**SOFTWARE DEVELOPMENT PLAN**

UMUC

**Sentiment Analysis App**

**Version 0.1**

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# **Change History**

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| --- | --- | --- | --- |
| Date | Version | Description | Author |
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# Overview

## Project Summary

### Purpose, Scope, and Objectives

* Purpose:
  + This project will provide a web UI which allows any arbitrary person to input one or multiple sentences, and upon pressing a submit button, will be provided with the discernable sentiment analysis of the provided text.
* Scope:
  + The scope of this project will incorporate two application components
  + The first component is going to be a client web interface
  + The second component will be a rest endpoint which exposes a POST route for submission of text for analysis
* Objectives
  + The primary objectives will be:
  + Define a user interface which follows industry standard accessibility guidelines
  + Define a REST endpoint which exposes a POST web interface for submitting text
  + Document functionality, design, testing, and user instruction
  + Deploy a working and functional website which exposes the application functionality

### Assumptions and Constraints

* UI:
  + A user could input garbage text, but if the AFINN / Emoji datasets can process it, they will
  + The input field should have an upper limit of 1MB worth of text to analyze at any one time, this will avoid overtaxing the server
* API
  + This endpoint should also kick off a delayed job to avoid binding the main thread of the server application
  + The expectation, is that the input will accept new line characters, and that is how individual sentiments will be broken up for the overall score
    1. Project Deliverables
* At the end of this project, the team should have a fully functioning web application which is served up over HTTP from a server on the internet.
* There should also be clear documentation on the page to describe what each element represents
* Lastly there should be comprehensive documentation of the process and implementation of the software, as well as attribution for any open source libraries leveraged to make the application what it is.

# References

* IEEE Std 1058-1998, Software Project Management Plans

# Definitions

* Agile – A lean development methodology used by the team to manage requirements on an iterative basis.
* Scrum – Agile based Software Development Lifecycle (SDLC) which incorporates a backlog of tasks to accomplish a requirement or multiple requirements
* TravisCI – Internet based continuous integration platform, free for use with public GitHub projects
* Taiga.io - Free scrum/kanban based project management application.
* Sprint – A measure of time over which the team will iterate on features and be expected to produce deliverables which meet the acceptance criteria of the requirements
* User interface (UI) - the way through which the user interacts with the product
* Application program interface (API) - a set of routines, protocols, and tools for building software applications

# Project Organization

## External Interfaces

* Customer – Dr. Nicholas Duchon

## Internal Structure

* The Sentiment Analysis development team will consist of a team lead / senior developer, test engineer, technical writer, and junior developer. This team composition will create a structure allowing for direct development of the software requirements, design and modification of the user interface elements as agreed upon between the client and the software lead developer.

## Roles and Responsibilities

* Team lead / senior developer - Performs the task of project oversight, requirements management, and schedule obligations for the team. Will deliver project-related integrated master schedules (IMS) as well as conduct schedule conflict resolution to mitigate any risks associated with the waterfall methodology. In addition, this position is also responsible for feedback from the customer base, and providing on-time deliverables at periodic milestones within the project lifecycle.
* Test engineer - uses the understanding and configuration of data sources and connectivity to persist data in the Sentiment Analysis tool. They will be required to validate and test requirements associated with saving data.
* Technical writer -Provides documentation for the project and oversight for all related documents. Will deliver the user guide.
* Junior developer - Collaboratively develops software to meet defined requirements with the guidance of the Sr. Developer.

# 5. Managerial Process Plans

## 5.1 Work Plan

### 5.1.1 Work Activities

|  |  |  |
| --- | --- | --- |
| * + 1. **Task Name** | **SDLC Task Category** | **SDLC Sub-Task** |
| Form Teams | Analysis | Business Analysis |
| Initial Customer Engagement | Analysis | Business Analysis |
| Identify Customer Needs and High-Level Requirements | Analysis | Software Analysis |
| Develop Milestones | Analysis | Business Analysis |
| Develop Requirements | Design | Software Analysis |
| Deliver and Discuss Software Requirements Specification | Analysis | Business Analysis |
| Software Design Review | Design | Software Design |
| Create Software Design Document | Design | Software Design |
| Deliver and Discuss Software Design Document | Analysis | Software Design |
| Create Software Testing Specification | Design | Test Design |
| Deliver and Discuss Software Testing Specification | Analysis | Business Analysis |
| Code Background Task Worker | Code | Task runner development |
| Code Sentiment Analysis process (job for worker) | Code | Design Job code to |
| Write tests for Worker and Analysis code | Test | Unit testing |
| Initial User Acceptance Engagement (display worker functionality against sample test data) | Test | User Testing |
| Code POST endpoint to accept text | Code | Web API Development |
| Integrate POST endpoint with job submission to worker | Code | Core Functionality Development |
| Write tests for integration of POST endpoint | Code | Unit Testing |
| Deploy current code (0.1) | Deployment | Deploy beta functionality |
| Team review of current functionality | Test / Analysis | Review the capability of POSTing data to web endpoint and receiving expected response |
| Customer Engagement | Analysis | Business Analysis |
| Code Index page | Code | UI design and implementation |
| Code Client-side JavaScript for AJAX form submission to POST endpoint | Code | Client side script design |
| Deploy current code (0.2) | Deployment | Deploy release candidate |
| Customer Engagement | Analysis | Business Analysis |
| Produce Extended Functionality User Documentation | Code/Documentation | Documentation Development |
| Test client facing interface | Test | Ensure functionality with multiple types of data |
| Fix regressions existent | Review/Code | Fix any bugs which are present in the functionality of the app from the user perspective |
| Release 1.0 | Deployment | Deploy working and deliverable project code |
| Final Customer Engagement | Analysis | Business Analysis |
| Final User Acceptance Engagement | Test | User Testing |
| Delivery of Product (Git repo containing all code and documentation) | Transfer of Code | Release of code to professor |

### 5.1.2 Schedule Allocation

* The project schedule will be fluid, with weekly sprints being accomplished. Each sprint should encompass some major feature, and a retrospective session following that week to adjust to help meet the delivery schedule of the end product. As each sprint completes, there should be some code or documentation which can be displayed to the team and customer for feedback and review, as well as action planning should any regressions be noticed.

### 5.1.3 Resource Allocation

|  |  |
| --- | --- |
| ***Resource*** | ***Allocation*** |
| *Application Server* | The server will be housed in Digital Ocean, and run against the Ubuntu 16.04 operating system |
| *Docker* | Linux container runtime, will be used to allocate application resources on the server for proper application functionality |
|  |  |
|  |  |

**Table 2: Resource Allocation**

## Risk Management Plan

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Risk Type** | **Probability of Occurrence** | **Impact** | **Loss of time (Days)** | **Exposure (Days)** |
| Design flaw | moderate | minor | 1-3 | 0 |
| Internet outage | low | high | variable | variable |
| Regression | moderate | moderate | 1-3 | 0 |
|  |  |  |  |  |

**Table 3: Risk Management Matrix**

# 6.Technical Process Plans

## 6.1 Process Model

The methodology to be used by the Sentiment Analysis tool development team shall be constructed in a waterfall fashion for the purpose of program management. Internally, the development team may organize and develop within the assigned periods for deliverables in a pseudo-agile fashion, building epics, stories and tasks in conjunction with the overall planning strategy for the team. This model is heavily influenced by the Department of Defense model for government acquisition planning with lean development phases. This model helps to achieve larger scale planning for acquisition and management, but provide more flexibility to the development teams tasked with implementation.

The process in place accommodates for a start (kickoff) activity based on project assessment and business analysis with and without the customer present. This provides for the development of both sub-processes and requirements which are used to generate milestones over the course of the project, and to assign responsibility of development tasks throughout the team. The conclusion of the project, also listed as a milestone, serves as the final delivery of the project after multiple cycles of customer engagement and user acceptance testing.

## 6.2 Methods, Tools, and Techniques

The Sentiment Analysis tool development team, following the agile methodology for program management in section 6.1, will also require a standard process by which development, testing, integration, and documentation is performed.

The following standards are to be implemented and adhered to throughout the lifecycle of the project.

* + As each feature is assigned to a sprint, that is a commitment to deliver that feature code, either as deployed software, or as a user facing interface to display.
  + Software and documentation changes will be added to the git based software repository and pushed up to GitHub
  + Every sprint will incorporate development, documentation, testing, and deployment.
  + The software repository will be integrated with TravisCI on every push of new code to GitHub (this includes documentation changes by design)
  + Upon test success within Travis, the project lead will deliver the designed code to the server for review and testing by the team prior to the next sprint planning