How Artificial Intelligence is Changing Advertising in China

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About Tencent
Tencent Has Developed into A Leading Provider of Internet Services in China

1998.11 Tencent was founded
1999.02 Launched instant messaging service-QQ
2003.08 Entered online games market
2004.06 Listed on Hong Kong Stock Exchange
2005.05 Launched social networking service Qzone
2007.06 Established Tencent Charity Fund
2009.12 Annual revenue over RMB 10 billion
2011.01 Launched Weixin
2011.06 Launched open platform strategy
2013.08 Mobile QQ and Weixin launched game centers
2013.09 Market capitalization over US$ 100 billion
2015.01 "Internet+" concept proposed by Pony Ma was included in the National Strategy Report
2017.05 Market capitalization over US$ 300 billion
2017.05 Tencent included in Fortune Global 500 Companies 2017

Developed into a Leading Provider of Internet Services in China
### 6 Business Groups Provide A Range of Internet Products

<table>
<thead>
<tr>
<th>Business Group</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CSIG Cloud &amp; Smart Industries Group</strong></td>
<td>Tencent Cloud, Tencent YouYu Lab, Tencent Auto Intelligence, Tencent Cloud &amp; Smart Industries Group</td>
</tr>
<tr>
<td><strong>WXG Weixin Group</strong></td>
<td>WeChat, Tencent Games, Tencent Animation &amp; Comics, Tencent Open Platform</td>
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<tr>
<td><strong>IEG Interactive Entertainment Group</strong></td>
<td>QQ Browser, Tencent Entertainment Group, Tencent Video, Tencent Open Platform</td>
</tr>
<tr>
<td><strong>PCG Platform &amp; Content Group</strong></td>
<td>Tencent Cloud, Tencent YouYu Lab, Tencent Auto Intelligence, Tencent Cloud &amp; Smart Industries Group</td>
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<tr>
<td><strong>TEG Technical Engineering Group</strong></td>
<td>Tencent Big Data, Tencent Data Center, Tencent AI Lab, Tencent Social Ads</td>
</tr>
<tr>
<td><strong>CDG Corporate Development Group</strong></td>
<td>Tencent Big Data, Tencent Data Center, Tencent AI Lab, Tencent Social Ads</td>
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</table>
“Connection” Strategy

- Connecting People with People
- Connecting People with Services
- Connecting People with Devices
Tencent AI Labs

- Tencent Youtu
- Wechat AI
- AI Lab

AI.QQ.COM
CASE 1 Smart Retail

Face Payment

Face recognition payment solution that empowers the retail industry

- Precise identification: 99%
- Extremely efficient: 1s
- Safe and reliable: 3D Live detection

应用场景

Self-service cash register
Small screen cash register
Mobile self-service cash register
CASE 2 Medical Imaging

Lung cancer monitoring
Locate suspicious nodules to improve the discovery rate and accuracy of early lung cancer
It has been applied to more than 60 hospitals

Pulmonary nodule detection  Lung cancer diagnosis  AI electronic diagnosis report
AI in Tencent Ads
Ads Serving – Machine Gun for a Moving Target

- Tens of billions of requests
- Hundreds of thousands of ads
- Real-time matching of the most relevant ads to users
- Supported by machine learning models trained on extremely large historical data
Intelligent Profile Understanding & Accurate User Insights

Demographics
- inherit
- location
- education
- marriage
- wealth
- employment

Device
- carrier
- network
- brand
- type
- OS
- price

Custom
- seed
- expansion
- 1-party labels

Interest
- purchasing intent
- hobby

Behavior
- travel
- App
- eCommerce
- O2O
- Ad engagement
- purchase

Vertical
- travel
- 3C
- finance
- FMCG

UID
Traditional User Definition - Manual Targeting

- Advertisers manually specify the targeting criteria.
- Boolean match during ads retrieval.

<table>
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<tr>
<th>Large number of targetable attributes</th>
<th>Advertisers manually specify the targeting criteria</th>
<th>Boolean match during ads retrieval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender, age, geo, education.</td>
<td>Interests, keywords</td>
<td>False</td>
</tr>
<tr>
<td>Marriage, employment, wealth, culture</td>
<td>Followers, APP installs, payments, engagements</td>
<td>False</td>
</tr>
<tr>
<td>Context, device, weather</td>
<td>APP, eCommerce, Search, and Social behaviors</td>
<td>False</td>
</tr>
</tbody>
</table>

Cons
- Prior knowledge
- Information loss
- Coarse graininess
- Manual optimization
Auto Targeting: Automatic User Identification by AI

- Existing leads from 1st-party data
- Previously Converted users
- User/Ad features

Multiple ways to define seed user

Targeting by machine learning models

Matching based on relevance

A change of mindset
- Targeting by user-ad relevance
Auto-Targeting: Representation Learning & ANN

**Representation learning**
Learns embeddings for users and ads; can be used during ad retrieval

**Approximate Nearest Neighbor Search**
Efficient ad retrieval based on user/ad embeddings under scalability constraints

Lookalike Expansion for Targeting: Identify Potential New Customers

**Custom audience based on known converters**
- 1st-party data
- Tencent data

**User Profiles**
- Mined user features

**Lookalike**
- Understand the commonality of the seed audience
- Find lookalike audience

**Peacock**
- Large scale distributed LDA

**Logistic Regression**
- One model per seed audience, expansion done offline

**DNN**
- Deep embedding for each seed user, expansion done online

2013 2014 2015
Static Creative is Hard to Optimize for Advertisers with Large Inventory

Challenges:
- Hit-or-miss
- Coarse-grained targeting
- Static content with no personalization
DPA: Automatic Creation, Retrieval, and Rendering of Personalized Ad Creatives

- **User**
  - Impression
  - Serving
  - Creation

- **Advertiser**
  - Product DB
  - Product targeting
  - Product retrieval
  - Online creative generation
  - Automatic creative generation
    - No need for trial-and-error optimization from advertisers
  - Fine-grained targeting
    - 100m targetable products
    - More detailed and accurate than ad targeting
  - Truly personalized
    - Different experience even for the same ad
AI Innovations by Chinese Startups
Collaboration

Kuaizi

AI Backend
Collaboration

Marketing Solution
Collaboration

Offline Data Platform
Collaboration

KOL Management
Thank you
Contact Us

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