Responses to Reviewers

Voice-Controlled Robotic Study Assistant — ECE 445 (ZJUI), Team 46

We thank the reviewers for their time and for the constructive evaluation of our final report. Below we respond to each reviewer in turn. Where the report was changed, the revised text is quoted or summarized and its location is given by section, table, or figure number; the revisions are incorporated in the re-submitted report (Final_Report_Team46_V3).

Response to Professor Lee

1. Summary

We sincerely thank the reviewer for the careful reading and for the very positive assessment of our report.

2. Evaluation summary

Introduction — 5/5
Design — 9/9
Cost and Schedule — 2/2
Requirements and Verifications — 8/8
Conclusions — 6/6
Total — 30/30

3. Point-by-point response

The reviewer awarded full marks (30/30) and did not raise any specific comments or requests for changes. We are grateful for the positive evaluation. Accordingly, no changes were required in response to this review.

Response to Professor Lin

1. Summary

We sincerely thank the reviewer for the helpful evaluation and for the specific request, which has improved the report. Our point-by-point response is below.

2. Evaluation summary

Introduction — 5/5
Design — 7/9
Cost and Schedule — 2/2
Requirements and Verification — 6/8
Conclusions — 6/6
Total — 26/30

3. Point-by-point response

Comment 1: For problems of the gravity of the wheel, explain how to improve.

Response 1: We thank the reviewer for raising this point. The reviewer is correct that the page-turning mechanism, as built, relies on the gravity of the friction wheel and its carriage to generate the contact force. In the original report, the contact normal force N in Equation (2.1) was set mainly by self-weight, so it was fixed and could not be tuned to a given paper or binding. If the force is too low, the wheel slips and does not lift the page; if the force is too high, the wheel can drag more than one page. We revised Section 2.2, immediately after Equation (2.1), to explain this limitation and to state a concrete improvement path. We also linked the issue to the measured 12 V motor-rail sag in Appendix A, because the vertical axis must hold the wheel contact force while the other motors run. The added/revised text reads:

> "*In the current prototype the contact normal force N is set largely by the self-weight of the wheel and its vertical carriage rather than by an adjustable mechanism. The available friction is therefore tied directly to gravity and cannot be tuned to the paper and binding at hand: if the force is too low, the wheel slips and the page is not lifted; if the force is too high, the wheel can drag more than one page. The final tests also showed that this mechanical limitation is coupled to the power subsystem, because the 12 V motor rail sags under simultaneous multi-motor load and reduces the vertical axis's ability to maintain repeatable wheel contact. A later revision should replace this gravity-only contact with a controlled normal-force mechanism, such as a spring-preloaded compliant mount or a small servo or linear actuator that presses the wheel to a set force. A contact or force sensor should then close the loop so that the controller can keep the force within a target window, detect a missed pickup, and retry with a corrected wheel position or normal force.*"

We also revised Sections 3.1, 3.3, 5.2, and 5.4 so that the final report consistently explains the improvement path: replace the gravity-only wheel contact with a spring-preloaded or actively controlled normal-force mechanism, add contact/page feedback, and improve or separate the motor power supply. These changes directly address the reviewer's concern by explaining both the cause of the gravity-dependent wheel problem and the specific design changes that would correct it.

Additional revisions

In addition, we updated the Abstract, Chapter 3, Conclusion, and Appendix A with the final demonstration results so the report no longer contains draft-stage language such as "to be measured." The revised report now states the measured results directly: about 3 s per page-turn cycle, 12 successful turns out of 20 continuous trials, about 4.9 V on the Raspberry Pi USB-C input under load, about 11.3 V on the motor rail under full actuator load, about 93 % OCR character accuracy, about 90 % voice-command recognition accuracy, and about 2 s command-to-action latency. We also marked the 12 V motor-rail requirement as not fully met and clarified its relationship to the page-turn reliability shortfall.

We thank both reviewers again for their time and feedback.