COMS BC 3162 Capstone Project

Developing Accessible User Interfaces

Spring 2024

1 Description

The goal of this project is to create an accessible front facing website designed to teach or more broadly inform an audience of a topic of your choice. In so doing show, you will showcase your ability to create an accessible design and understand how your design may be applied in the real world to communicate with a broad spectrum of virtual visitors. There is great flexibility with respect to the topic of your website, however some examples include using Flask to develop an educational tutorial on text-to-speech, screen magnification or computer vision hosted on github.io.

There are several milestones designed to ensure that you remain on track to complete the project by the end of the semester. You will also have an opportunity to explore in greater detail the various aspects which go into designing an accessible user interface. In-class presentations will take place on the final day of class. You have the choice as to whether to work in teams of 2-3 students or to work individually.

2 Milestones

The following milestones will be graded:

1. **Milestone 1: February 24th**
   The first milestone is primarily a written component. You will confirm your team members and provide a write-up of what your team will attempt to teach/communicate with its website, who will make the greatest use out of this information, and what accessible functionality would be most appreciated and used by this target demographic. In addition to citing current literature about the motivation for the inclusion and/or exclusion of certain accessible features in favour of others, think about how the target users might benefit specifically about the functionality they choose to implement and how the various facets of that functionalty complement each other to provide a more accessible user experience.

2. **Milestone 2: March 24th**
   A more code-centric assignment, here you should fundamentally provide initial code written up to this point for the website along with a small document detailing what you have already implemented, what you have yet to implement, what issues you forsee that you may run into and how you might solved them, alongside any modifications you have decided to make to their original outline and the motivations behind them. In addition, we ask the students to complete a small participation rubric for all team members to get some feedback regarding

how work is being split among teammates, this will be used in addition to a further rubric completed as part of Milestone III to arrive at a score for each student's participation in the project.

3. **Milestone 3: April 20th**
   This is the culmination of the project where the final functional website is submitted in addition to a document reflecting on the overall development process. Another participation rubric for each team member is also submitted to get a better idea of how work-delegation evolved throughout the semester. Students are asked to think about on what further steps they would take in development had they more time available to them and any changes they would make looking back on how they chose to develop their given another shot at the project. This is used as an opportunity to not only observe and grade the final product of the students' work but also ask them to examine the process of accessible design/creation and how their understanding of it shifted through the course of the class.

4. **In-class Presentation: Last Week of Class**
   You will prepare an in-class presentation for your website and topic for the last week of class. While teaching to the class the topic of the website is certainly a component of interest, the real aim of this presentation is to show how the website has been made accessible, the mechanics of implementing these accessible features and the way in which these features complement each other to create a virtual environment tailored to the audience of the website you designed. In addition to the presentation material and quality, we also monitor each student's participation to ensure equal distribution of work amongst team members.

3 Grading Criteria

Criteria	Pts
Milestone I	25 pts
Milestone II	25 pts
Milestone III	25 pts
In-Class Presentation	15 pts
Overall Participation (in part determined by feedback from partners)	10 pts
TOTAL	**100 pts**

4 Submissions

Courseworks: Milestone I, II, III, and a grading rubric for each team member to be used in the consideration of the overall participation grade as determined by the Tas IRL: In-Class Presentation (video recordings accepted in extraordinary circumstances)

5 Resources

Much of the access technology discussed throughout the course leverages ideas from computer vision, natural language processing and other topics in machine learning. You may be interested in a deeper exploration of some of the ideas and technologies we referenced throughout the semester. The capstone project is an opportunity to design something that allows you to explore a topic of your choosing in greater detail. For example, you may wish to develop a web browser extension that uses YOLO to detect objects in images and/or videos hosted on a website. Another idea would be to develop an extension of a text-to-speech system to detect and render text from images using CRAFT and optical character recognition. Both of these examples could be hosted on Google Cloud Platform and deployed on a service called Vertex AI by using Flask. You may also be interested in exploring traditional UI design topics. Below are several additional resources including papers, open source implementations and tutorials that may be of interest.

1. You Only Look Once: Unified, Real-Time Object Detection
   Paper: `https://arxiv.org/abs/1506.02640`
   Implementation: `https://github.com/ultralytics/yolov5`
   Video demo: `https://www.youtube.com/watch?v=MPU2HistivI`

2. Character Region Awareness for Text Detection
   Paper: `https://arxiv.org/abs/1904.01941`
   Implementation: `https://github.com/clovaai/CRAFT-pytorch`
   Video demo: `https://www.youtube.com/watch?v=HI8MzpY8KMI`

3. Semantic MapNet: Building Allocentric Semantic Maps and Representations from Egocentric Views
   Paper: `https://arxiv.org/abs/2010.01191`
   Implementation: `https://github.com/vincentcartillier/Semantic-MapNet`

4. Using Github to host a website
   Tutorial: `https://www.geeksforgeeks.org/using-github-to-host-a-free-static-website/`

5. Deploy a model endpoint on Google Cloud Platform Vertex AI
   Tutorial: https://medium.com/nlplanet/deploy-a-pytorch-model-with-flask-on-gcp-vertex-ai-8e81f25e605f

6. Requesting GCP Cloud Credits:
   Instructions: `https://learn.canceridc.dev/introduction/requesting-gcp-cloud-credits`