The Clinical Trial Dilemma as a Polya's Urn Simulation

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R+Shiny
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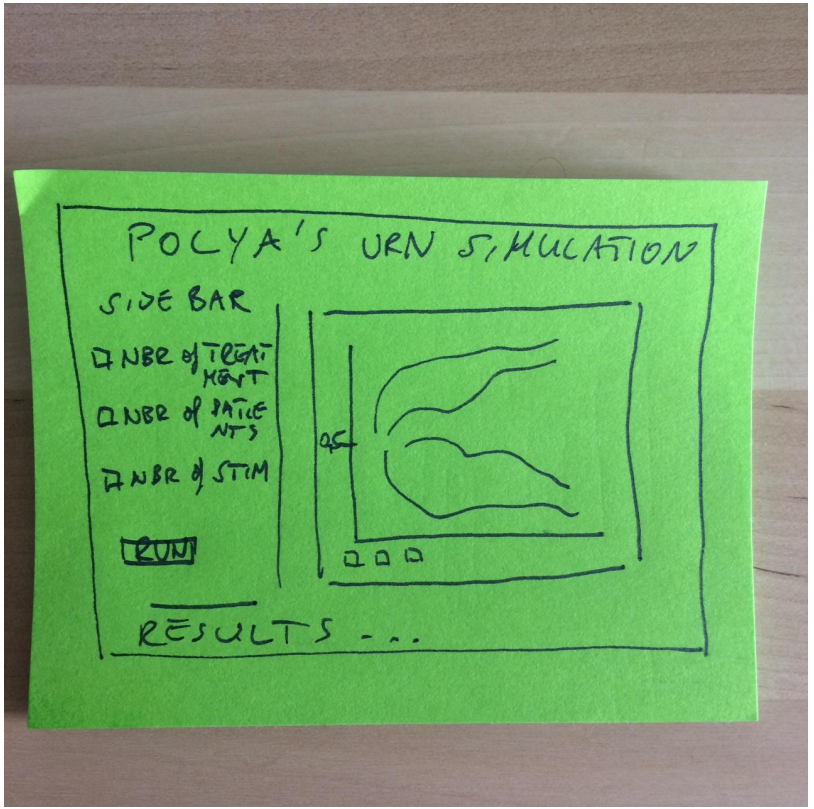
User Perspective

- You are a doctor and have 2 (or more) options to treat your patients
- BUT you don't know which is the best option
- AND you want to make sure that your patients get the best treatment possible



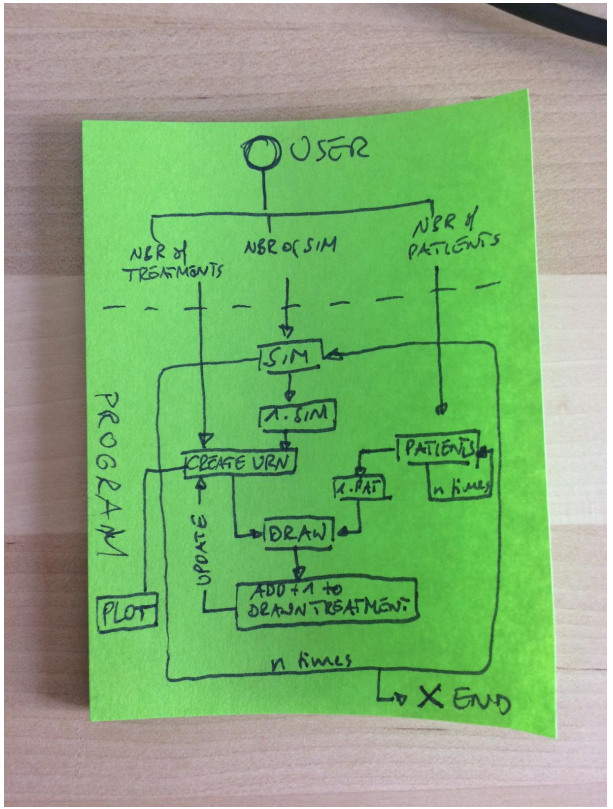
Software Perspective

```
Number of Treatments
Number of Patients          # Trials per simulation
Number of Simulations

    FOR 1 -> Number of Simulations
        initiate Treatments      # create Urn
        FOR 1 -> Number of Patients
            draw Treatment (success for patient)
            add drawn Treatment +1 to urn

        PLOT Distribution of Treatments
        REPORT most successful Treatment

PLOT Distribution of Treatments for all Simulations
REPORT most successful Treatment for all Simulations
```



Possible Extensions

- Adding Weights/Probabilities
- Adding delayed relapse
- Adding delayed success

Superpowers

ui.R | server.R | func.R*

Source on Save | Run

```
1  ##################################
2  ####### fuctions #################
3
4  # author: Mitja Seibold
5  # mail: 81N55E@gmail.com
6  # created: 9th May 2018
7
8  # TODO: more treatments
9  # TODO: different colors
10 # TODO: plot more treatments
11 # TODO: create advanced options
12
13 # fuct that represents polya's urn simulation setup
14
15 # fuct that represents the simple polya's urn simulation setup
16 # (2 treatments with just treatment plotted)
17 # input: #simulations #patients (treatments is 2)
18 # output: plot of the ratio of first treatment over patients
19
20 rfuncSimple<-function(sim, pat){
21   simPlot <- matrix(NA,sim,pat)          # creates empty matrix for plot
22   plot(1:pat,simPlot[1,],                # creates empty plot
23        ylim = c(0,1),
24        type = "l",
25        bty = "n",
26        xlab = "Patients tested",
27        ylab = "Probability of Treatment 1")
28
29   for(m in 1:sim){                     # for loop for the # simulations
30     urn <- 1:2                         # a vector representing the urn
31
38:68  rfuncSimple(sim, pat)
```

Polya's Urn Simulation in R + Shiny for PNS-Course@UvA

Edit

Add topics

10 commits | 3 branches | 0 releases | 1 contributor | GPL-3.0

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

81N55E Update README.md — Latest commit 842f6db 15 minutes ago

LICENSE	Initial commit	4 days ago
README.md	Update README.md	15 minutes ago
func.R	Add files via upload	41 minutes ago
server.R	Add files via upload	41 minutes ago
ui.R	Add files via upload	41 minutes ago

README.md

PNS_Polya's Urn Simulation (the Clinical Trial Dilemma)

Polya's Urn Simulation in R + Shiny for PNS-Course@UvA

This is code for a Polya's Urn Simulation (https://en.wikipedia.org/wiki/P%C3%B3lya_urn_model) written in R+Shiny.

Progress

Now

Polya's Urn Simulation (the clinical trail dilemma)

Please select version:

intermediate

Please select number of patients:

50

Please select number of simulations:

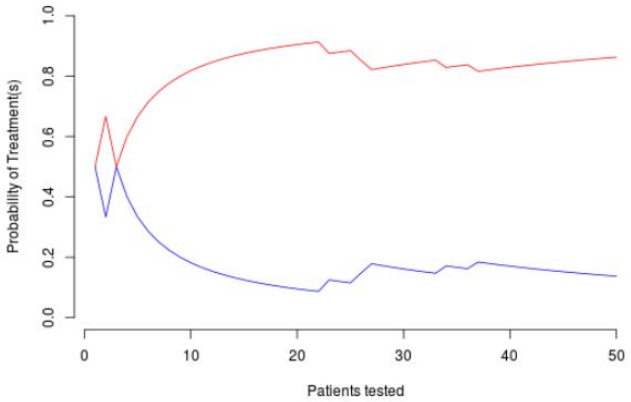
1

Please select number of treatments:

2

Please select number of best treatments plotted (max 3):

1 2 3



Future

Polya's Urn Simulation (the clinical trail dilemma)

Please select version:

advanced

simple
intermediate
advanced

Please select number of simulations:

1

Please select number of treatments:

2

Please select Advanced One:

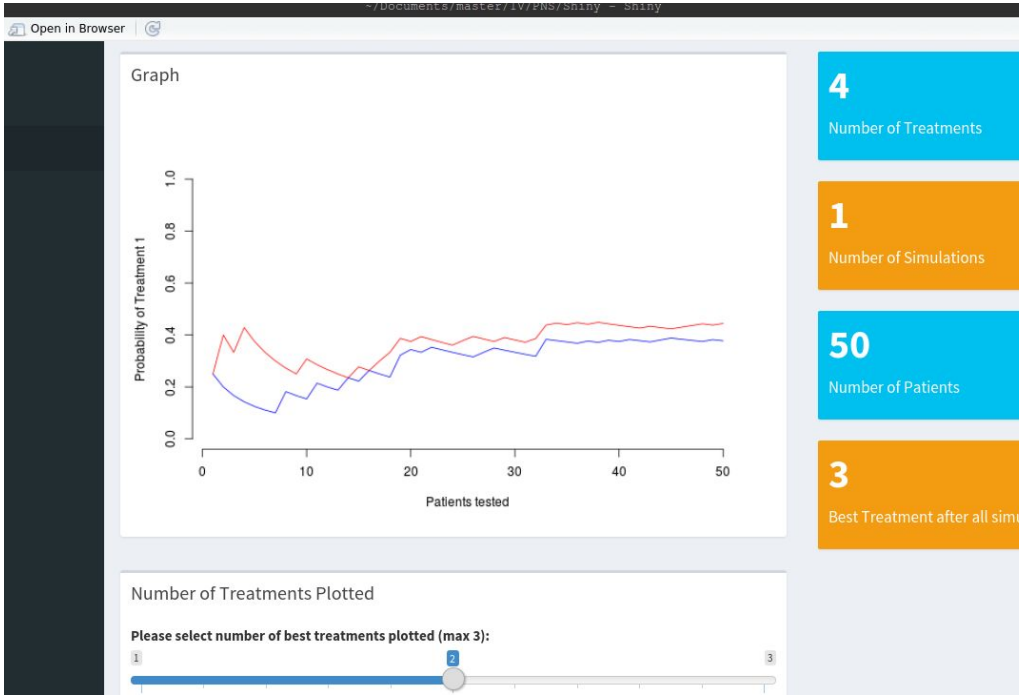
Yes

Please select Advanced Two:

Yes

Progress

Now



Future