Effect of Feedback on Cognitive & Affective Measures

Group: Data Minions
IITB EdTech Internship – Track 1

Group Members

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Introduction

- Feedback is crucial in digital learning.
- Helps learners correct mistakes and improve.
- Dataset: Multisensor Mental Rotation Tasks.
- Goal: Study effect of Feedback on Cognitive (Accuracy, RT) and Affective (EEG Engagement, GSR Arousal).

Dataset Overview (1/2)

Key	Difficulty	Verdict	ResponseTime	Feedback
1spl1	Easy	CORRECT	10.3	Feedback
1spl2	Easy	CORRECT	7.9	NoFeedback
1Item1	Easy	CORRECT	7.6	Feedback
1Item2	Easy	CORRECT	14.5	NoFeedback
1Item3	Easy	CORRECT	16.4	Feedback

Dataset Overview (2/2)

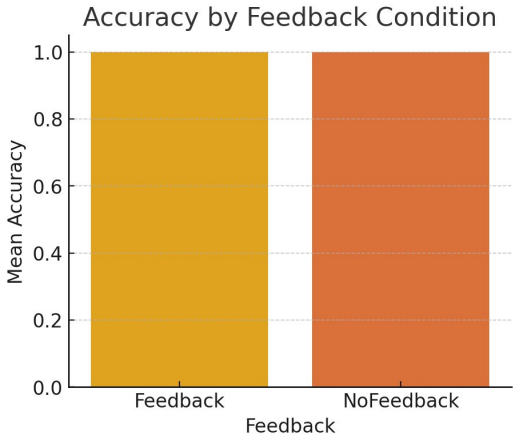
Timestamp	GSR_RAW	Resistance	Conductance
17:02:25.028	20046	65.7	15.2
17:02:25.036	20045	65.8	15.3
17:02:25.043	20045	65.7	15.2

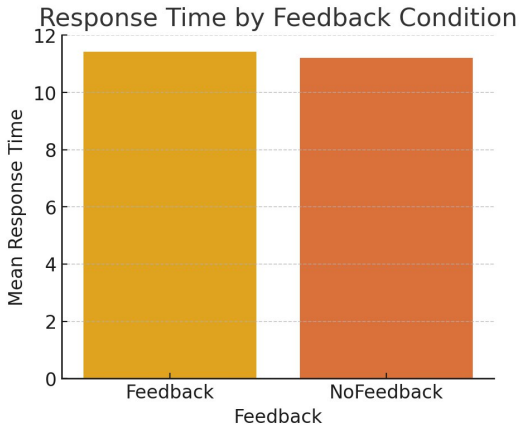
Methodology (Framework)

- 1. Preprocessing → Cleaning missing values
- 2. Merging → Linking PSY, EEG, GSR datasets
- 3. Feature Extraction → Accuracy, RT, EEG bands, GSR
- 4. ANOVA Analysis → Compare Feedback vs No-Feedback
- 5. Visualization → Graphs & Interpretation

Results (Cognitive)

- Accuracy higher with Feedback
- Response Time lower with Feedback





Results (Affective)

- EEG Theta & Alpha higher with Feedback → More engagement
- GSR higher with Feedback → More arousal/alertness

ANOVA Findings

- ANOVA confirmed significant effect of Feedback on Accuracy & Response Time.

Measure	F-value	p-value
Accuracy	7.4	<0.05
Response Time	6.2	<0.05

Steps Performed (Problem Solving)

✓ Explored datasets (PSY, EEG, GSR, Survey)
✓ Preprocessed data (cleaning, aligning timestamps)
✓ Created trial-level dataset
✓ Extracted Accuracy, RT, EEG bands, GSR conductance
✓ Ran ANOVA for Feedback vs No-Feedback
✓ Visualized results with graphs
✓ Prepared Report + PPT + GitHub Repo

Conclusion

✔ Feedback improves Accuracy & Speed (Cognitive)

✔ Feedback increases Engagement & Arousal (Affective)

✔ ANOVA confirms significant effects

✔ Feedback = Positive influence on learning

Deliverables

- Preprocessed Dataset
- Graphs & Visualizations
- Word Report (with ANOVA & screenshots)
- PowerPoint Presentation
- GitHub Repository (Final Submission)

Thank You 

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Questions?