Overview
In your project groups, you will document the process and outcomes of the design and development of your prototype over the course of the semester. This paper will act as a summary product of your project for this semester, and can become part of your portfolio to supplement your prototype demo that will be useful for you to share with future job opportunities. The paper is due via Canvas. There will be no final exam for the course.

Detail
Final Paper:
You will create an 8 to 10-page write-up (Times New Roman, 12-point font, 1.5 spacing) of your group’s course project, which will span the entire semester and will include both the design and development processes that you followed and the outcomes that you found. You must use the assignment template which will be posted on Canvas under ‘Files. This assignment template includes a paper outline which covers all the required sections, described in detail in this document.

Required sections of the paper include the following:

- **Cover Page** (1 page, not included in 8 to 10 page limit):
  - Group Members and Project Title – see template.
  - Prototype Screenshot – an illustrative screenshot of the main component(s) of your prototype, preferably showing off a natural user interaction if possible.

- **Iterative Design and Development Process** (6 to 7 pages):
  - Initial Design (½ to 1 page) – describe your initial design process. Summarize the material you have already included in your presentation for Part 2: How did you decide on the NUI commands (e.g., gesture, speech, body gesture) to support in your first prototype? How did you choose the set of features you have included in your first prototype? Include any use of personas, scenarios, or storyboards; any formal or informal interviews with classmates, friends, or family; and any use of your own prior knowledge, experience, or understanding of the users’ needs that your design is based on.

  - Developing the First Prototype (½ to 1 page) – describe your initial development process. Summarize the material you have already included in your presentation for Part 2: What development process did your group follow (team member contributions, version control, bug tracking, etc.)? What third-party APIs, toolkits, or frameworks are you using in your prototype? Include a high-level system architecture diagram showing the main components of your first prototype and how they are integrated. (This diagram should be smaller in size than the final architecture diagram requested in the next major section.)

  - User Study Summary (½ to 1 page) – describe the key details of your user study, results, and lessons learned. Summarize the material you already included in your presentation and paper for Part 3. Feel free to use, modify, and shorten your existing text from the User Study Overview, User Study Findings—Critical Incidents, and Lessons Learned—Planned Improvements to Prototype sections for this report.
Developing the Second Prototype (3 to 5 pages) – describe your development process for the second prototype. Focus on the changes you have made to your first prototype. Recall that you are required to make at least three changes to your first demo and user study version. Examples of a “change” would be (a) changing the gesture for “undo” from a circle to a backwards arrow, (b) changing the feedback your prototype gives the user on successful recognition of a NUI command, (c) adding a new command that your users felt was lacking from your first prototype, etc.

For each change discuss the following: (a) what was the original functionality, (b) what is the new functionality, (c) how did you get the idea for this change, e.g., citing evidence from your user study, and (d) how did you decide to include this change in the second prototype, e.g., from your prioritization of user study feedback. Include any design considerations we have discussed in class and how that impacted your final version of the prototype (e.g., fatigue, recognition errors, etc.). You will describe your development process, architecture, and third-party tools in the next section. As shown in the template, explicitly label each change you discuss, e.g.:

- Change 1
- Change 2
- Change 3

Final Architecture (2 to 3 pages):
- System Architecture (1 page) – create a high-level system architecture diagram showing the main components of your prototype and how they are integrated. The blocks in your diagram should correspond to code elements (e.g., classes, objects, etc.). Include the user and the NUI sensor in your diagram. Label all connections with descriptions of the message(s) and information passed between components. You are not required to create a full UML diagram of your software, but you may find that to be a useful starting point.

- Code Modules (1 page) – document all main code modules which you have produced during your project, organized by class and method. Model the documentation in the javadoc style: describe both the overall purpose of the class and what each method does. You do not have to fully document all method arguments and return parameters. Include only code modules for which you have worked with the source code itself (e.g., not third-party libraries or toolkits).

- Third-Party Tools (½ page) – define and cite all third-party tools which you have used in your project. This includes all APIs, toolkits, frameworks, libraries, etc. Include a URL for each tool and a brief (2 to 3 sentences) description of what you used the tool for within your prototype and any challenges you encountered.

- Source Code (1 line) – include a pointer to any online repository or downloadable version of your prototype, if applicable.

Future Work (½ page) – describe the next steps you would take if you continued this project beyond this semester. For example, what further design, development, or evaluation activities would you undertake? How much more work do you expect would remain before your prototype would be a viable application usable by your target audience?

*** Note: page limits per section are to be used a guide as to level of detail expected. Groups will not be graded on strict adherence to the page length suggestions, other than the overall 8 to 10 page length.
*** Note: in all sections of the paper, diagrams, photos, or screenshots are encouraged if they can help illustrate your points. Ensure that you include a caption for any visual aid you include in your paper.

*** Note: except for the system architecture diagrams, other diagrams, photos, and screenshots are not included in the page length requirements. This means that your paper may be longer than 10 pages due to inclusion of your visual aids. However, if your paper is under 8 pages without your visual aids, your paper will be penalized for being too short.

Peer Evaluation
There will also be a peer evaluation component, in which group members will be rate themselves and each other’s contributions to the project summary paper. These will be filled out in-class individually (to be handed out on the day the paper is due) and will be returned to the instructor before leaving on the last day of class. Evaluations will be kept confidential.

Assignment Grading

1. Final Paper: 90%
   a. Cover Page (5%)
   b. Iterative Design and Development Process
      i. Initial Design (10%)
      ii. Developing the First Prototype (10%)
      iii. User Study Summary (10%)
      iv. Developing the Second Prototype (30%)
   c. Final Architecture (15%)
   d. Future Work (10%)

2. Peer Evaluation† 10%

The goal of this assignment is to demonstrate that you have followed a user-centered design process throughout the course of your semester project, which involves also demonstrating that you understand how to de-code and prioritize user feedback in the design, development, and evaluation process. The overall goal of the course is that you will be able to apply this experience that you have learned through the course project in your future projects.

As with the previous assignments, penalties will be assessed for groups who do not follow the instructions precisely (e.g., assignments must follow the template, assignments must be in an approved file format, assignments must be submitted on time, etc.).

† 10% of group members’ individual grades for this part of the project will be based on the confidential peer evaluations by their group members.