WRITING QUALITY AGILE USER STORIES WITH STORYLINE

TOOL OVERVIEW AND SURVEY

OUTLINE

- Research Motivation and Purpose
- Finding User Story Defects: The Quality User Story Framework and AQUSA
- Overview of StoryLine
- Survey Overview

RESEARCH MOTIVATION AND PURPOSE

- The lack of standardized Requirements Engineering practices in Agile development negatively impacts system quality and contributes to 13% of projects being cancelled.
- Past studies have indicated that Agile requirements, or user stories, are often written without a quality framework in mind.
- The quality of a system is *highly* dependent upon the quality of its requirements! Requirement defects must be mitigated to ensure the requirements are clear, complete, and concise.
- Therefore, poor Agile user stories cannot bring project success.

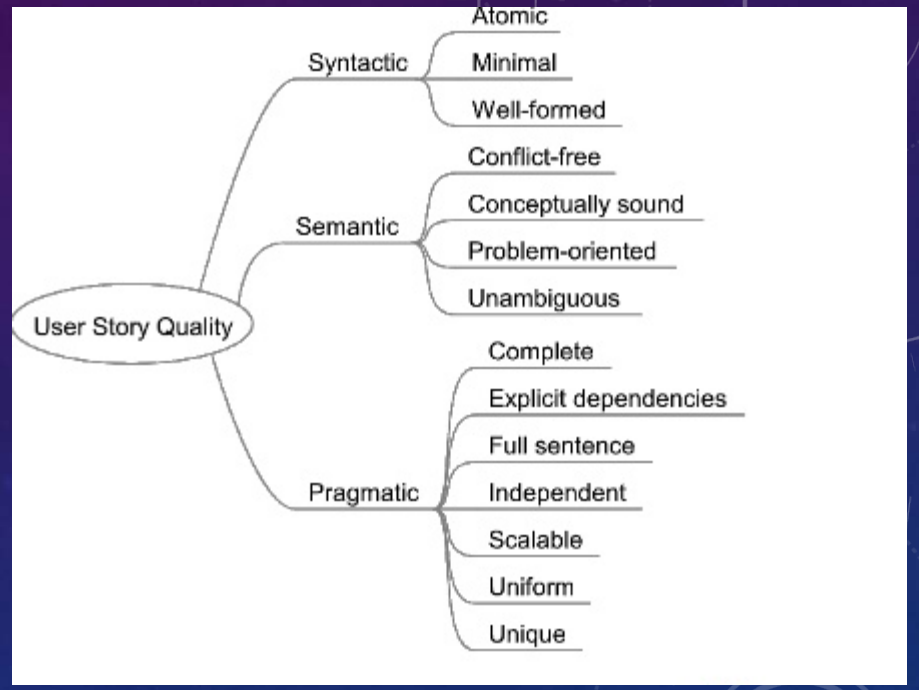
RESEARCH MOTIVATION AND PURPOSE

- Several Requirement Analysis tools exist to help analysts identify requirement defects. However, these tools:
  - Offer little to no guidance on how to mitigate potential requirement defects,
  - Require high levels of user customization to be effective, and
  - Were not developed with Agile user stories in mind.

- This research introduces StoryLine, a new Natural Language Generation (NLG) based automation tool, that automatically corrects defects in Agile user stories in accordance with the Quality User Story (QUS) framework (see later slides).
- Unlike previous efforts, StoryLine removes the burden of improving the quality of requirements from the user in a quick, efficient manner that is compliant with the Agile Manifesto.

FINDING USER STORY DEFECTS: THE QUALITY USER STORY FRAMEWORK AND AQUSA

- Since Agile user stories are often unable to adhere to traditional requirements quality characteristics (INCOSE, IEEE), Heck and Zaidman proposed the Agile Requirements Verification Framework, a tailor-made quality framework for Agile methods that focuses on four high-level verification criteria for user stories:
  - completeness,
  - uniformity,
  - consistency and
  - correctness.
- Lucassen and others expanded upon this framework with their Quality User Story (QUS) framework, a collection of 14 criterion that collectively determine the quality of user stories.
- Lucassen and others also developed Automatic Quality User Story Artisan (AQUSA) ©, a tool which identifies defects found in user stories, using the QUS framework as a reference.
- However, AQUSA leaves the burden of fixing user stories to the user.



AQUSA
The Automatic Quality User Stories Artisan

https://github.com/gglucass/AQUSA

COVERAGE OF AQUSA (DETAILS)

- The Automatic Quality User Story Artisan (AQUSA) © tool checks for the following:

Quality Criterion	AQUSA Details	Example
Atomic	AQUSA parses the *roles* and *means* of each user story for occurrences of "and, &, +" to find instances of compound requests.	"As a User, I am able to click a particular location from the map and thereby *perform a search of landmarks associated with that latitude longitude combination*" results in an error.
Minimal	AQUSA identifies any user story that contains additional text after a dot, hyphen, semicolon or other separating punctuation marks. Additionally, the tool checks for text that is in between brackets and/or parentheses.	"*As a care professional, I want to see the registered hours of this week (split into products and activities)*" results in an error being reported.
Well-formed	AQUSA verifies that each segment of the user story format is present	If no role in the form of "As a <type of user>" is found, such as in "*I want to see an error when I cannot see recommendations after I upload an article*", the tool reports an error.

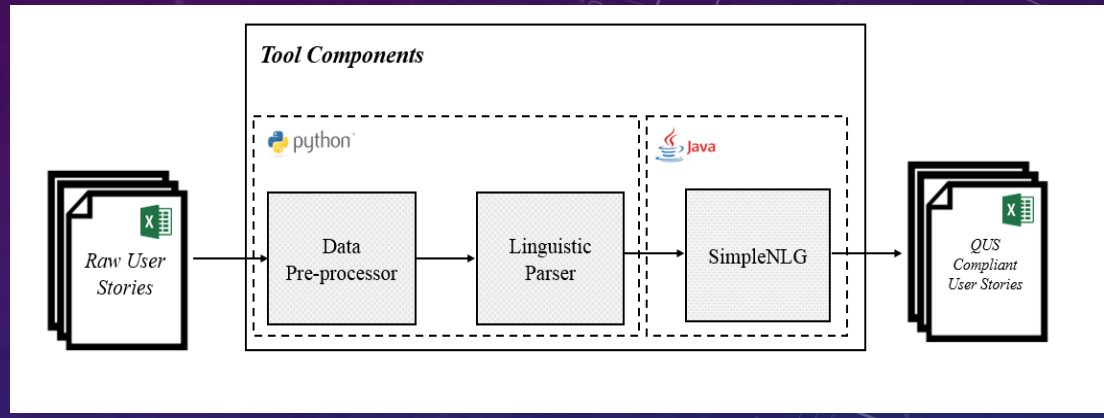
COVERAGE OF AQUSA (DETAILS)

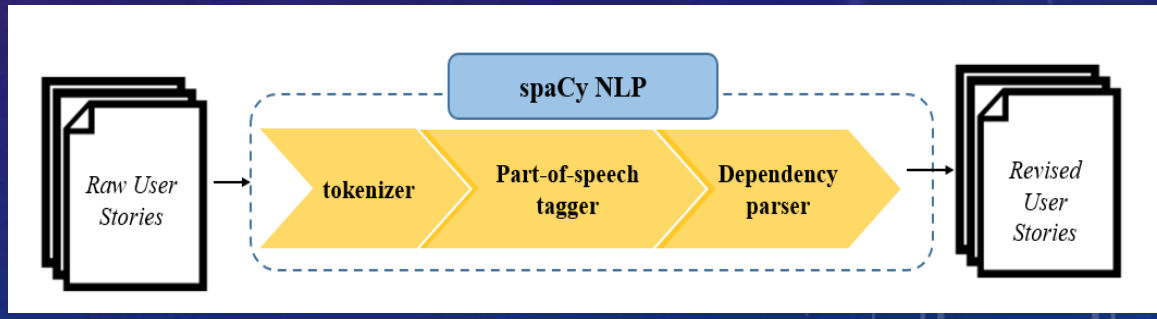
- The Automatic Quality User Story Artisan (AQUSA) © tool checks for the following:

Quality Criterion	AQUSA Details	Example
Explicit Dependencies	Whenever a user story includes an explicit dependency on another user story, it should include a navigable link to the dependency.	"*As a care professional, I want to edit the planned task I selected—see 908*" would prompt the user to change the isolated number to a hyperlink.
Uniform	AQUSA verifies that each user complies with the most commonly occurring format of "As a <type of user>, I want <some goal>, so that <some reason>".	AQUSA would report an error indicating that "*As a User, I am able to delete a landmark*" deviates from the framework 'I want to'.
Unique	When the similarity between user stories is bigger than 90%, AQUSA reports the user stories as potential duplicates.	N/A

OVERVIEW OF STORYLINE

- StoryLine is a new research based, Natural Language Generation (NLG) automation tool that automatically improves the quality of Agile user stories in accordance with the Quality User Story (QUS) framework.
- When a user story has a defect, StoryLine applies the AQUSA criterion to fix the user story on behalf of the user!
- Written in Python and uses the following tools:
  - SpaCy – for linguistic processing of user stories
  - JAVA – to reconstruct user stories once defects are mitigated
- Inputs and outputs provided in Excel, and traceability between inputs and outputs provided so that changes made by StoryLine are easily identifiable.

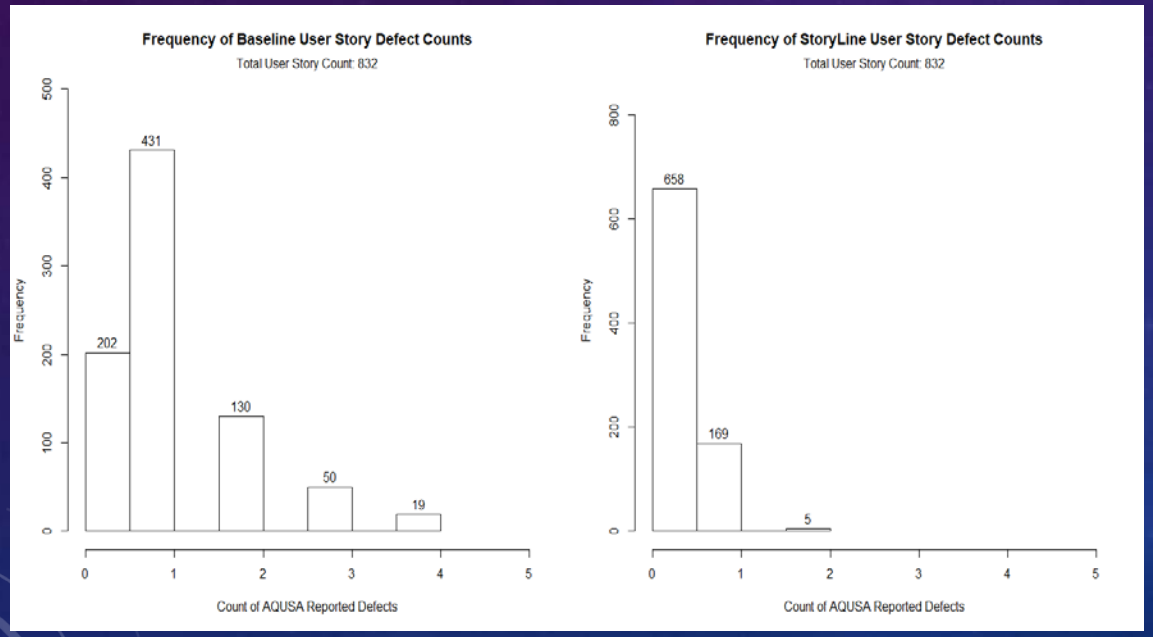


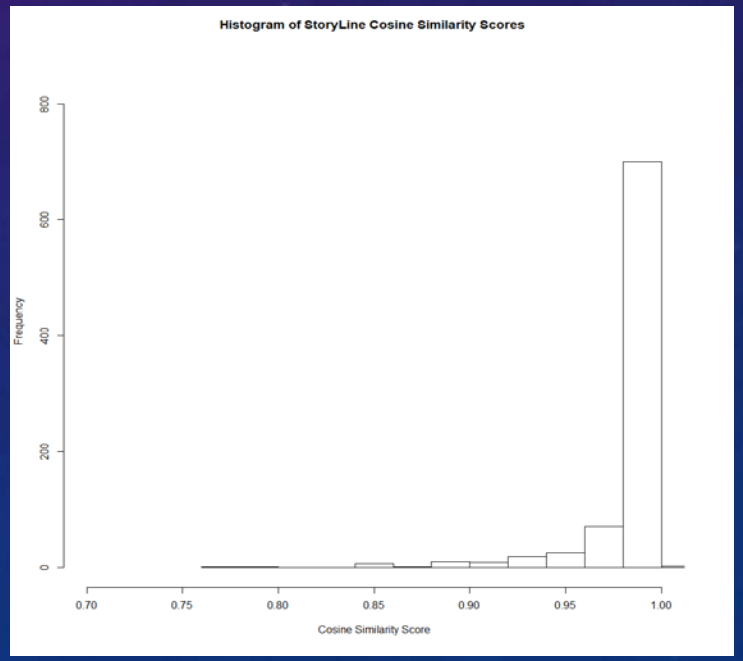


OVERVIEW OF STORYLINE

- To date, the viability of StoryLine has been proven in two ways:
  1. By proving that StoryLine fixes user story defects automatically by using AQUSA to show user story quality improves after using StoryLine, and
  2. By proving that modifications made to user stories by StoryLine does not change the original meaning of the user story.

$$Sim_{cos}\left(\overrightarrow{US_i}, \overrightarrow{US_j}\right) = \cos(\theta) = \frac{\overrightarrow{US_i} \cdot \overrightarrow{US_j}}{\left\|\overrightarrow{US_i}\right\| \left\|\overrightarrow{US_j}\right\|}$$





SURVEY OVERVIEW

- The purpose of this survey is to assess StoryLine's usability and ability to correctly modify user stories.
- Participation in this survey will be anonymous, and no PII data will be collected.
- The survey is expected to:
  - Have a duration of 2 – 3 hours
  - Consist of analyzing a set of user stories, before and after being processed by StoryLine, in order to answer the provided survey questions
  - Include a demo of how to use StoryLine
- The **Informed Consent for Participation in a Research Study** form for this effort is provided below for your review.
- HRP-503 - TEMPLATE Consent WOD and Exempt Research 8.6.2018_Ussery.doc

SURVEY OUTLINE

- 1 hour: analysis of 100 user stories to answer the following questions, on a per user story basis:
- 1-2 hours: Survey questions (per user story) :
  - Yes / No:
    - **Q1:** Does the user story have a defect according to the QUS framework?
    - **Q2:** Did StoryLine modify the user story?
    - **Q3:** If the user story was modified, were the modifications correct? (using QUS framework as measuring stick)
  - **Free text for comments :**
    - **Q3:** If the user story was modified but the modifications were incorrect, what errors still exist in the user story?
    - **Q4:** If any, what further changes would you recommend to improve the quality of the user story?
  - **5-point Likert Scale**:
    - **Q5: Ease of Use:** In comparison to your existing method of revising user stories, how easy was StoryLine to use? (If not manual, please describe your current method.)
- 15 – 20 minutes:
  - Q&A
  - General feedback / Recommendations