Social Interactions Representation as Users Behavioral Contingencies and Evaluation in Social Networks

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Acknowledgements

- CAPES, CNPq, MCT, FAPESP, FINEP
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Overview

- Introduction
- Behavioral Contingencies
- Our Proposal
- Social Interactions in Facebook
- Final Remarks

Introduction

- Social network analysis:
  - social entities (people, actors or users) and their interactions and relationships
  - small-world principle
  - representation of relationships based on the interactions among users

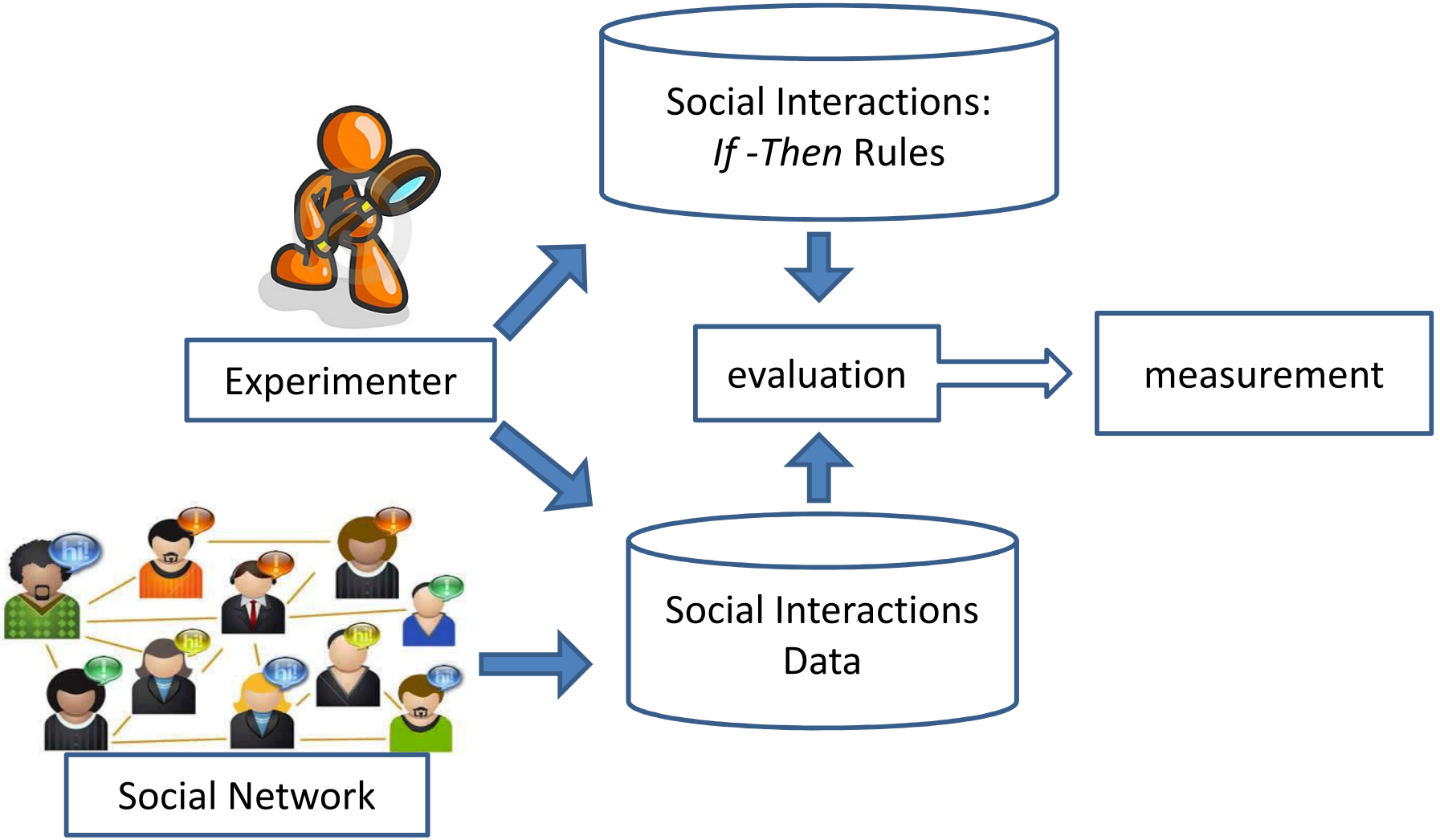
Introduction

- An opportunity for providing a human-readable model
  - the representation and the evaluation of situations which involve users in social interactions
  - making explicit
    - actions performed by users
    - the devices used, the media types involved in the interactions, etc…

Behavioral Contingencies

- Experimental social psychology research
- Social interactions are behavioral contingencies:
  - *if-then* observations
  - describing what users do or not
- For instance:
  - a game setting may be analyzed to determine how the game is played as a set of *if-then* observations

Our Proposal



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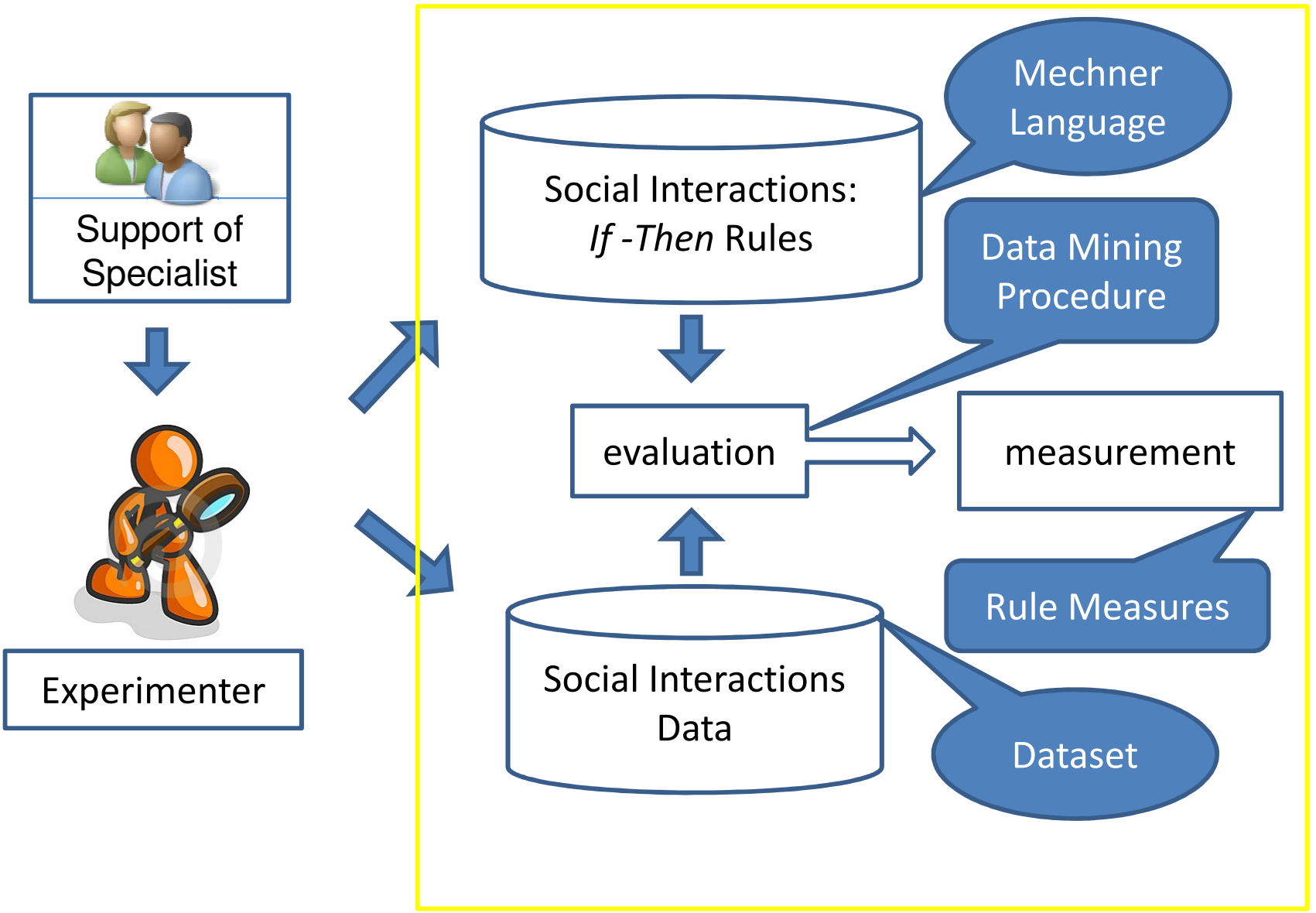

Representing Social Interactions

- Merchner Language (Social Psychology)
  - Action (or actions) = {A1, A2.....An}
  - Agent (actor) = {a, b, c...}
  - Consequence C = {C1, C2, ... Cn}

- Example: $aA1 \cap bA2 \rightarrow abC1$

Measuring Social Interactions

aA1 ∩ bA2 → abC1 Body → Head (B → H)

$$n = hb + \overline{h}b + h\overline{b} + \overline{hb}$$

	B	$\overline{B}$	
H	$n(HB)$	$n(H\overline{B})$	$n(H)$
$\overline{H}$	$n(\overline{H}B)$	$n(\overline{H}\overline{B})$	$n(\overline{H})$
	$n(B)$	$n(\overline{B})$	N

where

hb number of observations h and b true
$\overline{h}b$ number of observations h false and b true
$h\overline{b}$ number of observations head h true and b false
$\overline{hb}$ number of observations head h and body b false.

n = number of observations

Measuring Social Interactions

Support $$SupR = \frac{hb}{n}$$

Confidence $$ConfR = \frac{hb}{hb + \overline{h}b} = \frac{hb}{b}$$

Cossine $$CosR = \frac{hb}{n * \sqrt{\frac{h*b}{n^2}}}$$

... considering interactions in Facebook

Social Interactions in Facebook

Data from Facebook

- 1000+ user profiles
- Python crawler
- 3.328.248 actions
- 38.517 behavioral contingencies

Identifying Contingencies

Social interactions in Facebook:

- A1 = *Post* on a Wall
  - *photo, link, swf, video, text, etc..*
- A2 = *Comment* a Post
- A3 = *Like* a post
- A4 = *Mark* a user
  - *marking* the name of a friend in a message
- C1 = notification of a *Post* (social stimulus)
- C2 = notification of a *Comment*
- C3 = notification of a *Like*
- C4 = notification of a *Mark*

Andrea Vidal

Foi bom te ver na PDA correndo!!!
Boa, boa! Fez qto pra qto??Irs...
bjos

11 hours ago ·

Carlos Magno Do Nascimento Déa, tb gos
sinceramente não sei direito quanto eu fiz pq
que o 1o trecho terminei em 30 min (com os
Os trechos 5 e 6 (10,5km) fiz em menos de 5
mas preciso treinar direito rs. Vc nem preciso
né!? Tava com camiseta vip e tudo mais né. E
balada!! :-) Bjão!!

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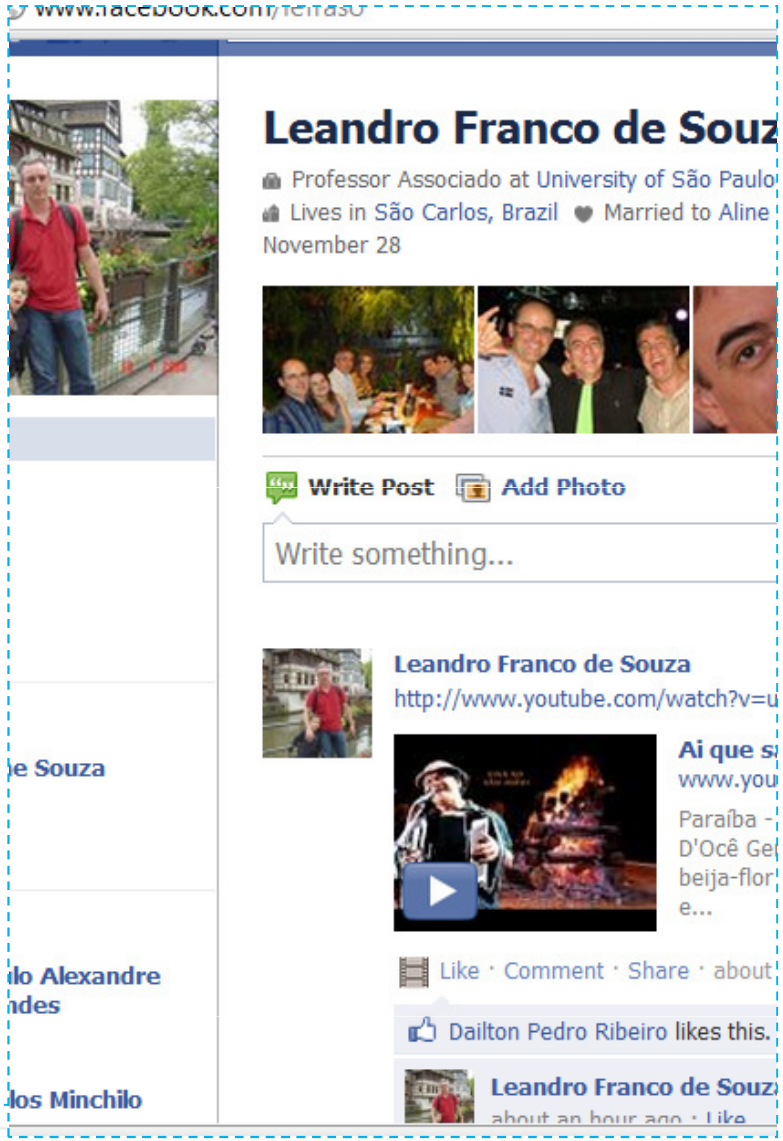

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que 100%, sem contar as risadas, idéias e conversas de almoço. Valeu pess
Hj teve bombom mas o Brownie virá na proxima aula de GP!

Saturday at 10:36pm ·

2 people like this.

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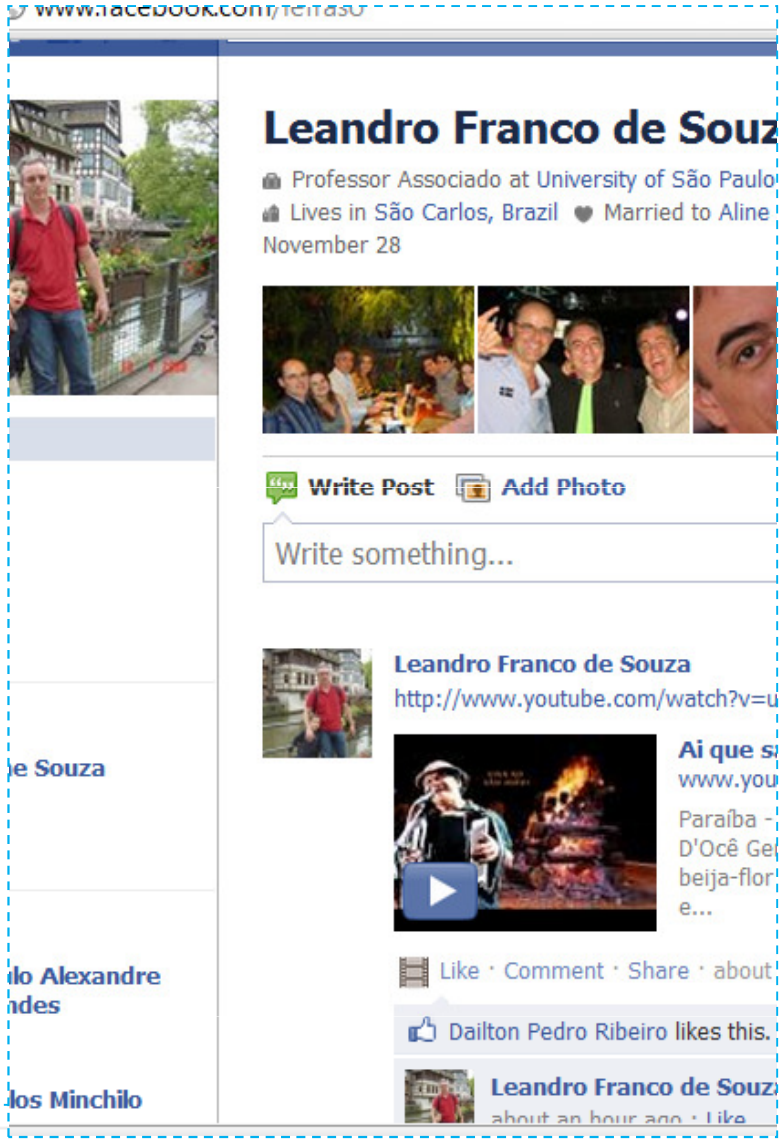

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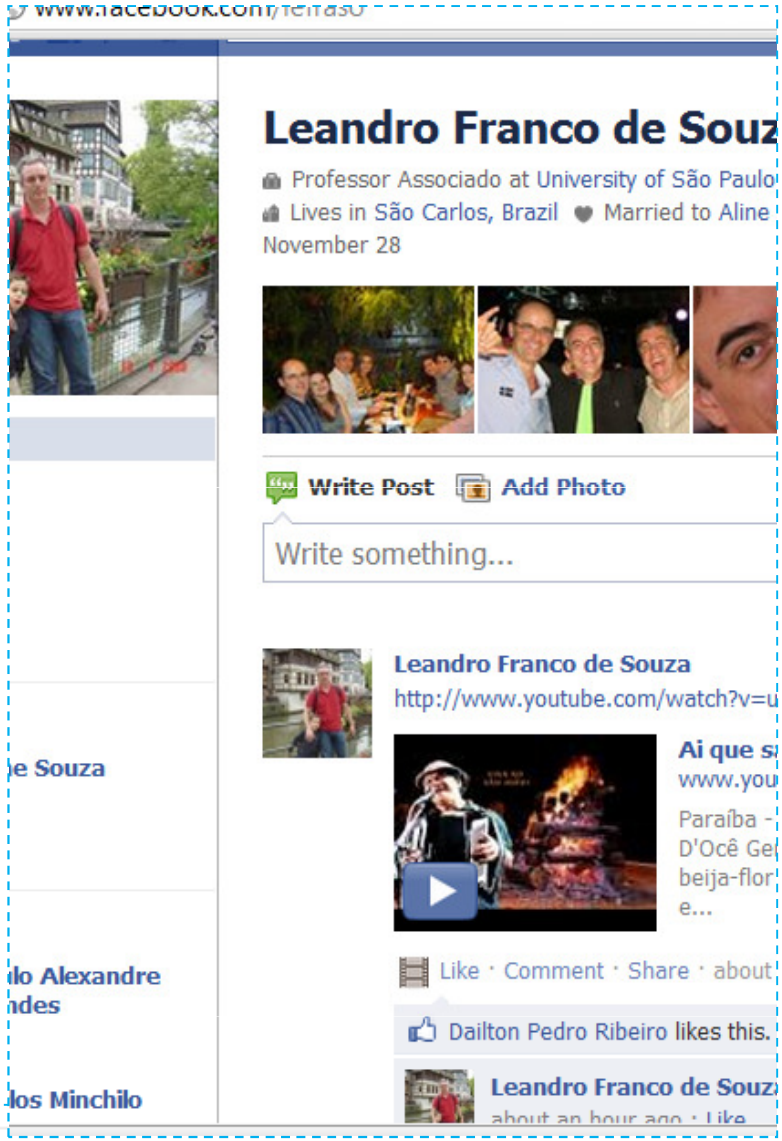

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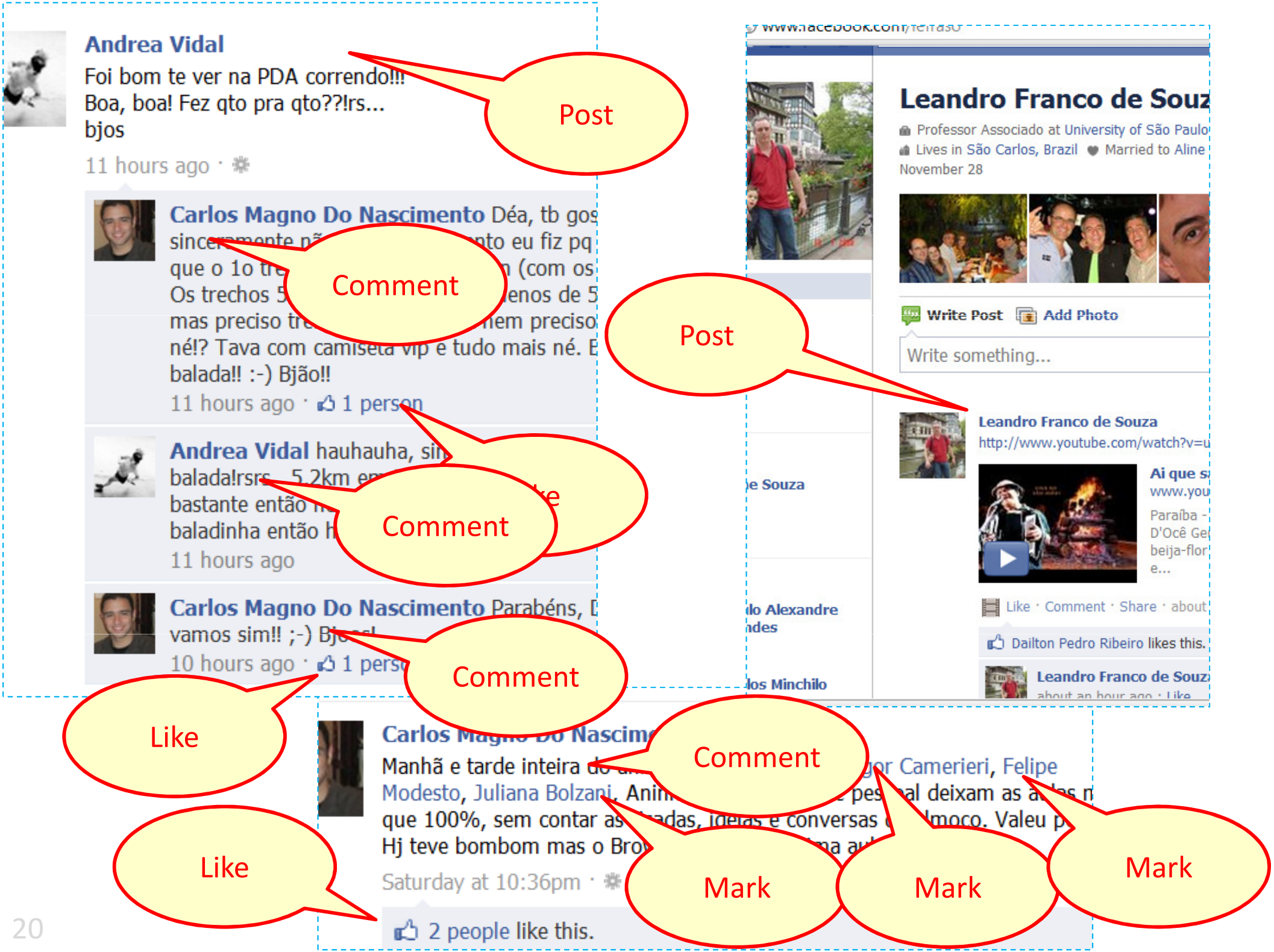
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Contingencies

$$\text{R1.1}\ aA_1 \cap akA_2 \cap alA_3 \rightarrow aklC_1 \cap aklC_2 \cap aklC_3$$
$$\text{R1.2}\ aA_1 \cap akA_2 \cap \overline{al}A_3 \rightarrow aklC_1 \cap aklC_2$$
$$\text{R1.3}\ aA_1 \cap \overline{ak}A_2 \cap alA_3 \rightarrow aklC_1 \cap aklC_3$$
$$\text{R1.4}\ aA_1 \cap amA_2 \cap amA_3 \rightarrow aklC_1 \cap aklC_2 \cap aklC_3$$
$$\text{R1.5}\ aA_1 \cap akA_2 \cap ak1A_4 \rightarrow aklC_1 \cap aklC_2 \cap aklC_4$$

- user *a*, groups of users *k* and *l*, and same group *m*
- user *a* **may or not** add *Comments* or *Likes*

R1.1 - comment + like

R1.2 - comment

R1.3 - like

R1.4 - comment + like from same group

R1.5 - comment + mark

Observations

$$SupR = \frac{hb}{n}$$

$$ConfR = \frac{hb}{hb + \overline{h}b} = \frac{hb}{b}$$

$$CosR = \frac{hb}{n * \sqrt{\frac{h*b}{n^2}}}$$

	ConfR	SupR	CosR	
R1.1	100%	64.28%	80.17%	comment + like
R1.2	100%	75.39%	86.83%	comment
R1.3	100%	88.89%	94.28%	like
R1.4	100%	43.04%	65.60%	comment + like from same group
R1.5	100%	50.97%	71.39%	comment + mark

like >
comment >
comment + like >
comment + mark >
comment + like from same group

Measurement

$$\text{R2.1}\ aA_1 \cap kA_2 \cap lA_3 \rightarrow aklC_1 \cap aklC_2 \cap aklC_3$$
$$\text{R2.2}\ aA_1 \cap kA_2 \cap \overline{al}A_3 \rightarrow aklC_1 \cap aklC_2$$
$$\text{R2.3}\ aA_1 \cap \overline{ak}A_2 \cap lA_3 \rightarrow aklC_1 \cap aklC_3$$
$$\text{R2.4}\ aA_1 \cap kA_2 \cap k1A_4 \rightarrow aklC_1 \cap aklC_2 \cap aklC_4$$

- user *a* **does not** add *Comments* or *Likes*

R2.1 - comment + like

R2.2 - comment

R2.3 - like

R2.4 - comment + like from same group

Measurement

	ConfR	SupR	CosR	
R2.1	100%	63.17%	79.48%	comment + mark
R2.2	100%	74.13%	86.10%	comment
R2.3	100%	87.83%	93.72%	like
R2.4	100%	50.53%	71.06%	comment + like from same group

like >
comment >
comment + like >
comment + like from same group

Summary

- Facebook users are more engaged in social interaction involving *Likes* than *Comments*, and more engaged in interactions involving *Comments + Likes* than *Marks*
- the participation of the user *a*, who provides the social stimulus, with actions *Comment* and/or *Like* does not modify significantly the involvement of other users in social interaction.

Final Remarks: Contributions

- A novel technique for providing a human readable codification and measurement of social interactions
  - represented as behavioral contingencies
  - evaluated using data mining procedures
  - allows the representation and evaluation of social interactions, making explicit actions performed by the users

Final Remarks: Limitations

- The identification and representation of actions and consequences as behavioral contingencies depends on the subjective evaluation of the experimenter

Final Remarks: Future Works

- Current efforts involve measuring the impact of the media usage in the social interactions
- We plan to evaluate other social interactions in other social networks such as Google+, and use the evaluation of social interactions to provide guidelines for designers
- Recent results observed interactions involving
  - mobile devices
  - media assets (e.g. YouTube videos)