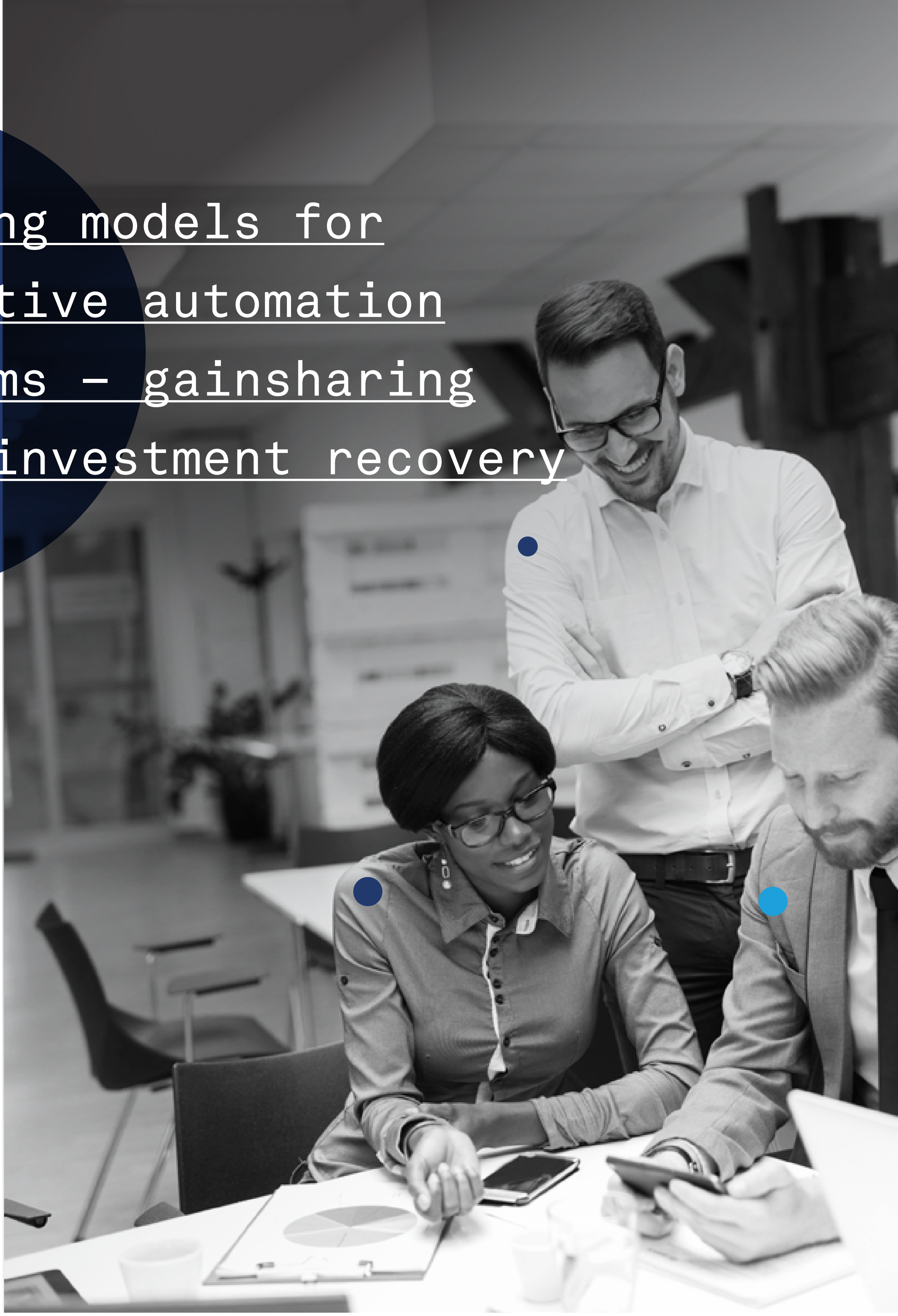
Pricing models for cognitive automation systems – gainsharing with investment recovery



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Cognitive Automation (CA) employs Artificial Intelligence (AI) and Machine Learning (ML) methodologies that often deal with understanding ambiguous inputs such as natural language texts or deriving insights from historical data to optimally predict an output by minimizing a cost function or maximizing a likelihood function. Increasingly, CA is being applied in many industry sectors. However, there are some unique challenges that exist. Firstly, data curation for generating training data is a non-trivial data scientist task. Secondly, CA systems are “best effort” and the exact cost savings they bring in cannot be clearly quantified. This has an implication on the investment by companies wanting to adopt CA. Finally, companies building CA systems find it hard to propose an attractive pricing and return on investment model for their customers due to these challenges. I shall further elaborate the same through a case study from real customer data to illustrate how an attractive pricing model can be used for building a CA system.

Gainsharing with investment recovery

A large telecom company X was looking to bring cognition into the automation of their support system – specifically auto-resolution of field service requests (SRs). The yearly volume of SRs for X is about 8000 in network products and 30000 in supply chain. The average cost to resolve an SR manually is about 5 USD in supply chain and 70 USD in network product SRs. An initial study of the SRs by the cognitive solution provider Z projected the following cost savings:

SR Categories	# Auto-resolvable	Cost Savings (USD)
Information Requests	600	42000
Licensing	720	50400
Software Known Issues	300	21000
Hardware	700	49000
Configuration	80	5600
Supply Chain	21600	108000
Total	24000	276000

Table 1: Cost savings calculation

Gainsharing with investment recovery is a method to share this cost savings between X and Z such that:

- X recovers its investment first from the savings
- Z recovers its investment next with claims to 50% savings after attributing 50% savings to X’s gain
- X and Z share the savings after their investment recovery using an agreed upon gainsharing ratio

Let’s define the variables and the algorithm steps for this pricing model.

Investment by X $=P_{x0}$, $Z = P_{z0}$

Cost of development $C_d = P_{x0}+P_{z0}$

Project timeline (months) = T $6 \le T < 12$

Principal amount for X for year i = P_{xi} $i>0$

Principal amount for Z for year i = P_{zi} $i>0$

Gain realized by X for year i = G_{xi} $i>0$

Gain realized by Z for year i = G_{zi} $i>0$

Cost of finance for Z (yearly) = r%

Savings realized every year i = S $i>0$

Savings realized first year = αS, $\alpha = \left(1 - \frac{T}{12}\right)$ $0<\alpha\le 0.5$

Gainsharing ratio = a

if $\alpha S \ge P_{x0}$

$$P_{x1}=0,\ G_{x1}=\frac{\alpha S - P_{x0}}{2},\ P_{z1}=P_{z0}\left(1+\frac{r}{100}\right)$$

gain_share_split (g=1)

while n>1

$$G_{xn}=\frac{s}{2},\ P_{zn}=P_{z0}\left(1+\frac{r}{100}\right)^n-\sum_{i=1}^{n}\left(1+\frac{r}{100}\right)^{n-i}G_{xi}$$

gain_share_split (g=n)

else

while n>0

$$P_{xn}=P_{x0}-\alpha S-(n-1)S$$

$$G_{zn}=G_{xn}=0,\ P_{zn}=P_{z0}\left(1+\frac{r}{100}\right)^n$$

if $P_{x0}<(\alpha+n)S$

break

if $S \ge P_{xn}$

$$P_{x(n+1)}=0,\ G_{x(n+1)}=\frac{S-P_{xn}}{2},\ P_{z(n+1)}=P_{z0}\left(1+\frac{r}{100}\right)^{n+1}$$

gain_share_split (g=n+1)

while k>(n+1)

$$G_{xk}=\frac{s}{2},\ P_{zk}=P_{z0}\left(1+\frac{r}{100}\right)^k-\sum_{i=1}^{k}\left(1+\frac{r}{100}\right)^{k-i}G_{xk}$$

gain_share_split (g=k)

gain_share_split (g)

if $G_{xg} \geq P_{zg}$

$G_{zg} = G_{xg} - P_{zg}$, $P_{z(g+1)} = 0$

$G_{z(g+1)} = aS$, $G_{x(g+1)} = (1-a)S$

stop

else

$G_{zg} = 0$

The examples below give a step-by-step calculation of the financials for this pricing model assuming C_d = 450000 USD, r = 10%, S = 276000 USD (from Table 1), T = 6 months (α = 0.5), a = 0.75

Year	P_x	P_z	G_x	G_z
Y_1	12000	330000	0	0
Y_2	0	231000	132000	0
Y_3	0	116100	138000	0
Y_4	0	0	138000	10290
Y_{5+}	0	0	207000	69000

Case A: P_{x0} = 150000 USD, P_{z0} = 300000 USD

Year	P_x	P_z	G_x	G_z
Y_1	0	426000	69000	0
Y_2	0	330600	138000	0
Y_3	0	225660	138000	0
Y_4	0	110226	138000	0
Y_5	0	0	138000	16751
Y_{6+}	0	0	207000	69000

Case B: P_{x0} = 0 USD, P_{z0} = 450000 USD

Year	P_x	P_z	G_x	G_z
Y_1	312000	0	0	0
Y_2	36000	0	0	0
Y_3	0	0	120000	120000
Y_4	0	0	207000	69000

Case C: P_{x0} = 450000 USD, P_{z0} = 0 USD

Case B is the most attractive for X since it has no investment requirement and the gains are produced from year one itself. The yearly cost of maintenance C_m can be factored into the model as a fixed recurring cost for X. The gainsharing ratio will be negotiated and baked into the contract after discounting all costs. In the above example, if C_m = 40000 USD, the gainsharing ratio will be a = 0.6 when no separate invoice to X for C_m is desired. There is no general rule-of-thumb for this gainsharing ratio and may vary depending on different factors.

Conclusion

The above case study can be used as a pricing guideline for customers embarking on a similar cognitive automation journey. Future work entails incorporating the savings realized from continuous assisted learning into this pricing model and also accounting for, the efforts by cognitive bots in partially resolving SRs.

About the author

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Sridharan is a technologist with over 17 years of diverse experience in software research and development (R&D), communication technologies, data science and machine learning. He has created several intellectual property (IP) assets at the intersection of business and technology.

At Wipro, he is primarily responsible for accelerating the cognitive automation transformation journey for customers through use case ideation, building minimum viable products (MVPs) and proof-of-concepts (POCs) using Wipro HOLMES™, Wipro's artificial intelligence platform. In addition, he supports targeted go-to-market (GTM) initiatives for strategic customers.

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