A photograph of three young children, two boys and one girl, looking intently at a tablet device held by the boy on the left. They appear to be in a classroom setting. The text of the slide is overlaid on the upper portion of the image.

Auto-Screening *Donors Choose* Posting Requests

Justin Mao-Jones

Charlie Guthrie

Lucy Wang

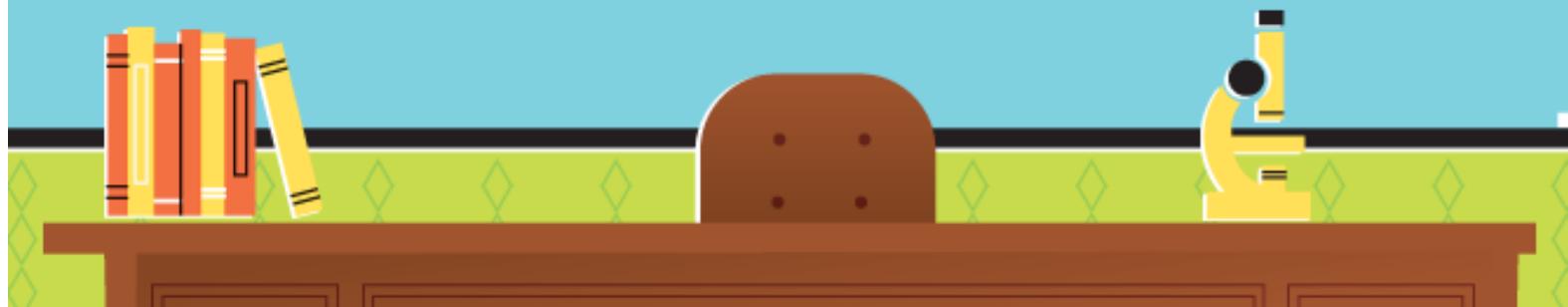
Yasumasa Miyamoto



DonorsChoose.org

Teachers ask. You choose.

DonorsChoose.org makes it easy to help classrooms in need. Public school teachers post classroom project requests which range from pencils for poetry to microscopes for mitochondria.



A crowd-funding site for school projects

Since inception in 2000...

- **\$283 million** to school projects
- fully funded **70%** of **650,000** posted projects
- **1.5 million** supporters
- **200,000** teachers
- **13 million** students

Teach For the Planet: Printing For Understanding ❤

Mr. Katz's technology project at Whitney Young Magnet High School in Chicago, IL | Highest Poverty



My Students: "In the end we will conserve only what we will love. We will love only what we understand. We will understand only what we have been taught." Baba Diom

My students need a 3D printer and scanner, along with filament, to build and design ... ➤ [more](#)

We are working to create an incredible opportunity, to create a professional collaborative project, between 10th-12 AP Environmental Science students, 11th-12th grade AP 2D Studio Art students, and 10th-12th grade Sculpture and Ceramics ... ➤ [more](#)

My students need a 3D-Printer, PLA and ABS filament, and a digitizer Desktop 3D scanner.

any amount

\$169 to go
35 donors

Half-off thanks to
Open Possibilities NBCUniversal

materials	vendor	price	#	total
MakerBot Replicator Desktop 3D Printer	Nasco	\$2,899.00	1	\$2,899.00
MakerBot Digitizer Desktop 3D Scanner	Nasco	\$799.00	1	\$799.00
1.75 mm PLA Filament for 3D Printers - Black	Nasco	\$29.95	3	\$89.85

Getting a Project Posted



DonorsChoose.org
Teachers ask. You choose.



Teacher

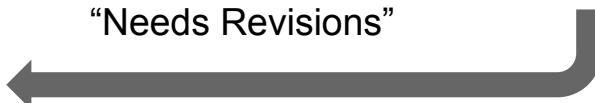


Project
Request



Screener

“Needs Revisions”



Looks
Fine

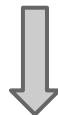


Criteria:

- Be real
- Benefit students
- Explain why funding is needed
- Spell-checked
- Follows website rules

Preprocessing

145,677 requests in 2014



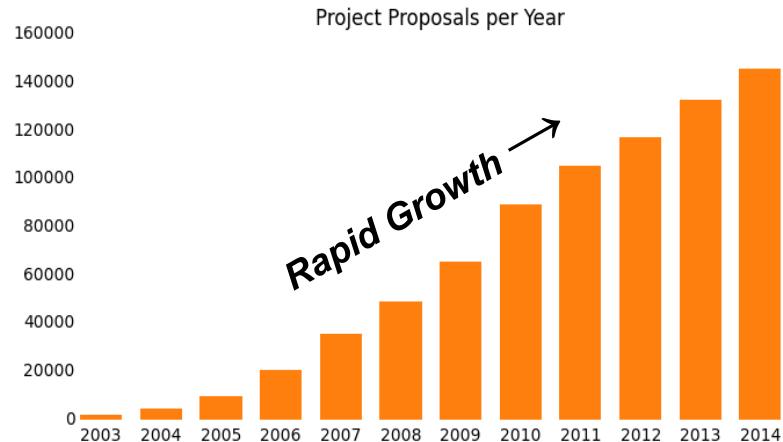
50 volunteers



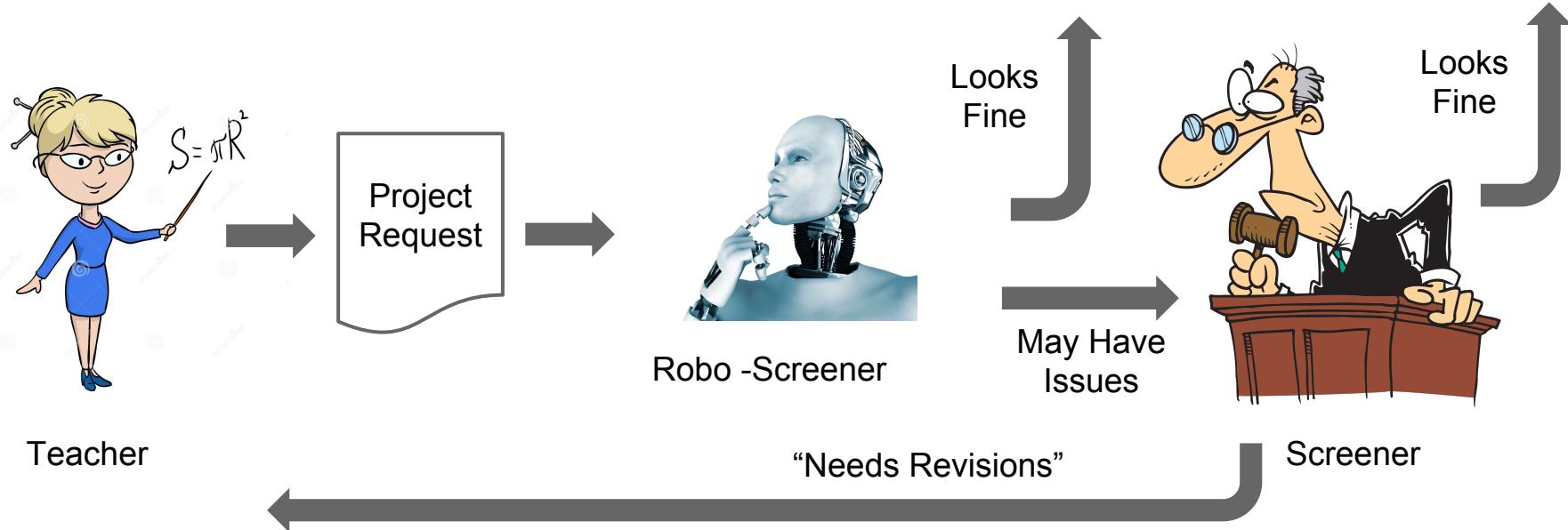
15 minutes/project

37,500 hours of review per year

The current screening process is unsustainable given the rapid growth of the organization



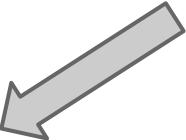
Automated Processing



Doesn't have to be perfect: 30% reduction = 6,000 hours

Data Science + Business Model

Approve as many
good projects as
possible

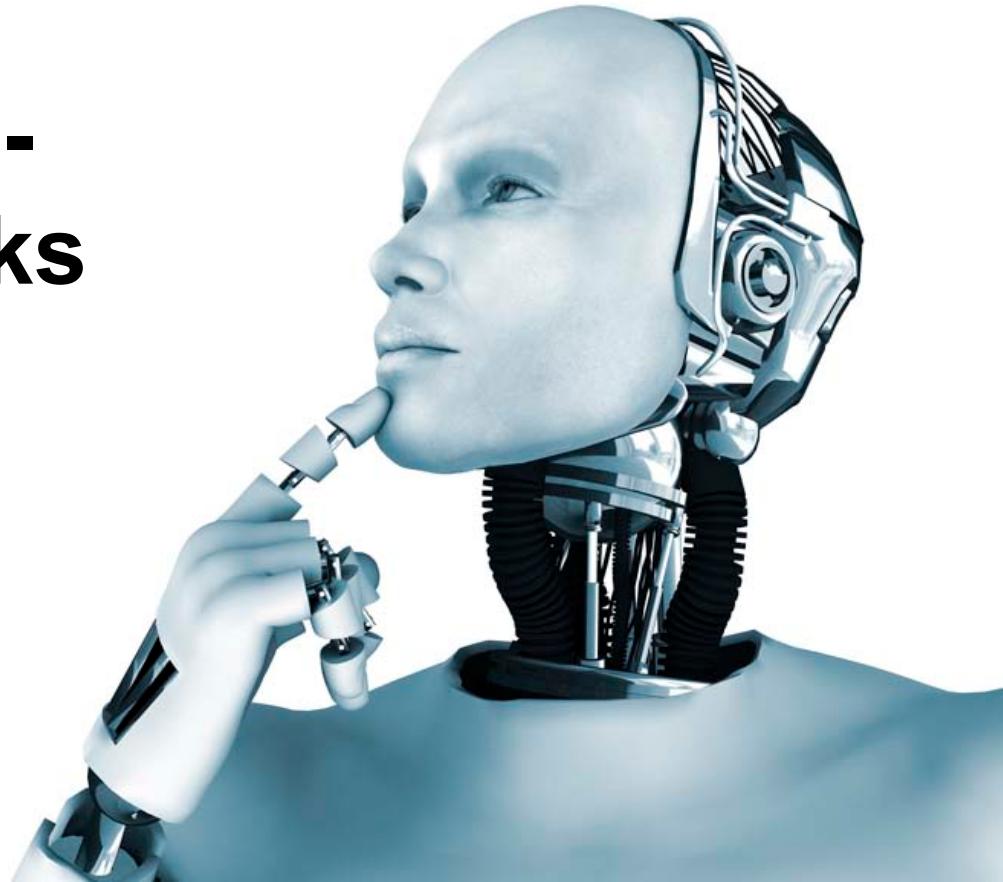


Avoid approving
bad projects

"My students are a group of English Language Learners who have so many goals for themselves. Our big goal in reading is to grow two reading levels in one year. Our biggest challenge in reaching this goal is having the right reading material since every one of my students is below grade level.

My students go to a district school four miles from the White House. Over 90% of my students have immigrated from South America, Central America, or Africa in order to capitalize on the opportunities this building represents. Without the right books, they will never be able to actually attain the goals they and their families have for them.

How the Robo-Screener Works



Teach For the Planet: Printing For Understanding ❤

Mr. Katz's technology project at Whitney Young Magnet High School in Chicago, IL | Highest Poverty



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NBCUniversal

[Save](#) [Share ▾](#)

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MakerBot Digitizer Desktop 3D Scanner	Nasco	\$799.00	1	\$799.00
1.75 mm PLA Filament for 3D Printers - Black	Nasco	\$29.95	3	\$89.85

Teach For the Planet: Printing For Understanding

Title

Mr. Katz's technology project a

project type

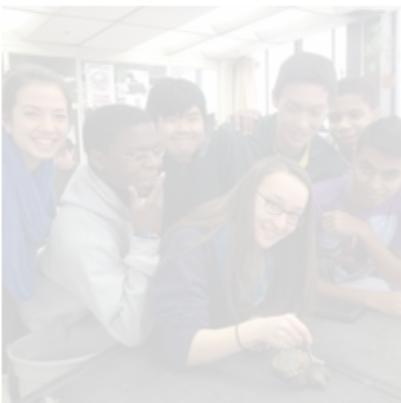
agnet

location

In Chicago, IL

Highest Poverty

poverty level



My Students: "In the end we will conserve only what we will love. We will love only what we understand. We will understand only what we have been taught." Baba Diom

My students need a 3D printer and scanner, along with filament, to build and design ... ▶ [more](#)

We are working to create an incredible opportunity, to create a professional collaborative project, between 10th-12 AP I Science students, 11th-12th grade AP 2D Studio Art stu
12th grade Sculpture and Ceramics ... ▶ [more](#)

**My students need a 3D-Printer, Pl
Desktop 3D scanner.**

Need Statement

any amount [Give](#)

\$169 to go
35 donors

Half-off thanks to

Open Possibilities
NBCUniversal

[Save](#) [Share ▾](#)

materials	vendor	price	#	total
MakerBot Replicator Desktop 3D Printer	Nasco	\$2,899.00	1	\$2,899.00
MakerBot Digitizer Desktop 3D Scanner	Nasco	\$799.00	1	requested funds 0
1.75 mm PLA Filament for 3D Printers - Black	Nasco	\$29.95	3	5

Text Analysis: Sample Essay

Spelling errors

"This field trip is for our Student Council. Our new council will be stepping up as leaders. My kids wulod like to have the oportunity to grow as learners. It will help my student council learn how to lead our school and do StuCo duties. The field trips would be \$200 for transportation and \$20/student for the event. This field trip could help my students. For more information and pictures, send me an email at clupone@gmail.com or visit <http://stuco.stamfordschools.edu>"

Emails and URLs

Missing Need Statement

My students need _____

Term Frequencies

term	freq.
student	3
need	2
council	2
etc...	

Our Model

Project Data

- school location
- poverty level
- project type
- grade level
- class subject
- resource type
- school type
- funding request

Extracted Essay Features

- dollar signs
- @ symbol, url
- missing values
- essay length

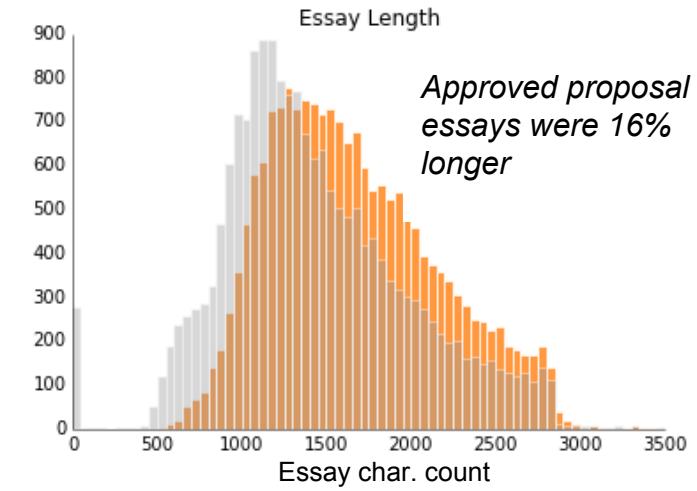
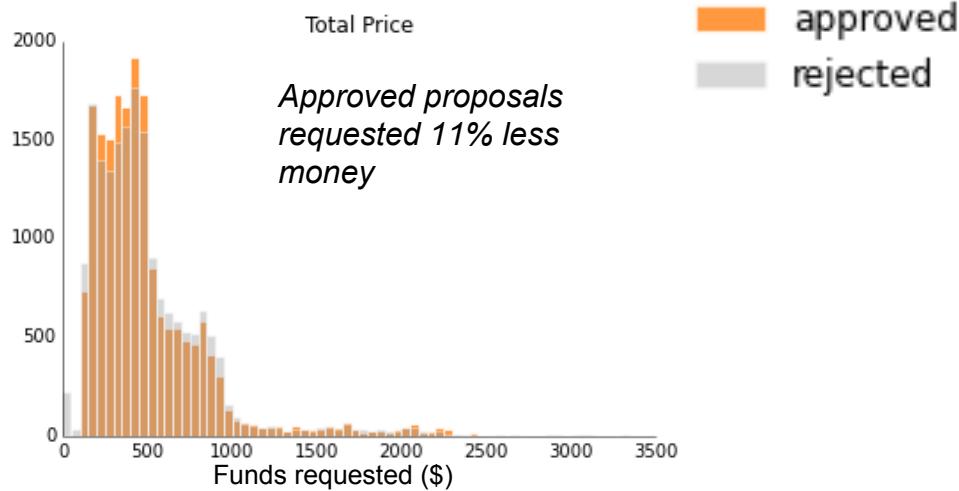
Matrix of Essay Term Frequencies

$$\begin{pmatrix} & T_1 & T_2 & \dots & T_t \\ D_1 & w_{11} & w_{21} & \dots & w_{t1} \\ D_2 & w_{12} & w_{22} & \dots & w_{t2} \\ \vdots & \vdots & \vdots & & \vdots \\ \vdots & \vdots & \vdots & & \vdots \\ D_n & w_{1n} & w_{2n} & \dots & w_{tn} \end{pmatrix}$$



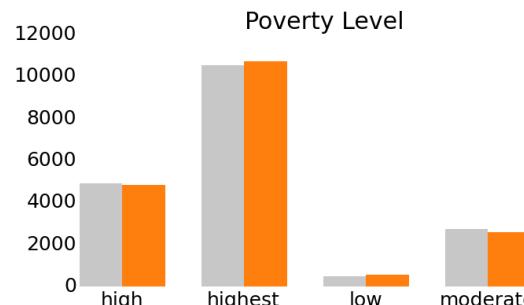
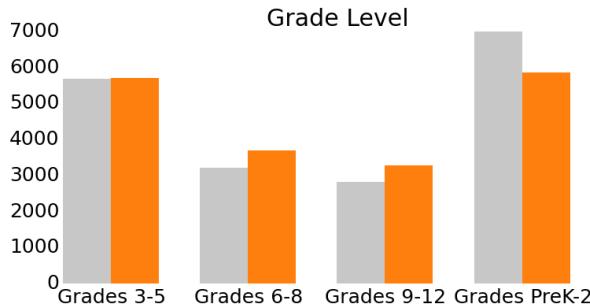
**logistic
regression
model**

**Proposal
Approval or
Review**



Proposals for grades K-5 are 8% more likely to be approved

Proposals from low-poverty schools were slightly less likely to be approved



Model → Impact

Model Performance

Test Environment

Thresholds



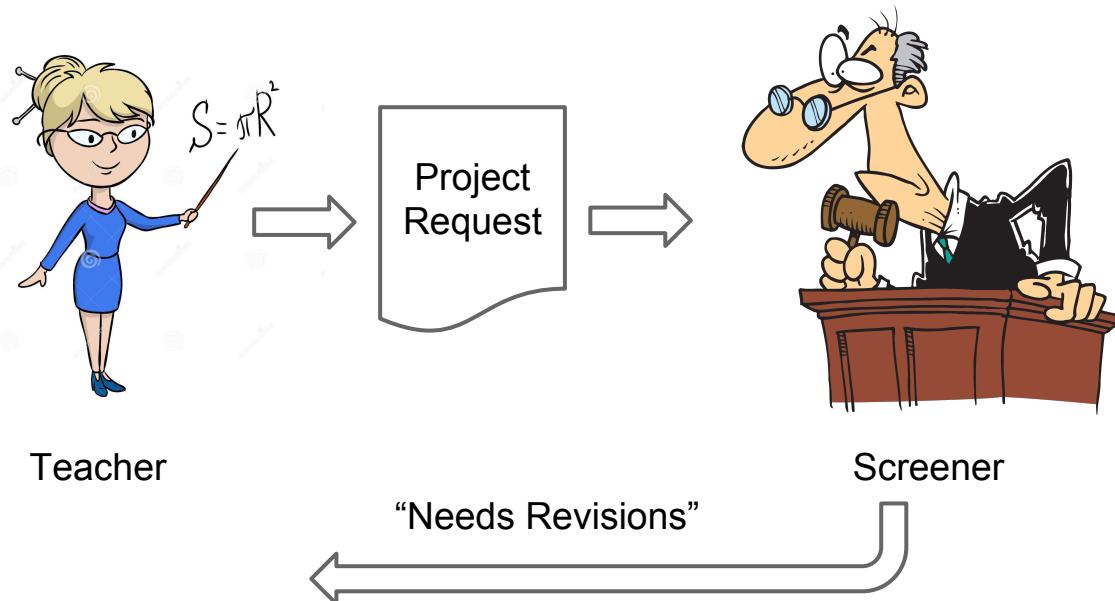
	Good Projects Approval Rate	Bad Projects Approval Rate
5%	5%	1%
15%	15%	5%
25%	25%	10%

Business Case



What is the appropriate threshold?

Data Challenge

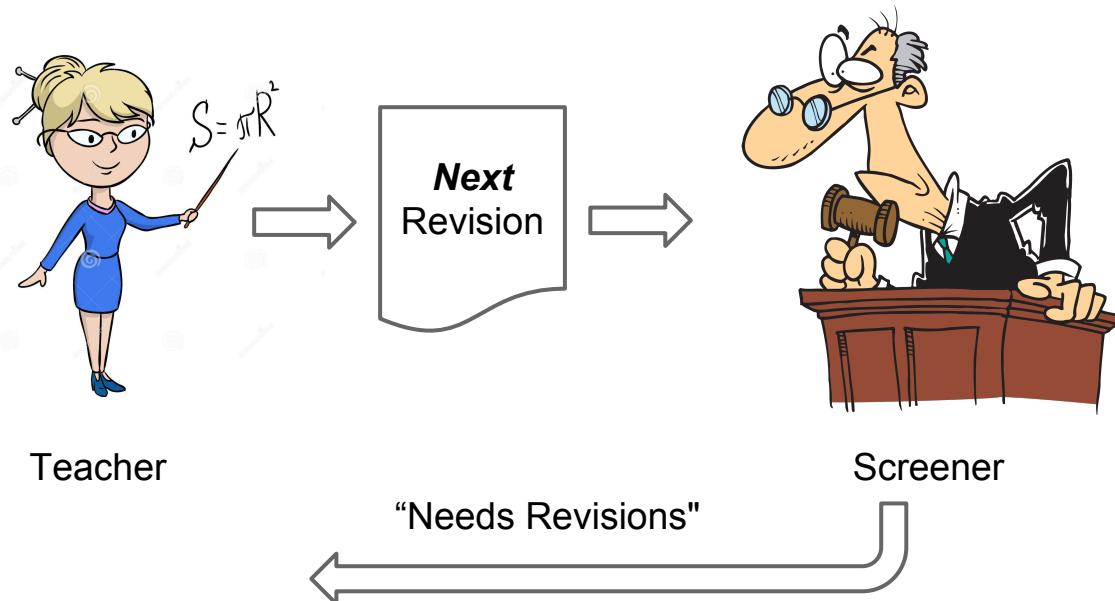


Data Challenge

Reality
18%
need revision



Current Data
3%
need revision



What does this mean?

Exploratory Analysis



Better Data
+
Detailed Analysis



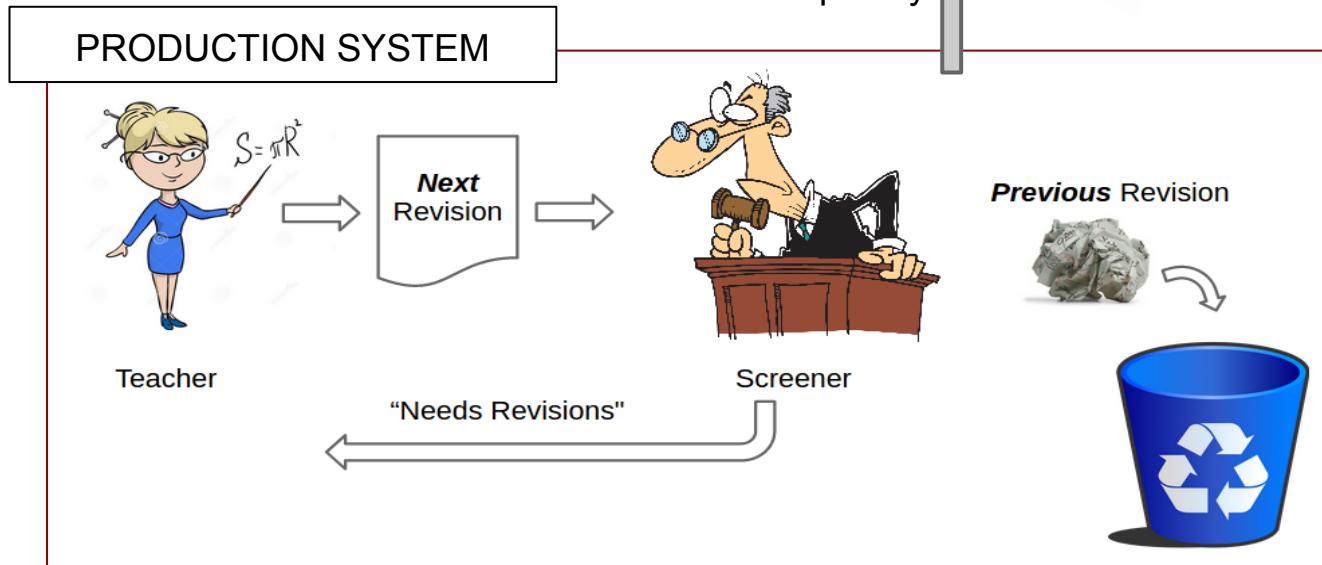
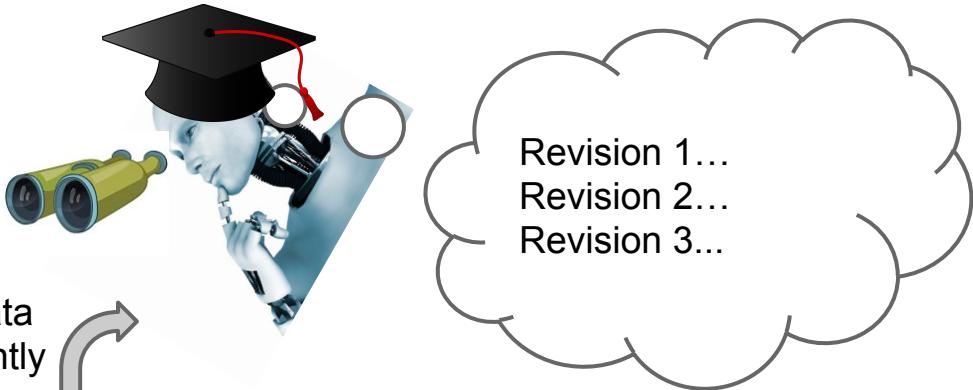
Scalable Production System



+



More Testing Recommended



Next Steps

Testing in parallel to production system

Low Hanging Fruits

- Detect ‘text’ not allowed in proposals, warn teachers
email addresses, url links, prices, etc.
- ‘Flag this project’ button

Business Case Discussions

- What is the right threshold for approvals?
- What are the costs vs benefits in the production system?

Questions?

Thank You!