

REDESIGNING COMPLEXITY

AT PFIZER



Complexity describes how difficult a particular clinical trial is to run. With **relevant and accurate complexity metrics**, Pfizer Global Clinical Supply (GCS) can **optimally allocate limited resources** among hundreds of clinical trials.

Input

- manual entry
- supervised automatic entry

Model

- normalized averaging
- area specific calculation
- overall score

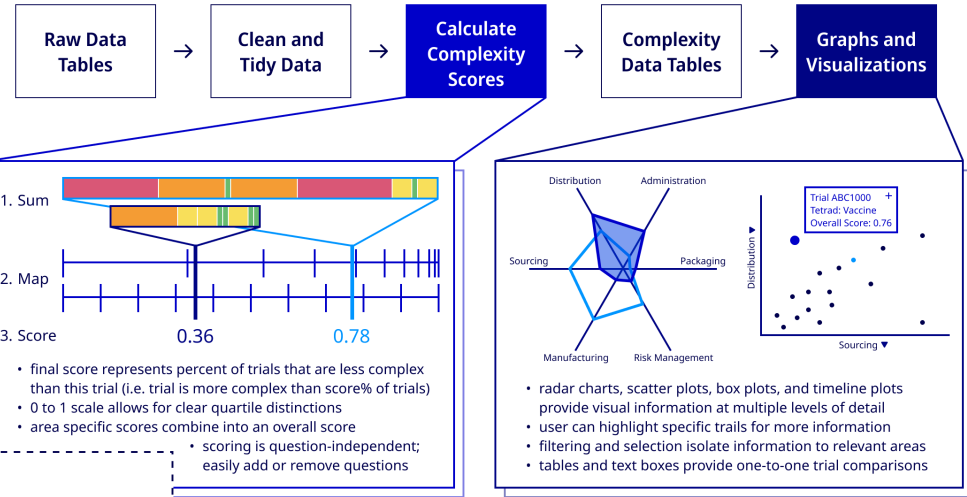
Output

- tables and graphs
- sort and filter

WE DELIVERED...

- detailed **recommendations for autofill**
- a Python program running the **new model to calculate complexity scores**
- **tables and graphs** visualized in Spotfire

COMPLEXITY SCORING AND VISUALIZATION



PAIN POINTS

Manual Data Entry

- manual entry necessitates a **limited question set** that lacks nuance
- lots of **historical data exists in plain-text documents** but it's prohibitively expensive and slow to manually enter it into the formatted data set
- **updates are rarely captured** and overwrite existing data

Low Quality Calculations

- scoring **does not account for missing data**; trials with more data score higher even when the data present indicates low complexity, and vice versa
- **overly simple averaging scheme** means that most trials fall into a meaningless "medium" category

Text Heavy Visualization

- text heavy interface is a bad choice for comparing multiple trials
- too much **irrelevant detail overwhelms the user**; different users want to sort and filter for different details
- single dashboard page is **crowded** and doing too many things at once

SUGGESTIONS FOR AUTOFILL WITH ML

WHAT FOR HOW

Large Language Models

- processing "human language" documents

Machine Learning Classification

- processing **unstructured text chunks**

HOW

1. provide structured, plain text trial documents
2. treats the data as a structured document and analyses grammar and syntax
3. **ask questions and receive answers in natural language** ("How many countries will the product be delivered too?" -- "13 countries including ...")
4. convert answers into computer data (e.g. countries = 13) if clear, else flag question for manual review

1. provide trial documents or other unstructured text
2. treats the data as an unordered bag of words/phrases and analyses word/phrase frequency
3. **ask questions in terms of word frequency and receive answers as probability** ("vaccine" (12) vs. "biologic" (2) -- 86% certain drug medium is vaccine)
4. log final answer (e.g. drug = "vaccine") if sufficient probability, else flag question for manual review

IMPACT

- autofilling data will significantly **reduce manual data entry saving time, money, and eliminating frustration**
- data quality will improve as missing historical data can be automatically filled in
- the number of questions asked per trial is no longer limited; expanded question set can capture more nuance
- **automatic re-parsing when updated trial documents become available** will keep data recent and relevant
- **manual intervention is limited** to verification; data points with low certainty are presented to humans for review

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