



**HONEYWELL
FORGE**

SMART APC SUPERVISOR

PRODUCT INFORMATION NOTE

Honeywell Forge Smart APC Supervisor is an Enterprise Performance Management solution that captures benefits above and beyond those realized by Advanced Process Control (APC). Smart APC Supervisor utilizes artificial intelligence (AI) & machine learning (ML) models and optimization techniques that provide insights and recommendations to operate underlying APC systems within their optimal ranges, increasing throughput and recovery.

WHAT IS ENTERPRISE PERFORMANCE MANAGEMENT?

EPM is a set of tools that collect, unify, and act on operational data to optimize performance, sustainability, and safety at the enterprise level.

CHALLENGES

- Adjust process and APC parameters with changes in plant operations and feed quality
- Utilize past changes in plant operations to drive adaptive optimization models
- Drive global optimization over the entire process as opposed to individual units

The diagram to the right shows the operational flow of data when Smart APC Supervisor is integrated into a process. Smart APC Supervisor sits above the existing APCs and utilizes AI/ML models along with an optimization engine to provide recommendations on setpoint and operating limit changes to the system.

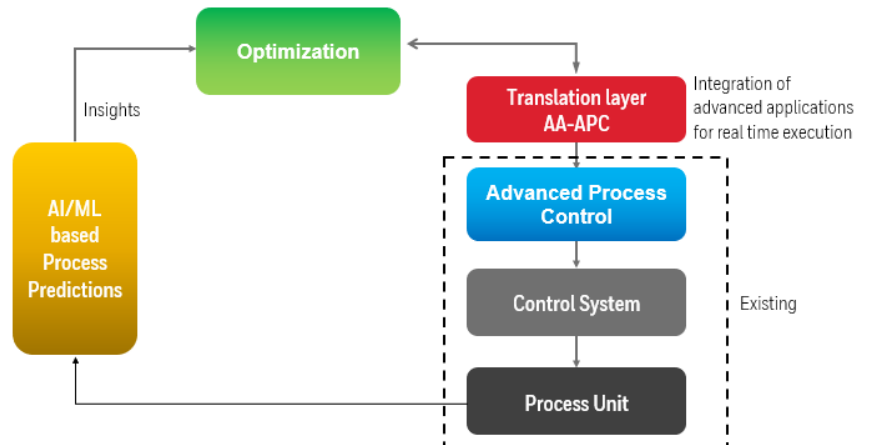
SOLUTION

Smart APC Supervisor is a supervisory-level optimization solution based on machine learning models and optimization techniques that provide optimum targets to underlying APC controllers.

Key Capabilities

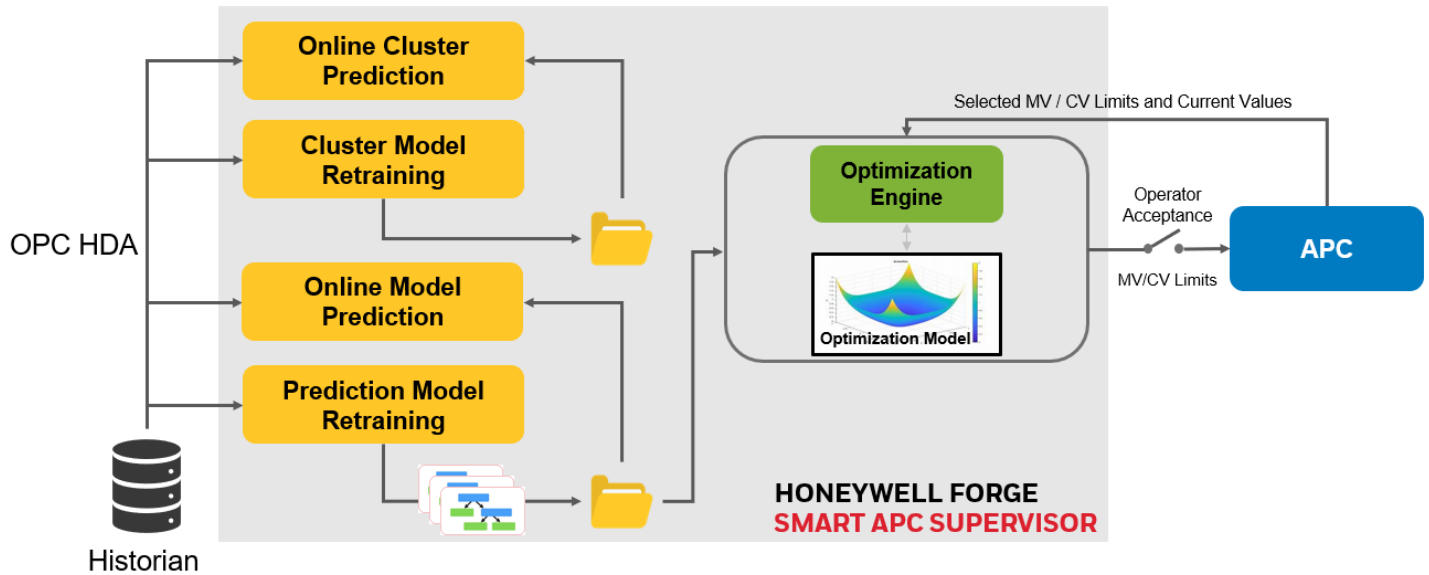
- Machine learning models are used to reduce human dependency and provide adaptive and optimal targets to APCs
- Can be implemented regardless of existing APC vendor
- Built on Honeywell domain expertise, Smart APC Supervisor deploys pre-defined analytics with standard architecture, resulting in fast deployment times and accelerated time to value
- AI/ML model-based prediction, clustering, and optimization. Models relearn at defined frequency to ensure relevant predictions and provide suggestions based on the most recent conditions and operating data
- Applicable to all base / precious metals applications to drive full mine-to-mill optimization

Conceptual Data Flow



Functional Architecture

The following figure illustrates the functional architecture of Smart APC Supervisor. Plant data is read from a site historian for all input variables needed by the prediction models to predict the target variables and by the clustering models to determine the present cluster of operation. Historic data is used for training and retraining these models. The optimization technique is constrained non-linear optimization, which provides optimum targets to the underlying APCs.



Benefits

Honeywell Forge Smart APC Supervisor results in accelerated time to value by:

- Faster response to on-going process changes like ore grade change (feedstock)
- Scalable solution that can be added as a module over existing APCs with a predefined analytics engine and architecture
- Manages complex interactions between multiple process units to reach the global optimum, not just the individual units
- Proven solution with typical results including a 2% Increase in throughput and/or 1% improvement in recovery

Operator Control

Smart APC Supervisor helps to reduce the workload on the operator by providing adaptive tuning and recommending optimal ranges for the APCs.

The end-user validates the recommendations provided by Smart APC Supervisor. Once approved, the updated limits are downloaded to the APC. Smart APC Supervisor tracks and monitors realized benefits for easy value recognition.

Connectivity

Honeywell Forge Smart APC Supervisor is compatible with any Distributed Control System (DCS). This product works with any existing APC applications and control systems (Honeywell or third-party).

Support Services

This product comes with worldwide, premium software support services through our Benefits Guardianship Program (BGP). BGP is designed to help our customers improve and extend the usage of their software application and the benefits they deliver, ultimately maintaining and safeguarding their software investment.

Var #	Tag Name	Description	Var Type	Mode	APC	APC Mode	APC Var Mode	APC Read Value	APC Low Limit	APC High Limit	Smart APC Low Limit	Smart APC High Limit	Optimum Value	Move	Recommendation	Accept
1	SMI-SAG.XP01_L02	sag1_hot_pressure	CV	ON	PSAG1	ON	GOOD	859.17	766.83	888.00	650.00	1000.0	846.70	46.984	TRUE	<input type="checkbox"/>
2	SMI-SAG.XE03	sag1_power	CV	ON	PSAG1	ON	GOOD	8.3445	6.8159	11.033	5.0000	12.000	8.8444	-0.8352	TRUE	<input type="checkbox"/>
3	SMI-SAG.PEBBLE3_S1	sag1_solids	MV	OFF	PSAG1	ON	ON	68.296	1.9938	80.000	100.00	500.00	295.17	0	FALSE	<input type="checkbox"/>
4	SMI-SAG.X504	Velocidad Sag	MV	OFF	PSAG1	ON	ON	8.4530	1.6058	9.3400	7.0000	10.000	8.9871	0	FALSE	<input type="checkbox"/>
5	SMI-SAG.FY2150	sag1_solids	MV	OFF	PSAG1	ON	ON	68.296	1.9938	80.000	70.000	80.000	78.969	0	TRUE	<input type="checkbox"/>
6	SMI-SAG.J2162A	Patencia Molino	CV	OFF	MB411	ON	GOOD	4.1391	3.7200	4.5400	3.0000	5.0000	4.4236	0	FALSE	<input type="checkbox"/>
7	SMI-SAG.LK2162A	Nivel Cuba	CV	OFF	MB411	ON	GOOD	37.282	19.493	38.980	30.000	100.00	23.196	0	FALSE	<input type="checkbox"/>
8	SMI-SAG.PI2208C	Presión Batena HC	CV	OFF	MB411	ON	GOOD	6.3406	33.910	39.890	5.0000	12.000	26.070	0	FALSE	<input type="checkbox"/>
9	SMI-SAG.DT2188A	Porcentaje de Solido	CV	OFF	MB411	ON	GOOD	67.650	60.900	74.400	45.000	75.000	5.8218	0	FALSE	<input type="checkbox"/>
10	SMI-SAG.250_AIT_PSI_411	Granulometria +100µ	CV	OFF	MB411	ON	GOOD	23.300	21.000	25.700	30.000	100.00	66.910	0	FALSE	<input type="checkbox"/>
11	SMI-SAG.FIC2188A	Agua a la Cuba	MV	ON	MB411	ON	ON	293.00	279.00	319.70	200.00	500.00	286.49	-18.213	TRUE	<input type="checkbox"/>
12	SMI-SAG.FIC2185A	Agua al Molino	MV	OFF	MB411	ON	ON	11.500	11.000	12.200	10.000	40.000	11.871	0	FALSE	<input type="checkbox"/>
13	SMI-SAG.J2162B	Patencia Molino	CV	OFF	MB412	ON	GOOD	4.1989	1.6433	4.8000	4.0000	6.0000	4.4430	0	FALSE	<input type="checkbox"/>
14	SMI-SAG.LK2162B	Nivel Cuba	CV	OFF	MB412	ON	GOOD	38.600	31.302	39.902	30.000	100.00	36.481	0	FALSE	<input type="checkbox"/>
15	SMI-SAG.PI2208C	Presión Batena HC	CV	OFF	MB412	ON	GOOD	6.0400	5.4300	6.6400	4.0000	9.0000	5.6872	0	FALSE	<input type="checkbox"/>
16	SMI-SAG.DT2188B	Porcentaje de Solido	CV	OFF	MB412	ON	GOOD	67.200	60.349	73.749	45.000	80.000	68.968	0	FALSE	<input type="checkbox"/>

	Source	Time	Message	Severity	Condition	AckRequired
1	SMI2_en@SAG1@SAG1	7/16/2021 11:10:14 AM	Target value is predicted and written the result successfully	INFO - LO		Info
2	SMI2_en@SAG1@SAG1	7/16/2021 11:10:14 AM	Data cleaning is done and written the cleaned data file at C:\ProgramData\Honeywell\Profit\Suite\SmartAPCSupervisor\...	INFO - LO		Info
3	SMI2_en@SAG1@SAG1	7/16/2021 11:10:14 AM	Validation of raw data and metadata is completed. No errors found.	INFO - LO		Info
4	SMI2_en@SAG1@SAG1	7/16/2021 11:10:14 AM	Reading of raw data and metadata is completed successfully.	INFO - LO		Info

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For More Information

Learn more about how Honeywell Forge Smart APC Supervisor can fit your operations, visit [Advanced Process Control](#) or contact your Honeywell Account Manager.

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