarter 2014 price level
Mr. Peter CHAN's Reply	HK\$6.8 billion	Updated estimate considering project details
Mr. Alex LUI's Reply	HK\$6 billion to HK\$7 billion	Approximate range provided

Thus, the estimated cost has varied slightly across different stages of the project's development, ranging from HK\$5 billion to HK\$7 billion, depending on updated assessments and feasibility studies.

What is the estimated cost of constructing the green deck at the Hung Hom Cross Harbour Tunnel Toll Plaza?

Based on the provided context, the estimated cost of constructing the Green Deck at the Hung Hom Cross Harbour Tunnel Toll Plaza is summarized in the following table:

Item/Phase	Estimated Cost (HKD)	Remarks
Construction Cost (2014 price level)	\$5 billion	As stated in preliminary concept plan
Total Project Cost	\$6 - \$7 billion	As stated by project representatives (latest figures)
Final Cost Estimate	\$6.8 billion	As estimated by Ove Arup & Partners, includes full project scope

Summary:

- The estimated construction cost for the Green Deck is between HK\$6 billion and HK\$7 billion, with a recent figure cited at HK\$6.8 billion.
- Earlier estimates (from 2014) were approximately HK\$5 billion, but updated figures account for scope expansion and inflation.

QWen

VS

ChatGPT

在紅磡海底隧道收費廣場建造綠色平台的預估成本是多少？



在紅磡海底隧道收費廣場建造綠化平台的預估成本可以在提供的資料中找到。根據不同的資料來源，成本估算略有不同：

資料來源	預估成本	備註
2014 年第 1 季價格水平	約 HK\$50 億	原始估價
2025 年最新報告	約 HK\$68 億	成本上升，考慮通脹與調整
PolyU 回應（2019 年）	約 HK\$60 至 70 億	技術可行性研究中估算

因此，最新的預估成本約為 HK\$68 億，但實際數字可能根據通脹、設計變更和施工條件進一步調整。

在紅磡海底隧道收費廣場建造綠色平台的預估成本是多少？



根據提供的資料，在紅磡海底隧道收費廣場建造綠化平台的預估成本如下：

項目	預估成本	備註
建造成本	約HK\$6.0 - 6.89億	以2022年顧問報告及最新資料計算
初步估算（2014年價格）	約HK\$50億	只供參考，需按最新價格調整
設計及諮詢成本	約HK\$0.25億（佔4%）	以建造成本約HK\$6.89億計算
年度營運及保養成本	約HK\$0.108億（每年）	3公頃 × HK\$360萬/公頃/年

所以，紅磡海底隧道收費廣場綠化平台的總預估施工成本約為 HK\$60億 至 HK\$68.9億，最常引用的數字為 HK\$68.9億（以2022年顧問報告為準）。此不包括持續營運、保養及設計諮詢等額外費用。

Thank You!

