



Articool Balancing Spoon During Transport

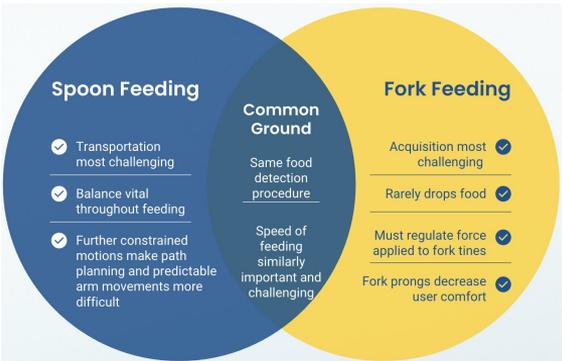
Introduction

The Assistive Dexterous Arm (ADA) is an assistive robot that helps people with upper-extremity mobility impairments eat independently. We have primarily focused on fork-based feeding. **We study the transition to spoon use** and show that it introduces distinct challenges, indicating that spoon-based feeding is a separate design space.

A User-Focused Approach



Why Spoon Feeding?



Eating is essential for independence, dignity, and comfort. While robotic feeding systems have focused primarily on fork-based interaction, **many everyday foods require a spoon.**

- Cereal
- Soup
- Yogurt
- Other liquid, viscous, or granular foods

Key Findings

Perceived Safety vs Motion Comfort

The CR felt more comfortable with a spoon compared to a fork, however comfort depended on predictable robot motion.

- No sharp tines

Transport Becomes the Bottleneck

With fork feeding, successful acquisition usually enabled reliable transport. With spoon feeding:

- Food can drip or spill during transport
- Small tilt deviations cause drips

Efficiency Matters

Efficiency, not appearance, was the priority.

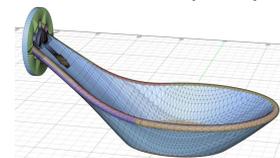
- Waiting increases anticipation of each bite
- Spoon wiping motions were disliked
- Larger bites preferred

Next Steps

- Improve path planning consistency
- Experiment with spoon design
- Relax fixed bowl positioning constraints
- Explore dynamic utensil switching



(a) Current spoon tooltip design



(b) Draft of elongated spoon design

We conducted a structured interview with a community researcher (CR) with motor impairments.

- Presented videos of spoon-feeding trials
- Granular, viscous, and liquid foods
- Guided discussion using structured prompts