1. PROBLEM STATEMENT

Pfizer Global Supply – Operations & Insights team has deployed multiple analytical tools to enable operational efficiencies in drug manufacturing process. Solution owners need an automated way to:

A. Define user adoption
B. Find target audience
C. Know what actions will increase adoption

2. OBJECTIVES

- Define criteria to qualify a user as an adopter of tool
- Build predictive models to forecast user likelihood of adoption and understand factors driving tool adoption

3. DATASET

<table>
<thead>
<tr>
<th>Usage activity across tools</th>
<th>KnowledgeGraph of people and process at Pfizer</th>
<th>Batch activity across sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 manufacturing sites</td>
<td>50bn doses annually</td>
<td>36 tools in production</td>
</tr>
<tr>
<td>50bn doses annually</td>
<td></td>
<td>20k users across tools</td>
</tr>
</tbody>
</table>

4. METHODOLOGY

Phase 1: Defining User Adoption Criteria

We cluster users based on their usage behavior over weeks and find target clusters for each user based on their characteristics (role, hierarchy, type of site)

Phase 2: Predictive Modeling

We utilize multiple logistic regression discrete time series survival models to predict adoption status, with unique goals for each model

Model 1. Predicting future adoption status from individuals’ own usage metrics

Features: Usage metrics (days accessed/time spent on tool) summarized over 24 weeks

Outcome: Predict adoption status 5-8 weeks out in the future with 96% of test set accuracy (baseline 86%)

- Conversion list of non-adopters to potential adopter if given a push
- Maintenance List of current adopters who are prone to losing adopter status

Model 2. Network effect on user adoption status

Outcome: Network metrics can predict user adoption status with 88% test set accuracy

Model 3. Find most influential users in network

Bin users by degree of connectedness and find proportion of bin that used tool >10 minutes in corresponding week

Outcome: Lower degree users in network are more predictive of adoption status. Model has test set AUC 0.7 and accuracy 87%

5. RESULTS & IMPACT

Takeaway: Conversion of lower degree network members into users can increase tool adoption rates

Impact: Deviation from Release Attainment time (RA: planned time to ship for batch) at sites can be reduced by increasing adoption of Batch Tracker. Batch Tracker usage and RA deviation had an average correlation −0.3 at 4 large sites

6. NEXT STEPS

- Explore other network representations based on data availability
- Process Centric Teams (PCTs)
- Shift reporting structure
- Seek out “connection” data to model network on, i.e. number of emails, Teams messages, meeting data