

Wald and Z-Test
A Good Example To Compute
Interaction Between Human and
Machines
A Case Study with Facebook
(July 2017)
Author: Heider Jeffer ©2017

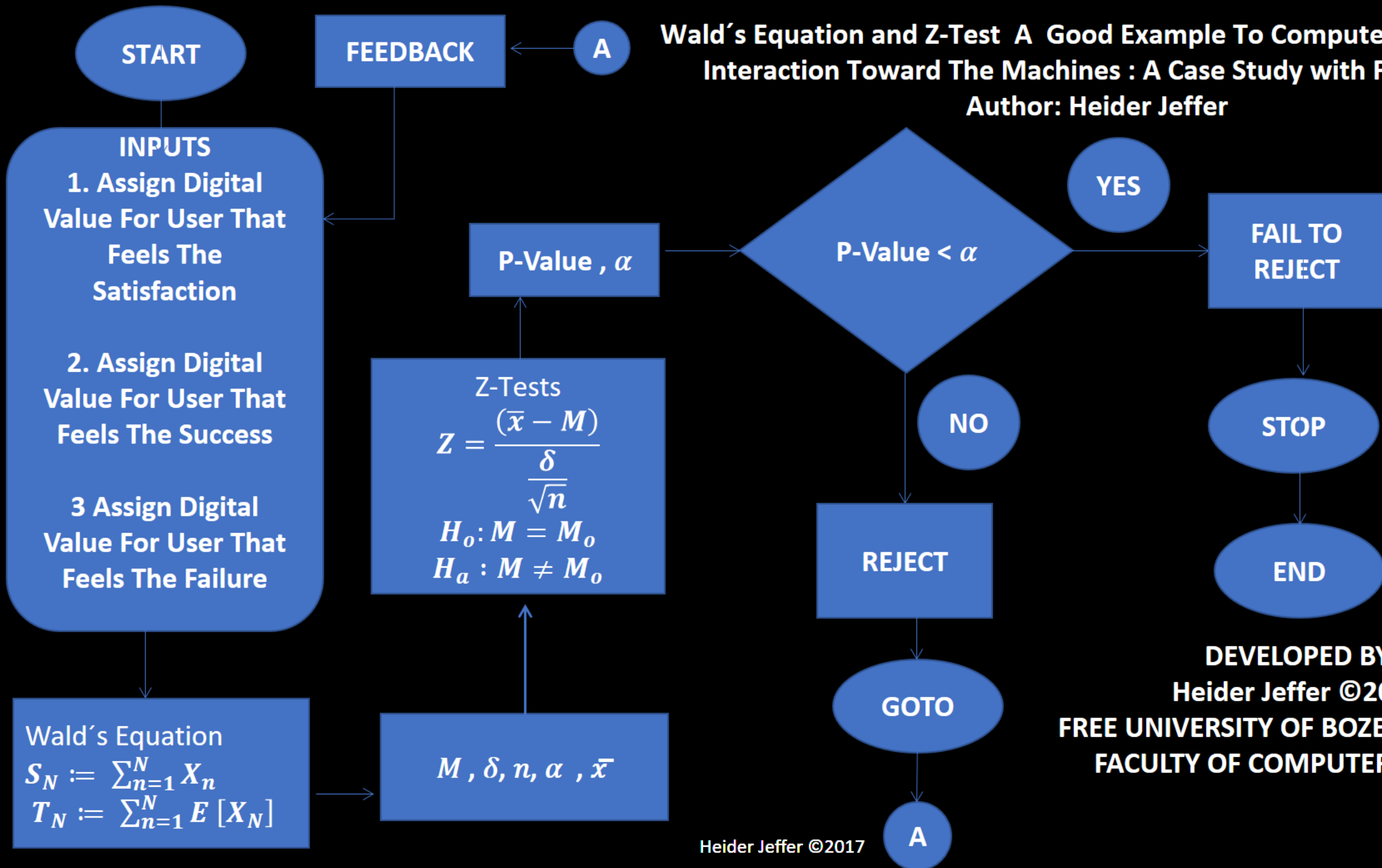
DIGITIZE HUMAN EMOTIONS A New Idea Start With Facebook:

- Human feeling to be computable
- A new dimension in machine learning.
- Computing Three States of Human Emotions Satisfaction, Failure and Success.
- Easy to apply. Easy to prove.



Wald's Equation and Z-Test A Good Example To Compute The Human Interaction Toward The Machines : A Case Study with Facebook

Author: Heider Jeffer



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FACULTY OF COMPUTER SCIENCE

INPUTS PROCESS OUTPUTS

INPUTS ~~PROCESS~~ ~~OUTPUTS~~

1

**Assign Digital
Value For User
That Feels The
Satisfaction**

INPUTS ~~PROCESS~~ ~~OUTPUTS~~

2

**Assign Digital
Value For User
That Feels The
Success**

INPUTS ~~PROCESS~~ ~~OUTPUTS~~

3

**Assign Digital
Value For User
That Feels The
Failure**

INPUTS ~~PROCESS~~ ~~OUTPUTS~~

1

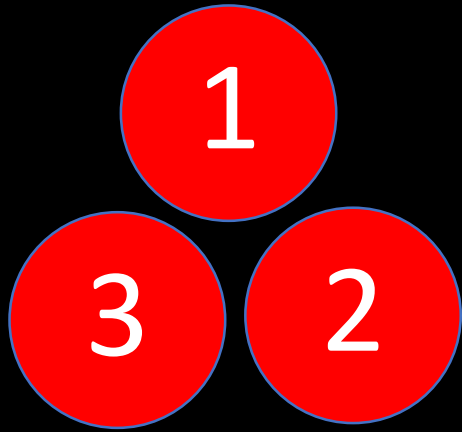
**Assign Digital
Value For User
That Feels The
Satisfaction**

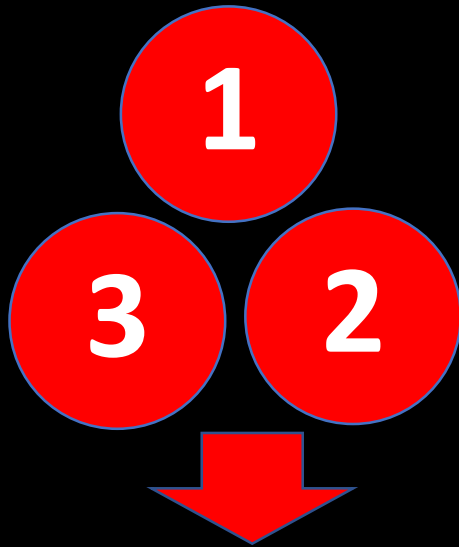
2

**Assign Digital
Value For User
That Feels The
Success**

3

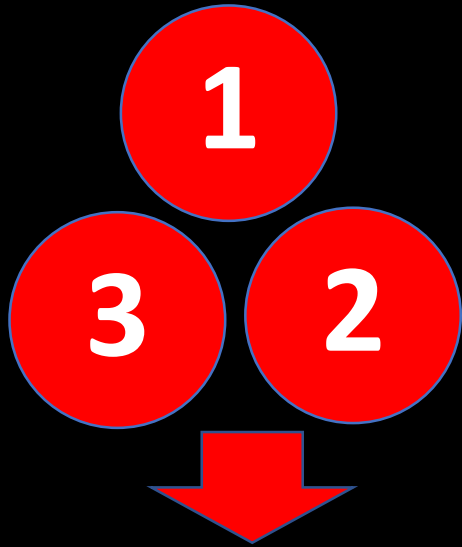
**Assign Digital
Value For User
That Feels The
Failure**





Wald's Equation

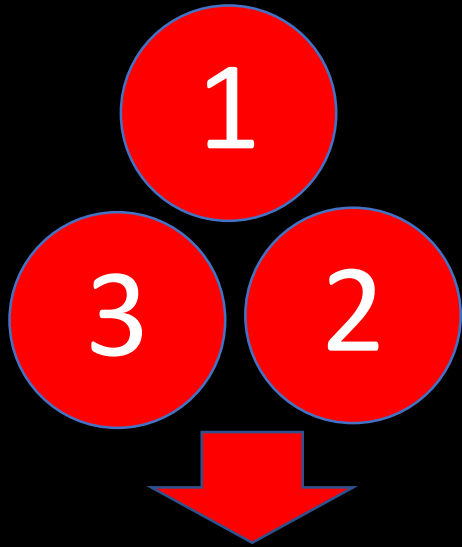
$$S_N := \sum_{n=1}^N X_n \quad , \quad T_N := \sum_{n=1}^N E[X_N]$$



Wald's Equation

$$S_N := \sum_{n=1}^N X_n \quad , \quad T_N := \sum_{n=1}^N E[X_N]$$

$$M = 7.4 \quad \delta = 1.9 \quad n = 13 \quad \bar{x} = 8.1 \quad , \quad \alpha = 0.05$$



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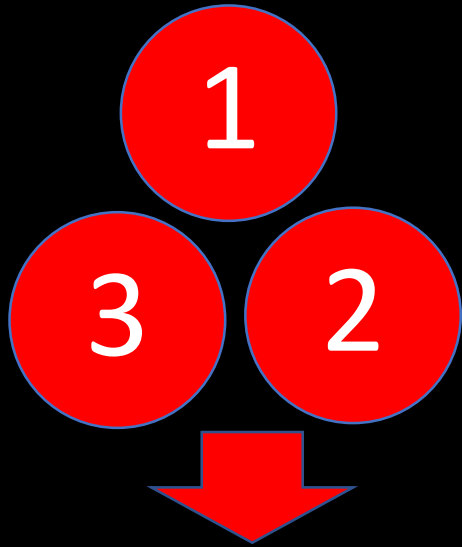
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Z-Tests

$$Z = \frac{(\bar{x} - M)}{\frac{\delta}{\sqrt{n}}}$$

$$H_o: M = M_o$$

$$H_a: M \neq M_o$$



Wald's Equation

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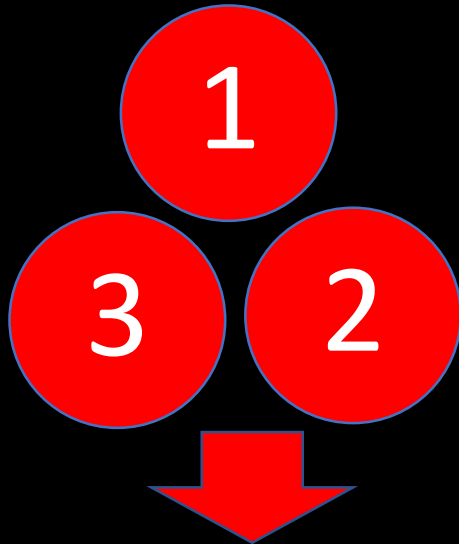
Z-Test

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$$\text{P-Value} = 0.0404 \\ < \text{Alpha} = 0.05$$



Wald's Equation

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Z-Testv

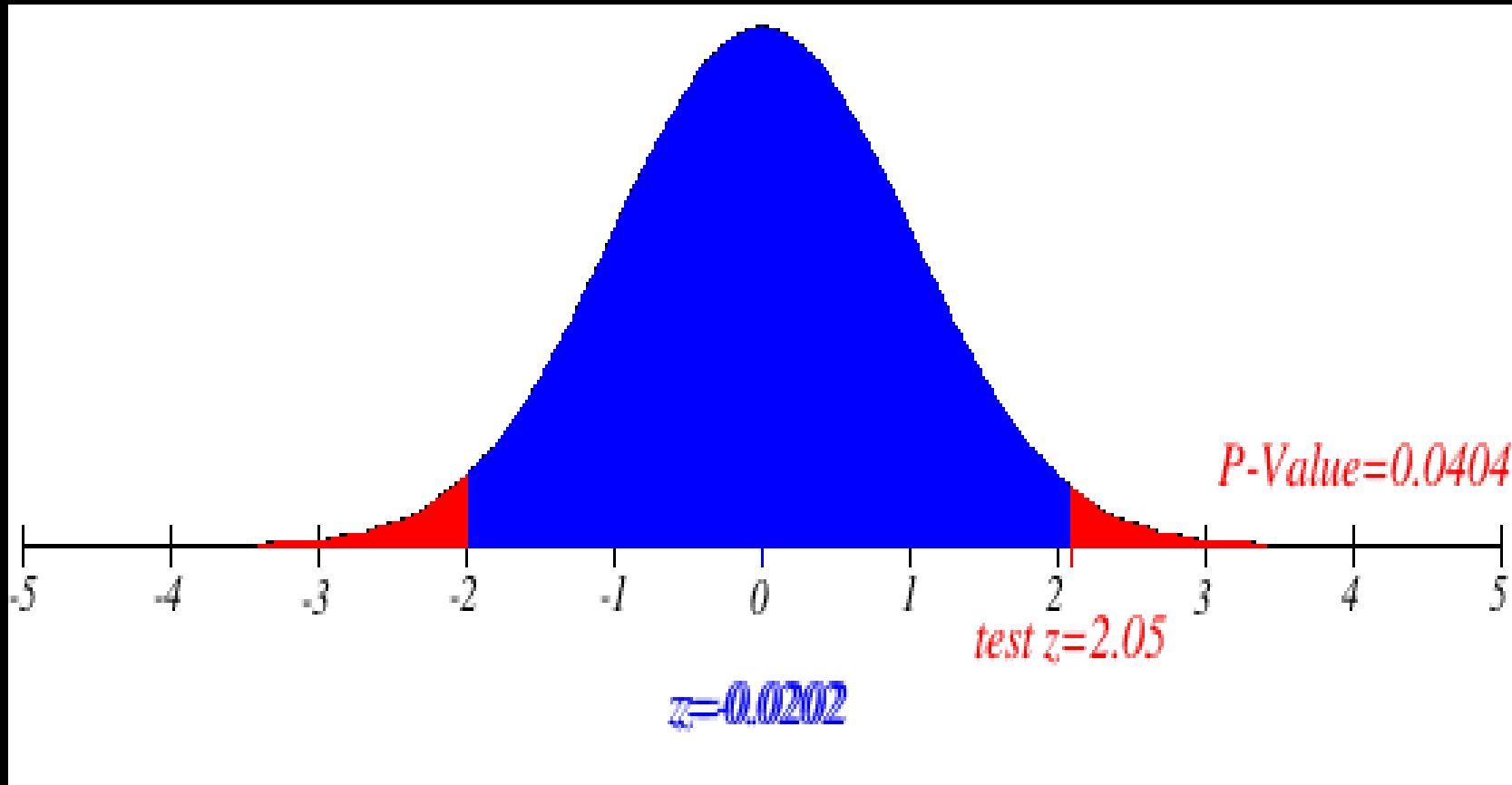
$$Z = \frac{(\bar{x} - M)}{\frac{\delta}{\sqrt{n}}}$$

$$H_o: M = M_o$$

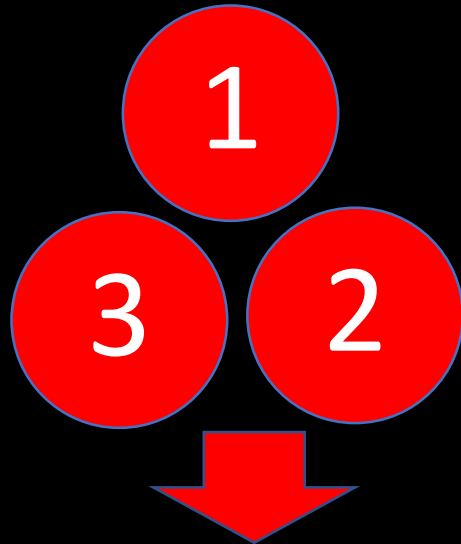
$$H_a: M \neq M_o$$

$$P\text{-Value} < \alpha$$

$$P\text{-Value} = 0.0404 \\ < \text{Alpha} = 0.05$$



- At the 1% significant level the data do provide significant evidence to conclude that the mean of our [Wald's results for all 13 users in facebook] is differ from 7.4.
- We are 99% confidence that the mean of [Wald's results for all 13 users in facebook] is greater than 7.4. We fail to reject



Wald's Equation

$$S_N := \sum_{n=1}^N X_n \quad , \quad T_N := \sum_{n=1}^N E[X_N]$$

$M = 7.4 \quad \delta = 1.9 \quad n = 13 \quad \bar{x} = 8.1, \alpha = 0.05$

WE ARE DONE



Z-Testv

$$Z = \frac{(\bar{x} - M)}{\frac{\delta}{\sqrt{n}}}$$

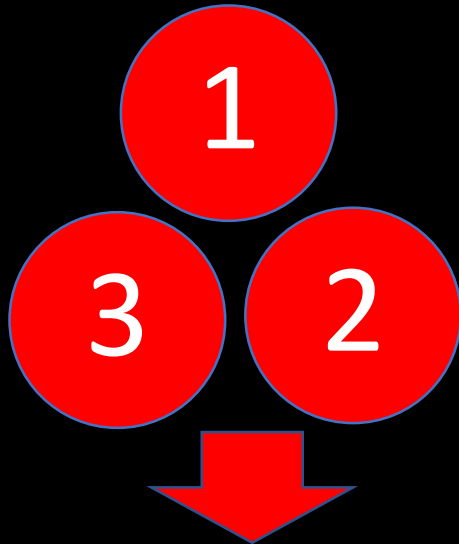
$H_0: M = M_0$

$H_a: M \neq M_0$

Fail To Reject

P-Value < α

P-Value = 0.0404
< Alpha = 0.05



Wald's Equation

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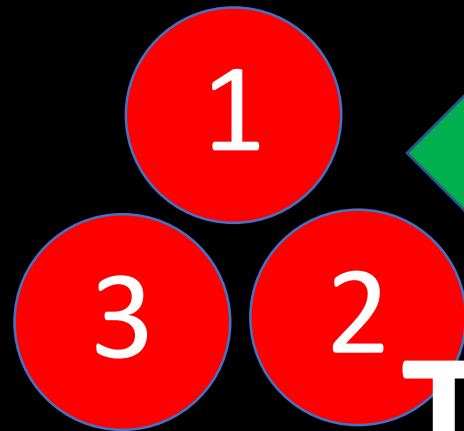
$H_0: M = M_0$

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P-Value < α

P-Value = 0.0404
< Alpha = 0.05

Reject



FEEDBACK

Reject

THIS IS NOT OUR PART



Wald's Equation

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Z-Testv

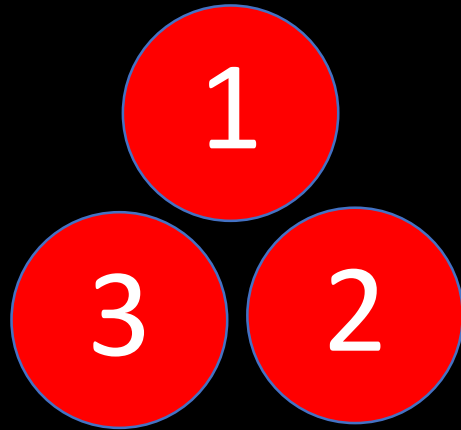
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P-Value = 0.0404
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FEEDBACK

Fail To Reject

Wald's Equation

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P-Value < α

P-Value = 0.0404
< Alpha = 0.05

RELATED WORK

- my deepest gratitude to, Professor Rosella Gennari. She is a professor of human machine interaction at the Faculty of Computer Science of the Free University of Bozen-Bolzano, for the great collaboration on this research
- Big thanks goes to Professor Leonardo Ricci. He is aggregate Professor at Department of Physics, Interdepartmental Center Mind / Brain – CIMEC, for his help in the Wald's Z-Test to prove the realistic of Wald
- Thank You (E. Levin) You gave us a better understanding on what kind of impact Wald's equation could have in the audio, visualization, and eye scanning.
- Thank You A lot I. Scott MacKenzie article "Fitts' law as a research and design tool in human-computer interaction" helped us out with its detailed information about how to make a statistic test to investigate the interaction between the user and the machine

FINAL CONSIDERATIONS

WELCOME TO THE FUTURE

- Although this research was designed with a very small scope, including only the Facebook participants
- now we can say this research has a positive impact on software designers, and machine learning
- This research is success to compute the human behavior toward the machine which is every thing the software designers need to create a software that able to improve the UX
- Above all computing the human activities help the AI to improve the machine learning
- We can say that. Yes it is possible to design a model to compute the interaction between machine and human

Thank You For Your Attention
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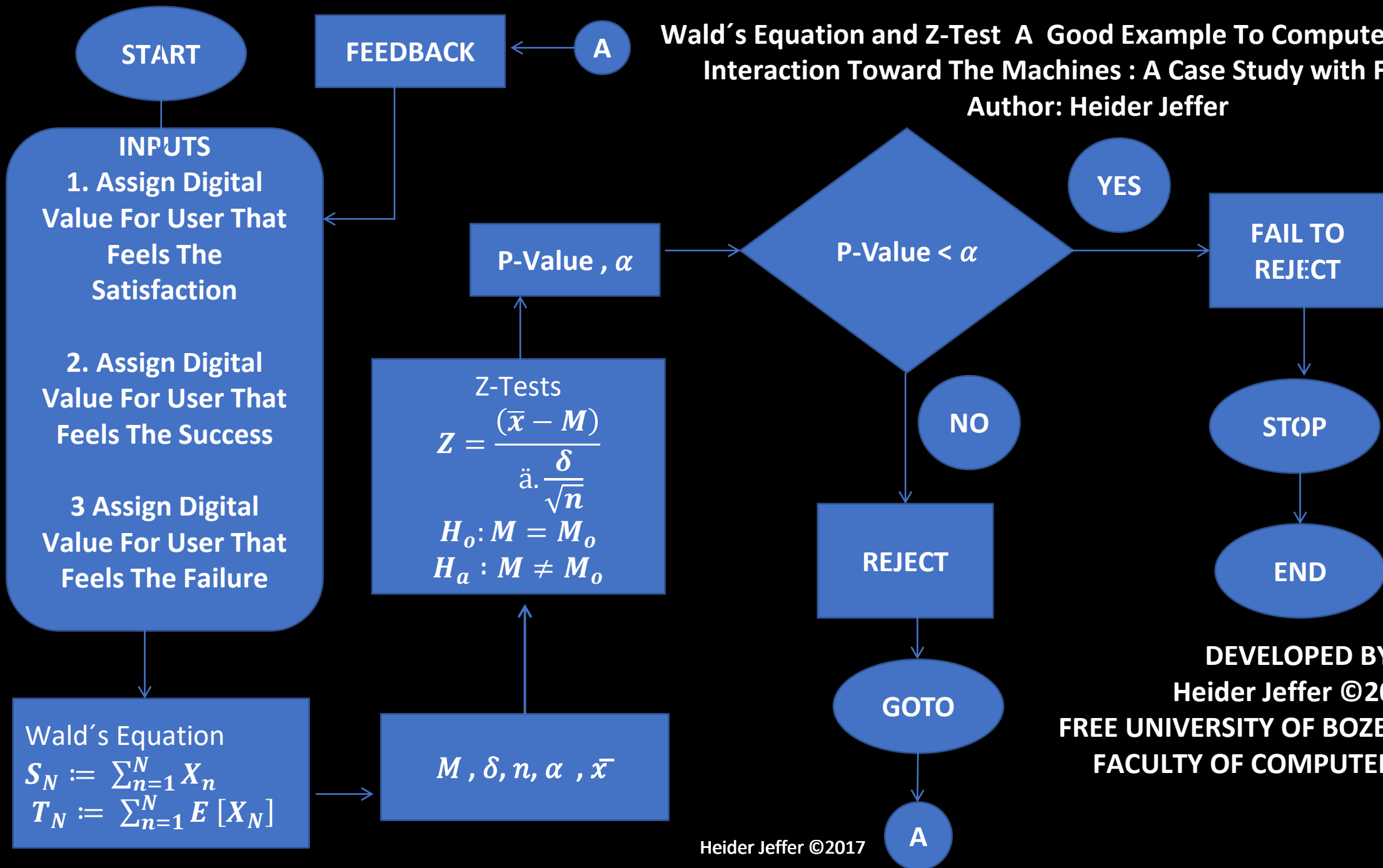


Questions ?



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