Analyzing Interactive Narratives using Computational Models and Player Response Data

John Murray

January 13, 2018

1 Introduction

Why do we need stories?

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Stories encode complex experiential information in a way that not only allows for communication, but also for living. They combine dynamic, interesting situations with characters that are relatable and worth getting to know. They capture the types of emotions that we don't ordinarily get to experience in everyday life. The art of writing a good story is to find the balance of finding true observations about how humans live and connecting them together. We don't always have all the information, we often are attached to outcomes, we take risks, we make mistakes.

Existing models of story understanding pursue the "content" of stories as if there were a simple model for how they exist in our heads. Stories are not modeled, however, in the head of a reader. They are lived, and then the results are more or less memorable. A character's actions accumulate over time and over key sceenes to become predictable. We come to know the characters in stories *in the very same way* as we have come to know people in our own lives.

What role do computers have to play in story? Computers can be collaborators or research assistants; they can be actors or directors. They can create stories using some of the same creative algorithms that writers do.

What can computers not do?

They cannot predict, given a story, how a person will react. They cannot tease apart the meaning from a passage. They cannot create a moment that resonates in the way that a lifetime of witnessing human events and people can.

And that seems pretty obvious, given that writers spend years watching people and building various models of behavior and personality.

The act of witnessing a story is one of the most human activities in existence, and one still far out of reach of current computers.

But our approaches to what is "computable" are beginning to shift. AI has begun with a clean, mathematical model of meaning that translates into planning, into ontologies and into a simpler model of how information is accumulated and shared (schemas, scripts, etc). Today, various neural network approaches are increasingly becoming capable of tranining themselves on datasets in both supervised and unsupervised methods. These systems are still far from being capable of reading stories, and the research community has yet to realize exactly how important it is to both have the capabliity of telling a story and to make use of this most fundamental capacity to understand humans.

Stories are a lens into the human experience. This dissertation sets out to rectify at least part of the two major trends of ai research through the problem of stories. One, the statistical and data driven approach of machine learning, and two, the logical representations of meaning present in ontologies, diagrams and other innovations in symbolic reasoning.

To do this, we'll attack a harder problem than story understanding as it has yet been tackled, that of textual understanding. We'll develop a theory of meaning co-creation in the tradition of reader response using a case study of a choice-based cinematic adventure game that has rich layers of authored and interpreted information. We'll also likewise treat the player's experience as a primary source of insight into the meaning of the work. Using the data including video recording and phyisological signals from the experience itself and from the player's raw moment-to-moment understanding and reaction we will begin asking questions about what the right questions are.

2 Story Understanding and The Semantic Gap

3 Extending Story Intention Graphs

4 Study Design & Data Collection

5 Analytical Methodologies

6 Conclusions

7 References

References

[1] David K Elson. *Modeling Narrative Discourse*. PhD thesis, Columbia University, 2012.

8 Export Configuration

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