Rulex Robotic Data Correction™

AUTOMATICALLY FIND, FIX, AND PREVENT DATA ENTRY ERRORS

The Problem with Humans

Human data entry is a critical element of the standard workflows in most enterprise business and operations processes, but even the most experienced workers can, and do make mistakes when entering data into even the most familiar software applications.

Data entry errors result in higher costs, reduced efficiency, and increased risk in key processes, negatively impacting everything from timely customer deliveries to safe and effective medical care. Some erroneous entries can be corrected through costly expert human oversight before they can affect the system, but many cannot, due to the complexity of interdependent relationships between different data fields. Those errors can typically only be found once they have caused problems.

Many organizations grossly underestimate the prevalence of human data entry errors in their mission-critical systems, with actual error volumes 5-10 times greater than their estimates for established applications and workflows. Also, not surprisingly, companies replacing experienced workers with off-shore services firms or less experienced new employees to perform data entry usually see a steep, rapid rise in data entry errors and their impact on business and operational effectiveness.

EXAMPLE: VENDOR SHIPPING METHOD

Acme Music sells musical instrument which can be small or large and inexpensive or expensive. The correct shipping method for each instrument depends on weight and price.

As the shipping clerk prepares for shipment of those items, he or she is responsible for selecting the shipping method for each item that is most appropriate in terms of insurance and freight charges.

In the following list of shipments, the highlighted values entered by the shipping clerk for the Shipping Method are incorrect, with the last column showing the correct choices for each item.

Product Name	Instrument Type	Weight Lbs.	Price	Selected Method	Correct Method
Blues Baby	Harmonica	1	$20	Post	Post
Parlor Player	Acoustic Guitar	6	$300	Parcel	Parcel
Multi-Scale	Harmonica	3	$75	Parcel	Post
Gigster	Electric Keyboard	20	$1,200	Post	Parcel
Metal Master	Electric Guitar	12	$800	Freight	Parcel
Virtuoso	Baby Grand Piano	800	$11,000	Freight	Freight
Concerto	Full Grand Piano	1200	$25,000	Parcel	Freight

Left uncorrected, these errors can result in a delay due to the shipper declining receipt of the item, or a financial loss due to a lost accepted shipment being uninsured.

An experienced, long-tenured shipping clerk who is familiar with the products being shipped and with the features of each possible shipping method will not make many such mistakes, but a new clerk, without such experience and knowledge, is very likely to make many such data entry errors. And, in a real-world company with a larger, more complex product line, even the most experienced personnel will not be able to learn all the *rules of thumb* needed to ensure the correct choices every time.

The Cost of Data Entry Errors

One single, simple error can have a cascading, costly, and sometimes catastrophic business impact. In the Supply Chain, an erroneous routing code in a major shipment can cause goods to be shipped to the wrong location, with rerouting adding to transportation costs and creating a fulfillment delay that could be many thousands of dollars in SLA penalties. And if that shipment also contains any incorrect product codes, there will be additional transportation cost, as well as costs for manpower and cycle time for returns processing and inventory management. For a large manufacturer, one typo can cost hundreds of thousands of dollars.

To avoid such costly problems, the only solution has been manual data review and correction, an expensive and time-consuming process that leaves many errors undetected. For one large manufacturer studied, manual error corrections consumed more than 30,000 manhours annually, at a cost of more than one million dollars per year!

What's the Frequency?

Most large enterprises vastly underestimate the frequency of data entry errors in their operational applications - often by 300% or more - because the number of errors they can find and correct manually or with data analysis software is but a small fraction of the total number of entry errors that exist in the system.

A single application like SAP ERP can have hundreds of screen forms, with at least 5-10 entries per form being filled in by hundreds or even thousands of different operations workers daily, creating an opportunity for many tens of thousands of entry errors every day. Even the most competent, experienced employees who is making hundreds of entries per day has a high probability of making many more mistakes than expected.

For most large enterprises, the daily frequency of new, undetected data entry errors in operational applications systems is well over 10%, and for some can be as high as 25%.

Why Can't MDM Solve the Problem

Master Data Management software operates on references to static data assets, like customer and product database records, with the goal of ensuring agreement between all instances of the same information. This is called the "Single Version of the Truth". In such systems, record entry errors can be easily caught and corrected because the error pattern exists between different instances of comparable static records.

Applications forms entry errors are not static. They are individual, sometimes temporary data values that are logically, not structurally related to other data values in the same form and elsewhere, often in very complex, indirect, and transient ways.

The statistical, record-oriented batch processing done on highly structured reference data by MDM systems cannot find or fix these kinds of errors. It is the wrong tool for the job. This is a job for Rulex AI.

Rulex Robotic Data Correction to the Rescue

Rulex Robotic Data Correction (RDC) is a turn-key AI-based solution for the automated correction of data entry errors in transactional and operational systems for Manufacturing, Finance, Insurance, Healthcare, Retail and other industries that rely heavily on human-entered codes and data values for controlling and executing key business processes.

Rulex RDC analyzes historical business and operations data and automatically discovers patterns in the data that reveal the logical rules for what the correct entries should have been, and then uses those rules to find and fix incorrect entries in existing and newly created data.

For Acme, the example music distributor, Rulex RDC first discovers shipping method rules like these.

- If Price < $100 and Weight < 10 lbs, Shipping = Uninsured Post
- If Price ≥ $100 or Weight ≥ 10 lbs and Weight ≤ 100 lbs, Shipping = Insured Parcel
- If Weight > 100 lbs, Shipping = Insured Freight

Then, Rulex RDC applies those rules to the new orders in the shipments table and automatically changes the entry errors to the correct values, as shown in the last column of the table above.

Rulex RDC in the Real World

Rulex RDC is a general-purpose AI that can find and fix many kinds of data errors on a massive scale in a wide variety of industries, including the following plus many others:

- Materials, plants, product types, network routes, and shipping addresses for ERP.
- Damage classes, coverage limits, and repair authorizations for Insurance Claims.
- Authorizations, processors, and regulatory clearance for Financial Transactions.
- Diagnoses, procedures, prescriptions, and equipment for Medical Records.

Such errors are the result of human mistakes in selecting, reading, or typing the correct values required in various applications process forms. These items are typically entered into the system by operational personnel who might select them from a drop-down list in an application, look them up in an electronic or physical dictionary, copy and paste them from a web page, or type them in from memory or based on judgement.

Rulex's Robotic Data Correction software uses Artificial Intelligence to automatically detect data entry errors when and where they occur, and to automatically correct them before the data is used by other processes. And RDC also enables process experts to easily review and approve all proposed corrections before they are performed in the system.

Let the Robot Do It

RDC uses Rulex's unique proprietary machine learning algorithms to automatically discover erroneous data entries and to predictively correct them. Unlike conventional machine learning techniques, which requires deep, ongoing data science skills in math, statistics, and programming, Rulex machine learning can be set up by existing enterprise data experts with limited training. And unlike other data cleansing solutions, which require the introduction of complex data manipulation and new software programming to many business processes, Rulex Robotic Data Correction is highly transparent, offering fast push-button operation by business end-users within the familiar Microsoft Excel interface, with no learning curve whatsoever.
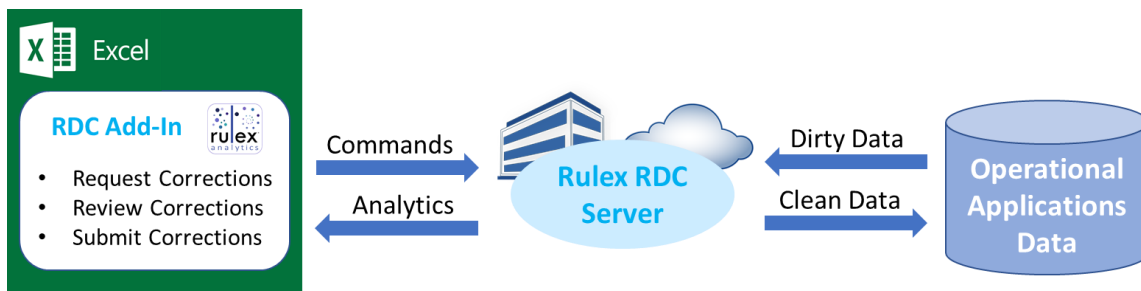
Using RDC is easy. Rulex provides a simple Microsoft Office add-in for Excel 2016 on the user's desktop system that creates a tool ribbon containing controls for operating Rulex

Robotic Data Correction. The RDC add-in communicates with the Rulex RDC server, on-premises or in a private cloud, and the RDC server exchanges data with databases used by the target application, ERP, for example.

The RDC add-in serves as a user dashboard for controlling and monitoring the data correction process. It does not download any enterprise data, nor does it do any data processing or manipulation in Excel. The Rulex AI server does all the work of getting the data, finding the errors, predicting the corrections, and updating the applications data.

To perform data correction, typically on a daily basis, an operational worker with general knowledge of the applications data to be corrected uses the RDC Excel add-in controls to correct thousands of errors with just five simple steps:

1. Start a new correction session
2. Review RDC's proposed corrections
3. Accept, deny, or edit corrections
4. Commit applications data changes
5. Finish the current correction session

Rulex Robotic Data Correction is proven to be fast, reliable, and highly scalable, with its first user, a F50 manufacturing company, now using RDC on a global scale to make tens of thousands of supply chain data corrections every day.

And Rulex RDC is very affordable, with a fast time to business value and no long-term lock-ins.

- RDC is available on a subscription basis.
- RDC can show provable business value within weeks.
- RDC does not require changes to databases, applications, or business processes.

Do you need a solution like Rulex Robotic Data Correction? Probably. But how can you be sure? Rulex AI can tell you that, too.

An Audit You Will Want

You may not know how many errors are lurking in your company's data, but you probably think there are fewer than there really are, and that means your related business risk may be higher than you think.

Would your company like to find out how many errors you have in your operational data, where they are, and what they are? You can, with a Rulex RDC Operational Data Audit.

A Rulex specialist will use our proprietary AI to rapidly analyze your historical data and show you:

- How many errors do you have?
- How many kinds of errors do you have?
- What is the error frequency in the data set?
- What are the most common types of errors?

The RDC Operational Data Audit is fast and inexpensive, and it will quickly show you how much money you can save by using Robotic Data Correction to automatically find and fix the errors already in your data, and correct new data entry errors when they happen. The Audit will also provide actionable operational intelligence about where in the business the errors are occurring and what their potential impact might be.

To find out more about Rulex Robotic Data Correction and the Operational Data Audit, please visit www.rulex.ai/RDC.