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The Effect of User Features on Churn in Social Networks

Marcel Karnstedt, Matthew Rowe, Jeffrey Chan, Harith Alani and Conor Hayes

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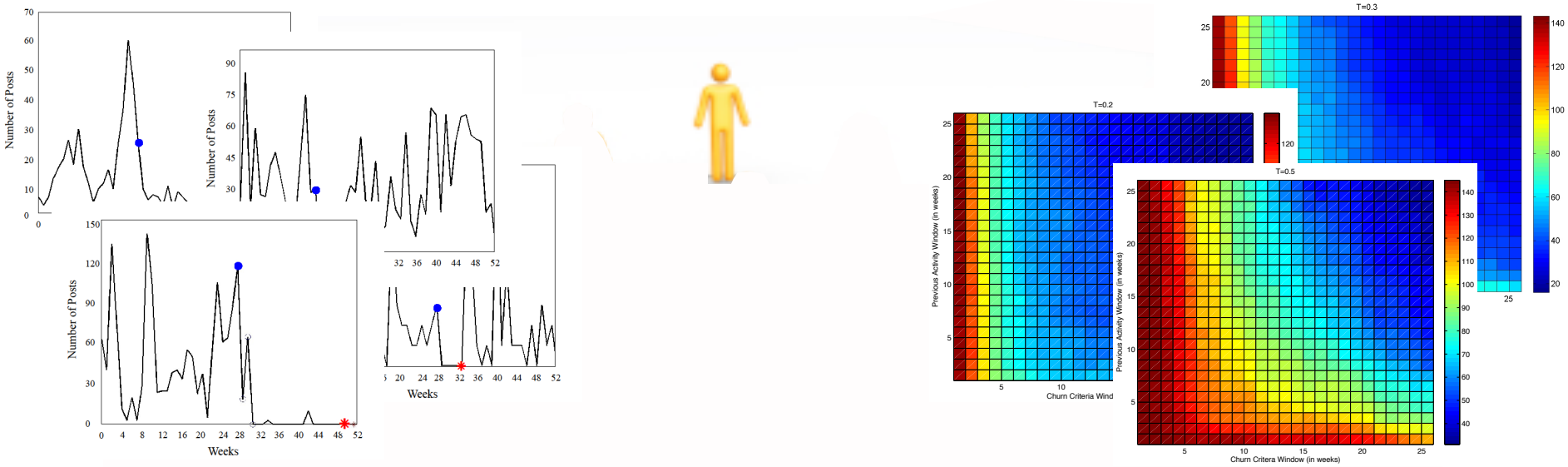
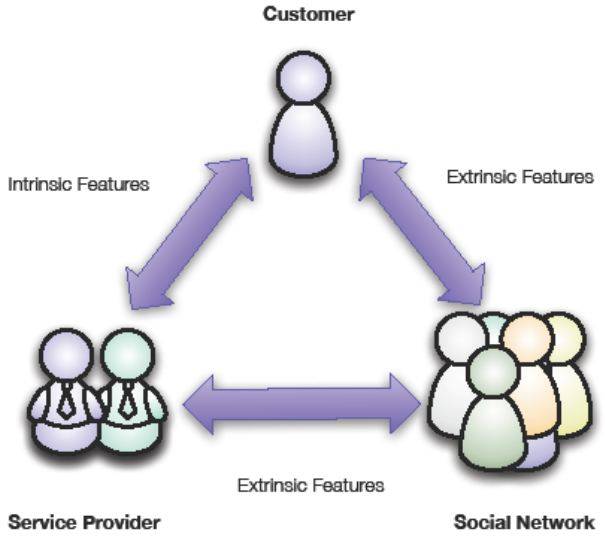
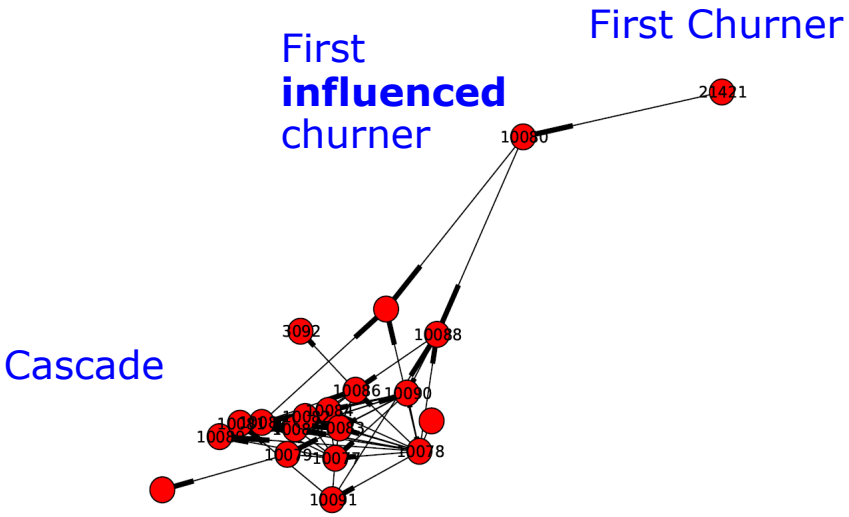
What is Churn??



- *Churn* is a risk (opposite to opportunities)
  - User retention vital to community health & functioning
- Hot topic in industries like telcoms
  - Not clearly defined in online social networks
  - Full defect vs. partial

Why Churn?





- Additional dimension
- Community & user value
- Personal needs & satisfaction
- Network effects observable

Where we are…

1. What is Churn?
   – Proposed flexible definition, different types
2. Why Churn?
   – Identified features, community & user value
3. **How to predict?!**
   – How do we know if a user is going to churn?
   – Can we correlate a user's value within a community with their churn probability?

- Set our future research agenda…

User Value & Churn Probability

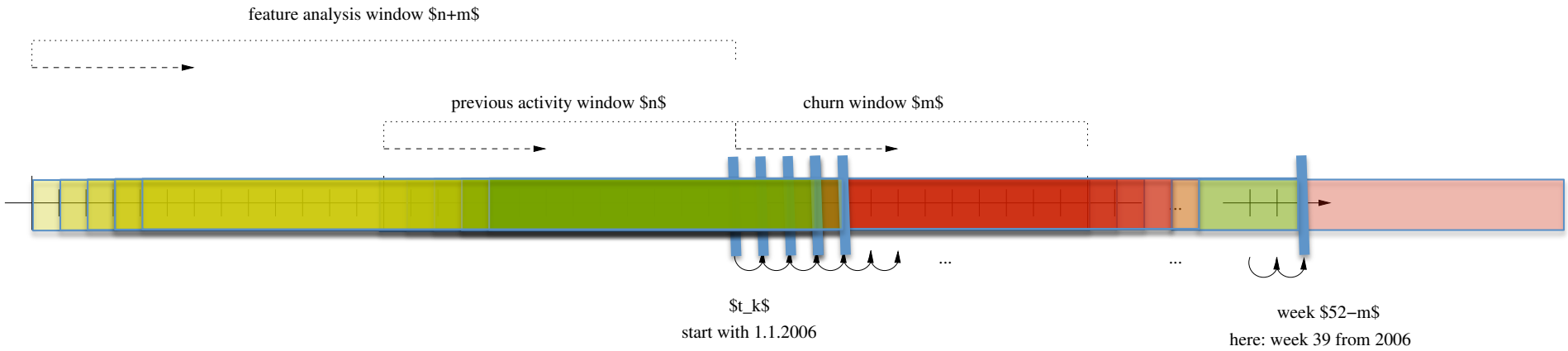
- Like in telcom: start with feature-based approach
- But we're sure: network effects have to be considered
- Correlation: features vs. churn probability

$$P(churn|v_i) = \begin{cases} 0 & \mu_C(v_i) \geq \mu_{PA}(v_i) \\ 1 - (\frac{\mu_C(v_i)}{\mu_{PA}(v_i)}) & otherwise \end{cases}$$

  - Features: structural and social network, reciprocity, persistence/productivity, popularity, sentiment, …

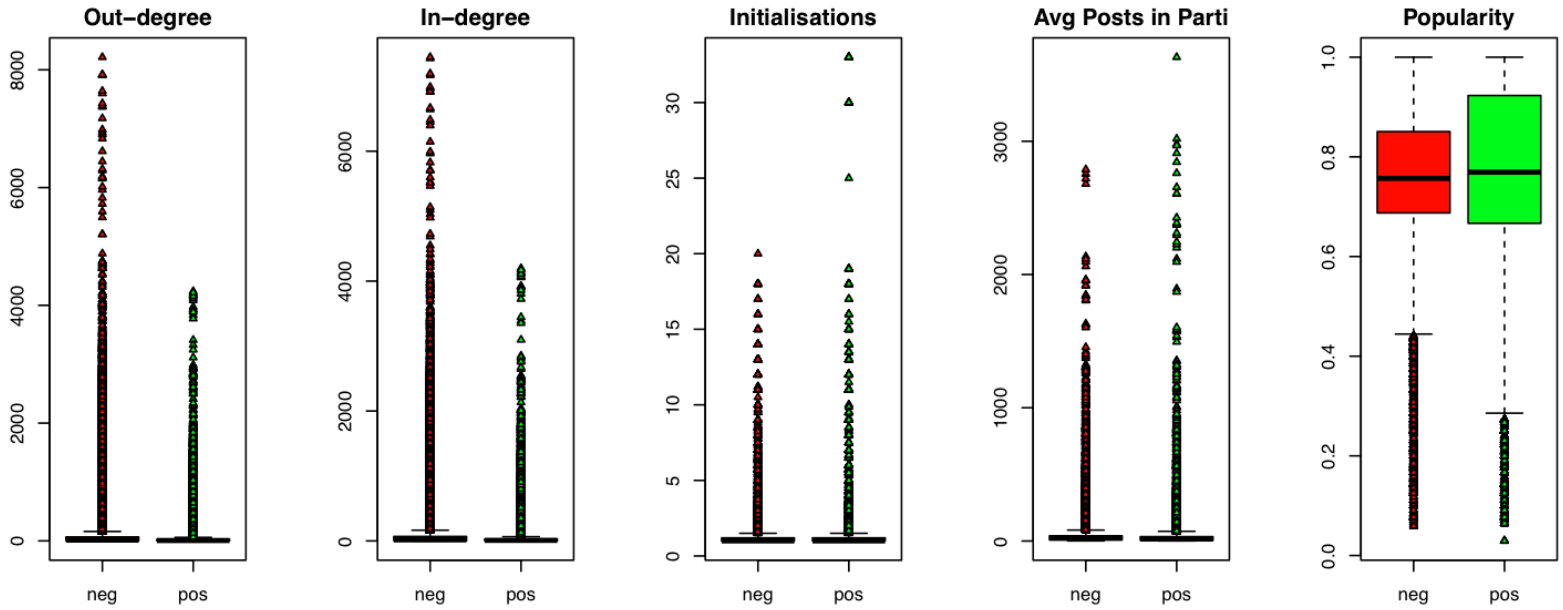
Case Study

- Data provided by the largest Irish message board Boards.ie
- Used all data published within 2006
- Derived features at weekly increments



Analysis: Global Churn

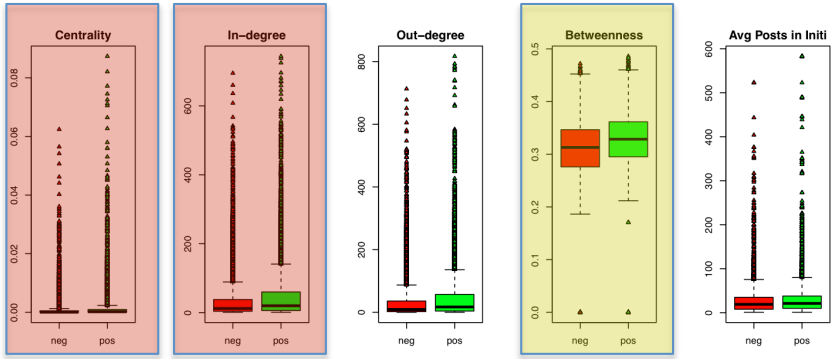
Threshold	P	R	F_1	κ
0.2	0.638	0.639	0.635	0.266
0.5	0.668	0.666	0.649	0.286
0.7	0.734	0.741	0.733	0.410



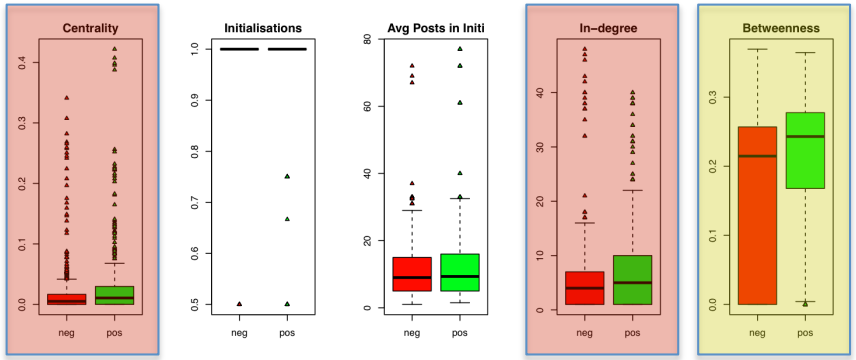
Expected!?

Surprise?!

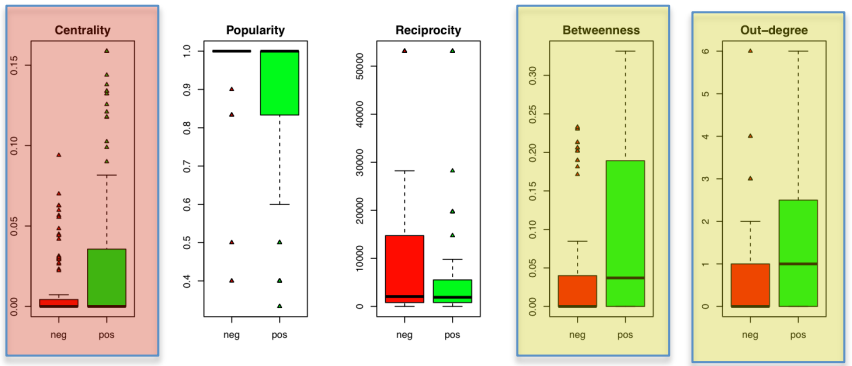
Analysis: Per Forum Churn



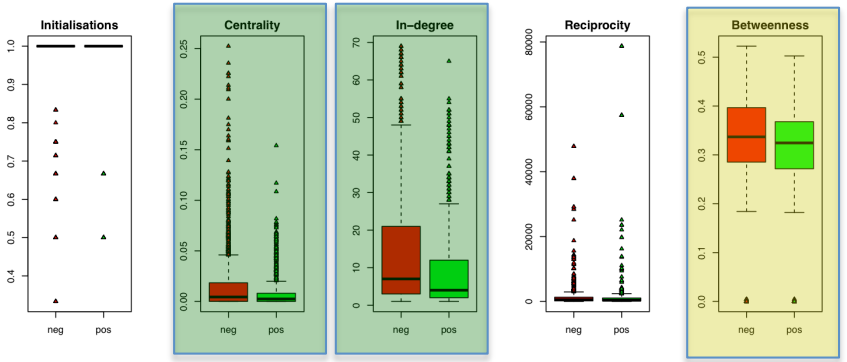
Highest: After hours



Median: Prime time cartoons



Lowest: Japanese culture



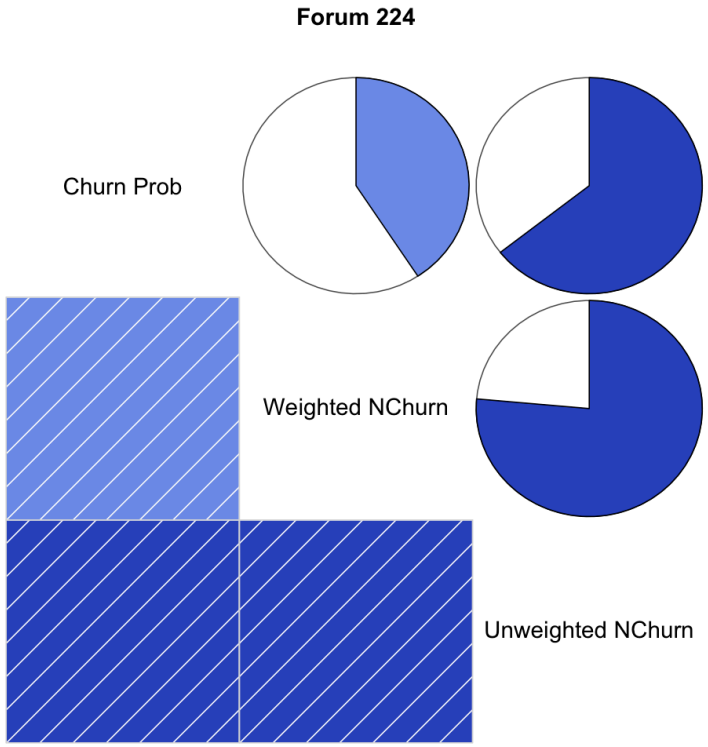
Mean: World of Warcraft

- Performance better than global, larger values better in forums with greater activity
- Distinct forums exhibit distinct behaviour

Towards Network Effects

- Unweighted Neighbourhood Churn:
  - Average churn probability of neighbours
- Weighted Neighbourhood Churn
  - Average weighted churn probability of neighbours
- Experiments over 4 forums from before
- Induced Linear Regression Model
  - Dependent variable: churn probability
  - Independent variables: unweighted and weighted neighbourhood churn probabilities

Analysis: Per Forum Neighbourhood Churn



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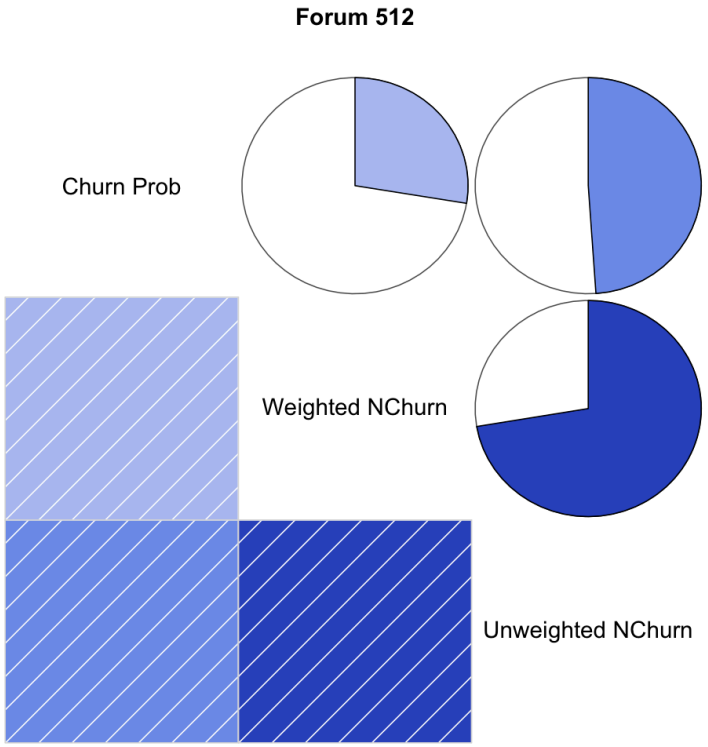

Median: Prime time cartoons

Positive correlation between churn probability of a user and neighbourhood churns

…what about other features of the neighbourhood?!?

Conclusion

- Correlation existing, but significant differences:
  - Global vs. local
  - Between forums
- Advanced analysis of forum characteristics and these effects needed … classification/clustering
- Extend analysis (windows, filters, sample, …)
- Choice of features, integrate social roles
- Analysis of network effects
- *…value, health, personal needs, … loads to do!*