

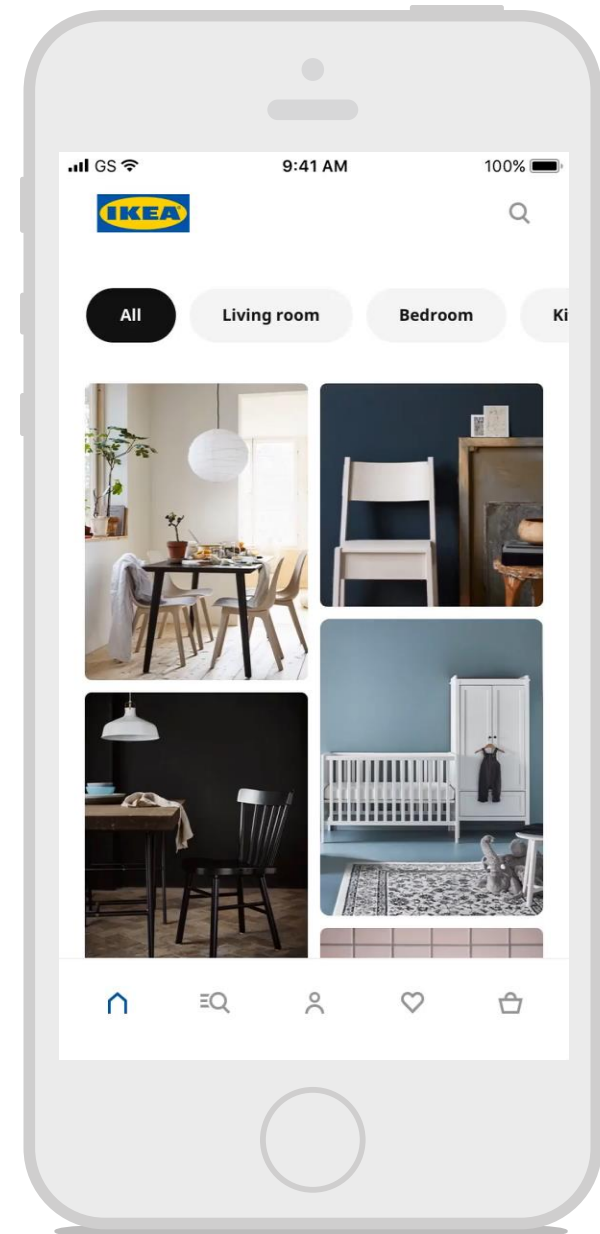
Explore-Exploit algorithms used at IKEA Recommendations

Balázs Tóth

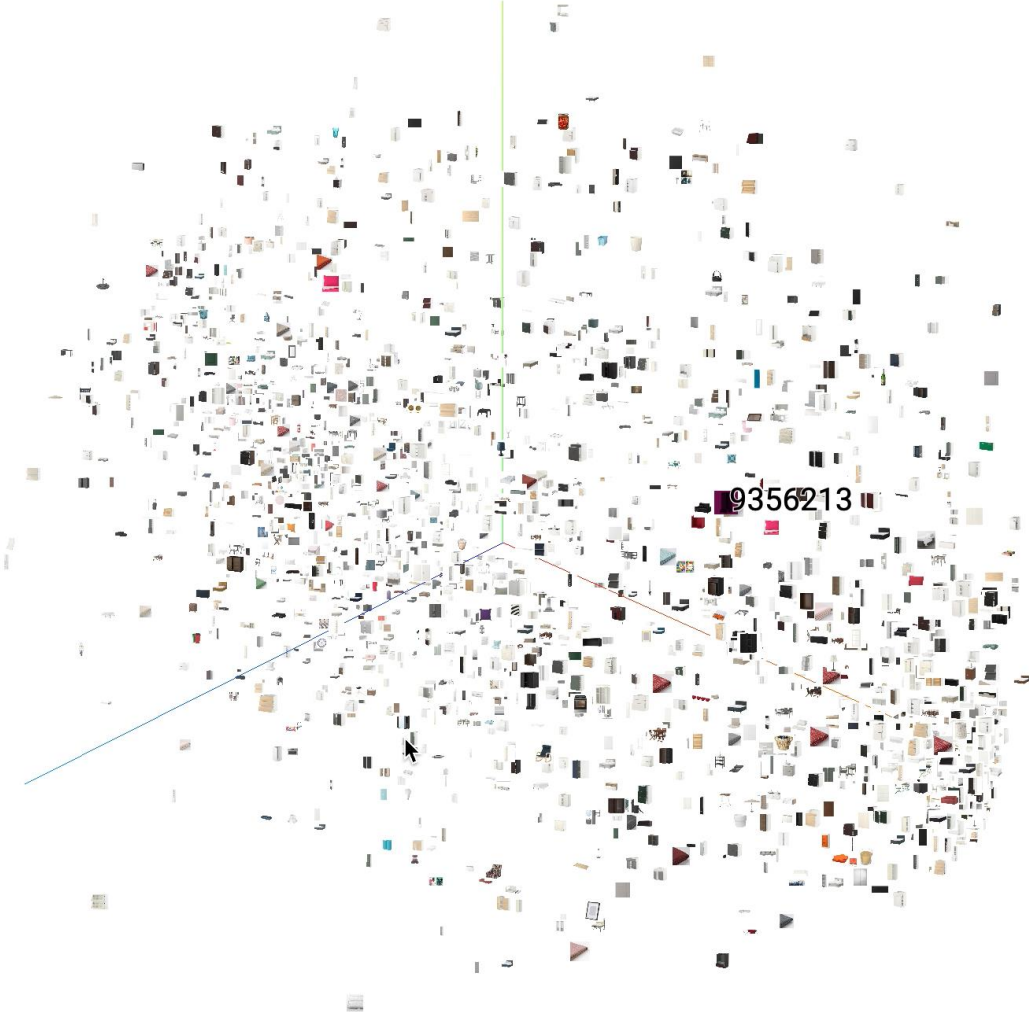
Inspiration Feed

300 million
users yearly

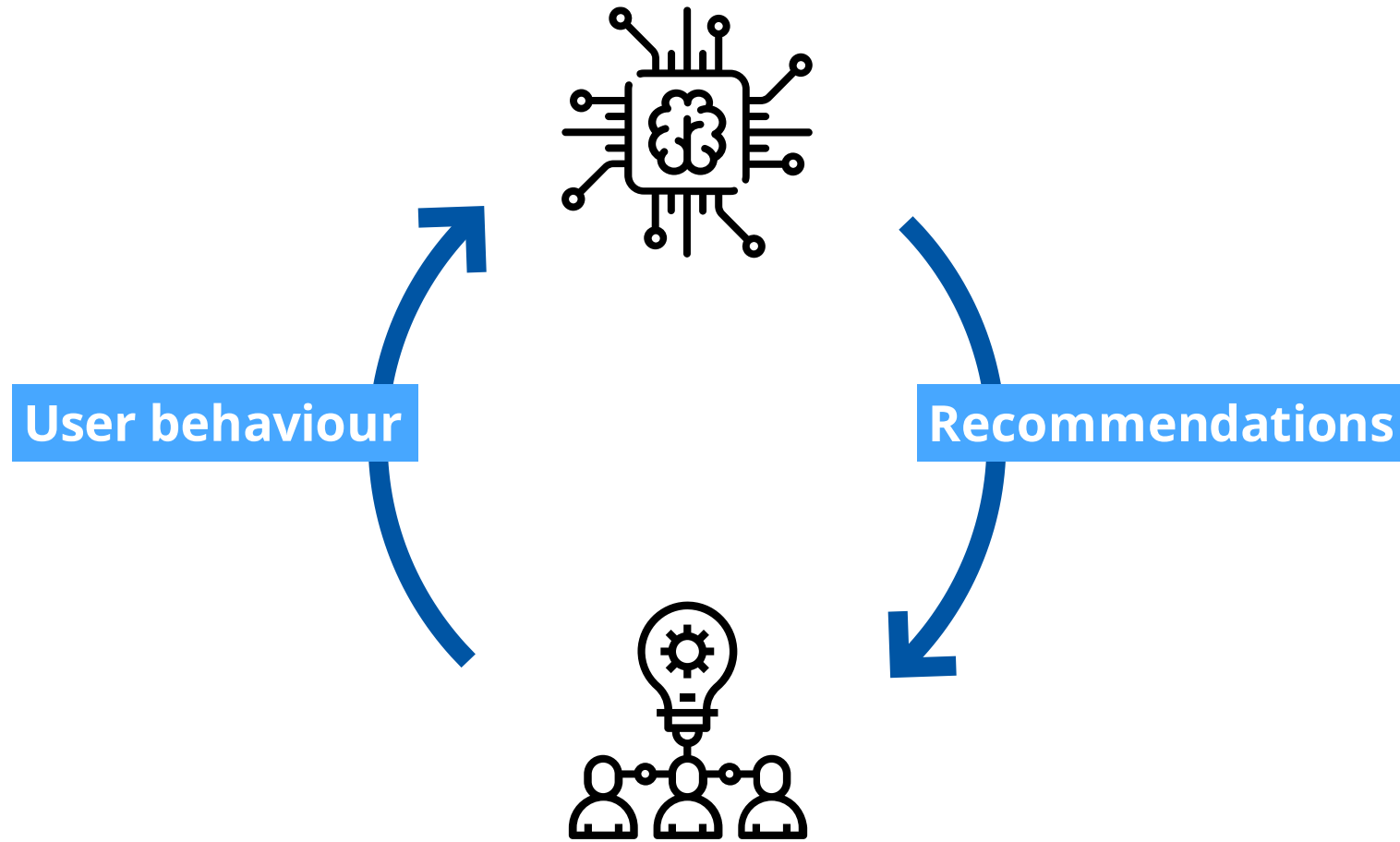
Millions of
recommendations
daily



Traditional Recommender System



Influencer System





A

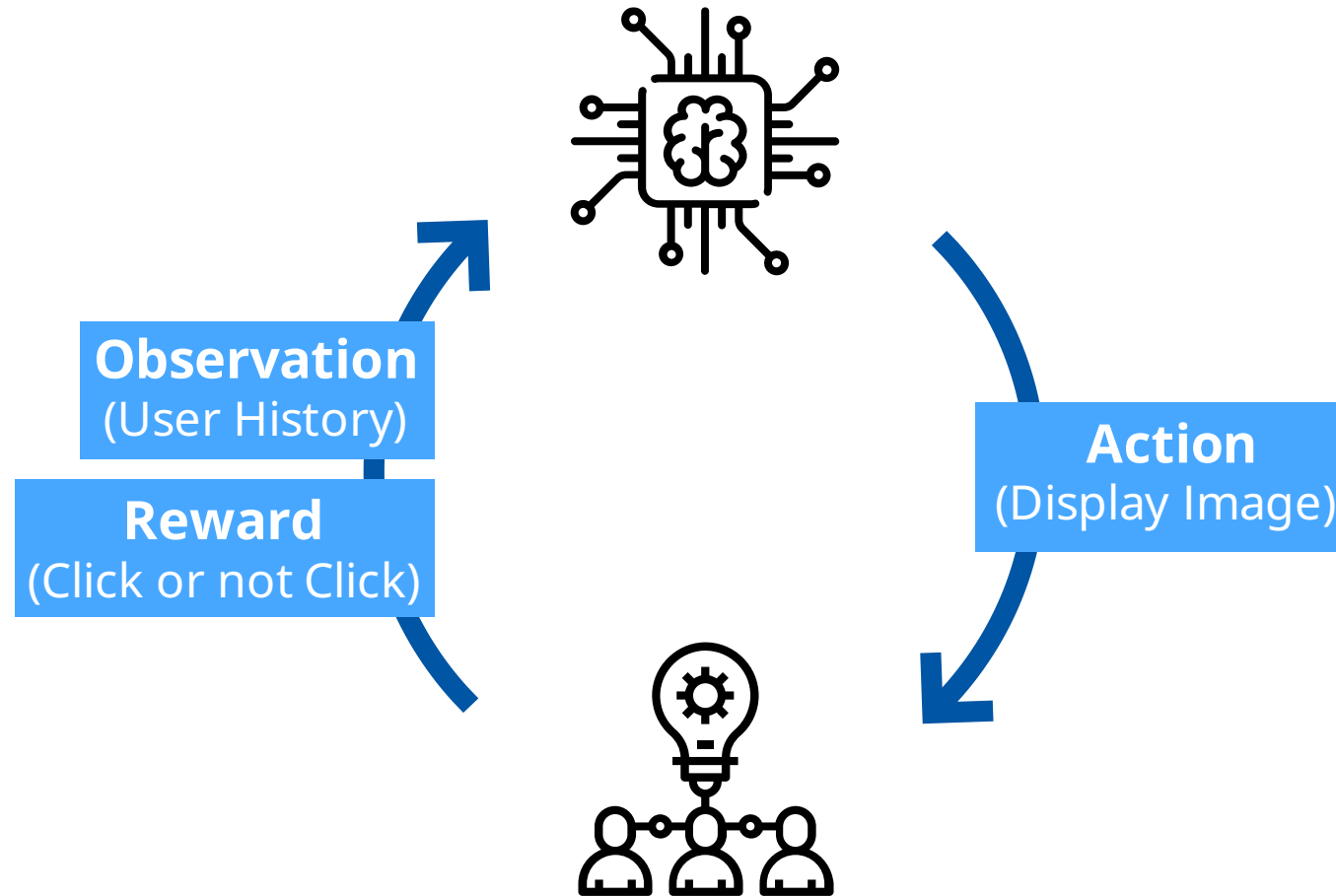


B



Never
recommended

Contextual bandits



$$Loss = - \left(\frac{1}{n} \sum_{i=1}^N \delta_i \frac{\pi_{\theta}(y_i | \mathbf{X}_i)}{\pi_0(y_i | \mathbf{X}_i)} \right)$$

$\delta = \text{reward}$ (1, 0) | $\mathbf{x} = \text{context}$ (click history)
 $\mathbf{y} = \text{action}$ (which inspiration image to show) | $\pi = \text{policy}$

Recommendations After viewing a chair



AB Test Results:

20 % increase in CTR



2 week



**2 million
unique visitors**



**6 Biggest
IKEA Markets**

Challenges

**Images that are
not clicked are
not explored**

Cold start

Delayed feedback

Challenges

Images that are not
clicked are not
explored

Cold start

Delayed feedback

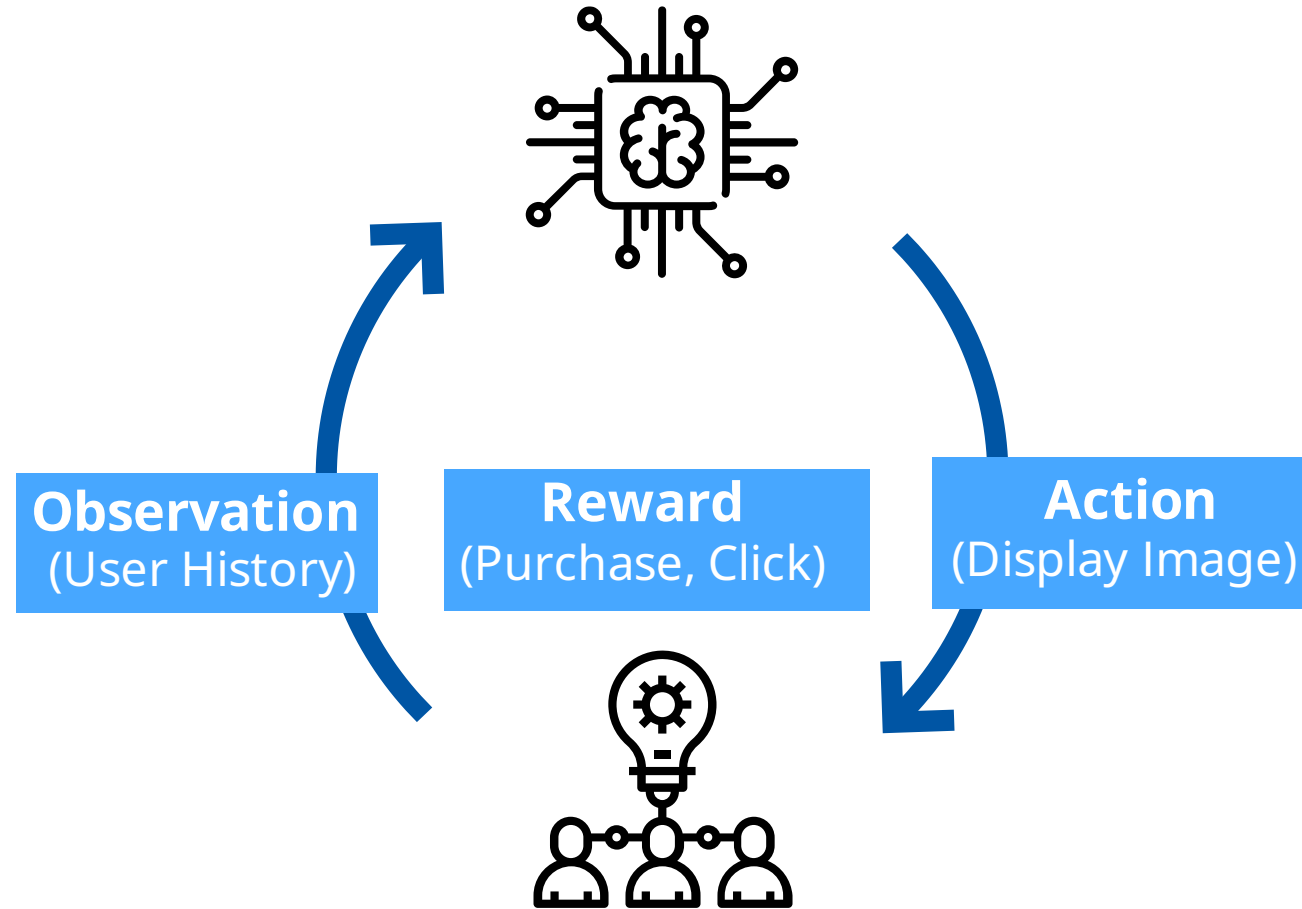
Challenges

Images that are not
clicked are not
explored

Cold start

**Delayed
feedback**

Optimization for Revenue - BCQ



Summary

**Exploration
is essential**

**Contextual Bandits
improve rec quality**

**AB Test - 20 %
increase in CTR**

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