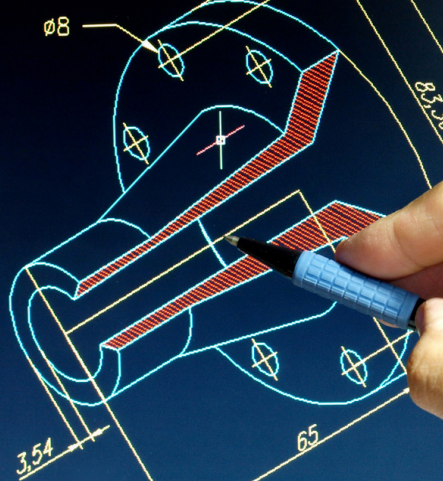


SOLIDWORKS

USING PRODUCT LOG ANALYTICS TO IMPROVE USER EXPERIENCE

Elder Research developed a user segmentation model based on SolidWorks' product usage logs. These segments, reproducible with 92% accuracy, served as the basis for helping SolidWorks employ product log analytics to better understand, communicate with, and serve their users.



INDUSTRY

- » Retail
- » Commercial Software

BUSINESS NEED

- » Ability to analyze product usage logs, allowing user data to drive product decisions, customer understanding, and user segmentation

SOLUTION

- » Developed a robust user segmentation model based on product usage logs

BENEFIT

- » New user segments enhanced understanding of SolidWorks product usage
- » Data findings were leveraged to power custom software for data visualization and increase understanding of the needs of distinct types of users

THE CHALLENGE

Many software products produce logs tracking their usage. These logs contain everything from the session duration and information about the user's computer (operating system, video card, etc.) to the number of mouse clicks to execute a certain command or use a specific feature. Since 2000, SolidWorks has enabled their software users to opt in to allow tracking of how they are using the products. The log data is anonymized so users cannot be identified. Collecting the data was a necessary first step, but the data was too vast and unstructured to analyze easily. In order to gain insight from that resource, SolidWorks contracted with Elder Research to employ analytics to increase organizational understanding of SolidWorks 3D software users' behavior.

THE SOLUTION

The goal was to develop cluster and segmentation models to provide a unique cross-industry view of how users were interacting with the software. Although the potential value of the software log data was great, it was bottled up due to its challenging storage format. Log data was stored in a format that is not amenable to analytics and required significant data exploration, cleaning, and feature engineering prior to modeling. SolidWorks stored the log data in a relational database, yet Elder Research needed to work with their IT experts to further restructure the data. This was a sizeable challenge, as there was over 1TB of data, collected at the rate of 150,000 software sessions per day. The data restructuring set the stage for a successful segmentation effort, and for future analytic projects. The preparation effort also enabled SolidWorks to view and understand the data for the first time after storing it for many years.

The next stage of the project required extensive investigation of the SolidWorks software's commands, and how to use the available data to segment the users into distinct groups. Elder Research worked with SolidWorks to understand how commands are invoked from within the software and which commands were most appropriate to include in cluster development. In-depth command understanding led to several useful findings; for instance, that most SolidWorks' customers were using a very limited spectrum of available commands. This unanticipated finding helped in the user segmentation effort, but more importantly helped clarify for

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SolidWorks which areas of the product were underutilized, laying the foundation for better outreach and client engagement.

Given the sparsity of command usage, Elder Research was able to define groups from correlations between commands. After identifying a core set of commands used by the largest number of users, any deviations from these were useful for defining distinct groups of users. Beginning with the core command set, a novel bootstrapping (i.e. resampling) technique was developed, which started by sampling subsets of users to determine the clusters. The cluster labels from this subsample were then used to train a predictive model that could be applied to the rest of the user data to predict cluster labels for every user. Using a robust cross-validation procedure, Elder Research determined eight distinct user segments that could be predicted with 92% accuracy. This model was then employed to classify users based on their usage logs over three annual versions of the SolidWorks 3D software.

Figure 1 illustrates how customers from each cluster use each software command. Popularity (x-axis) is the percentage of users in the specified cluster that employed the command at least once. Intensity (y-axis) is the frequency of command usage, which is the command count averaged over all users in the cluster. Commands in the upper-right quadrant of the graph were used by a higher fraction of users in that cluster than other clusters, and with higher command frequency. This allowed commands to be identified that were associated with users in different segments thereby characterizing the cluster. Working with SolidWorks, Elder Research was able to create user

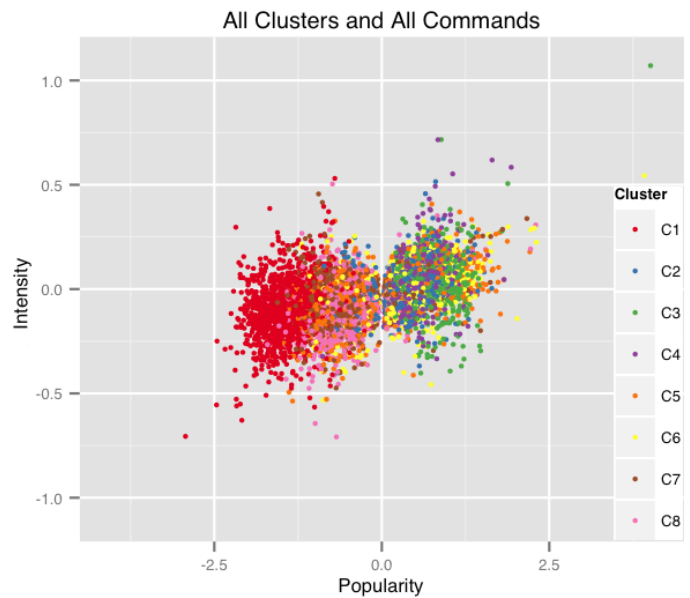


Figure 1. Command usage popularity vs intensity for each cluster helps to identify which commands are distinguishing for each cluster.

personas for each cluster, making the data come alive in a way that enabled SolidWorks to start reaching out to their clients in a more meaningful and actionable way.

Because of the success of the user segmentation, SolidWorks contracted with Elder Research to build a custom visualization tool leveraging the user segments and the comprehensive data understanding gained throughout the initial phases of the project. This visualization tool is helping SolidWorks make data-driven decisions while at the same time furthering customer understanding, helping them retain existing users and reach out to new customers.

RESULTS

A robust user segmentation model was developed based on observed command sequences in the SolidWorks software, and eight distinct segments were identified with a mean of 92% accuracy. In collaboration with SolidWorks, these segments defined unique user personas, enabling

more effective customer engagement and outreach. The data understanding from the segmentation served as the basis for a custom visualization tool, and inspired a robust analytic strategy, helping solidify SolidWorks as a leader in the field of 3D software tools.

CUSTOMER INFORMATION

SolidWorks offers complete 3D software tools that let users create, simulate, publish, and manage their data. Founded in 1993 with the explicit purpose of making 3D CAD technology more accessible, SolidWorks Corporation was ac-

quired by technology giant Dassault Systèmes S.A. in 1997. Today the company offers a complete toolset to maximize the productivity of engineering resources. More than 3 million users in 80 countries rely on SolidWorks' software.

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