

# Presenting XAI-generated Explanations Of Cricket Shots

## Introduction

- Cricket is one of the largest sports
- Technology, such as Explainable AI (XAI), can improve cricket performances
- But this may not be understandable to average cricket players

## Research question(s)

What are the most effective ways to present XAI-generated explanations to facilitate learning in cricket training?

- Finding existing explanation formats
- Finding most efficient formats for cricket
- Analyzing role of interactive features

## Background

- 5 explanation formats: numeric, rule-based, textual, visual, and mixed [1]
- In general, user studies show no preference in format
  - Except for specific contexts
- Interactivity could reduce cognitive load

## Methodology (prototypes)

- 2 prototypes were designed
  - One with static and one with interactive explanations
- Both prototypes had 4 handmade explanation (formats):
  - Textual (Text), visual (Comparison), rule-based (Table), and a mix between textual and visual (Keypoints)
  - Numeric was not intuitive so excluded



Figure 1: The first prototype

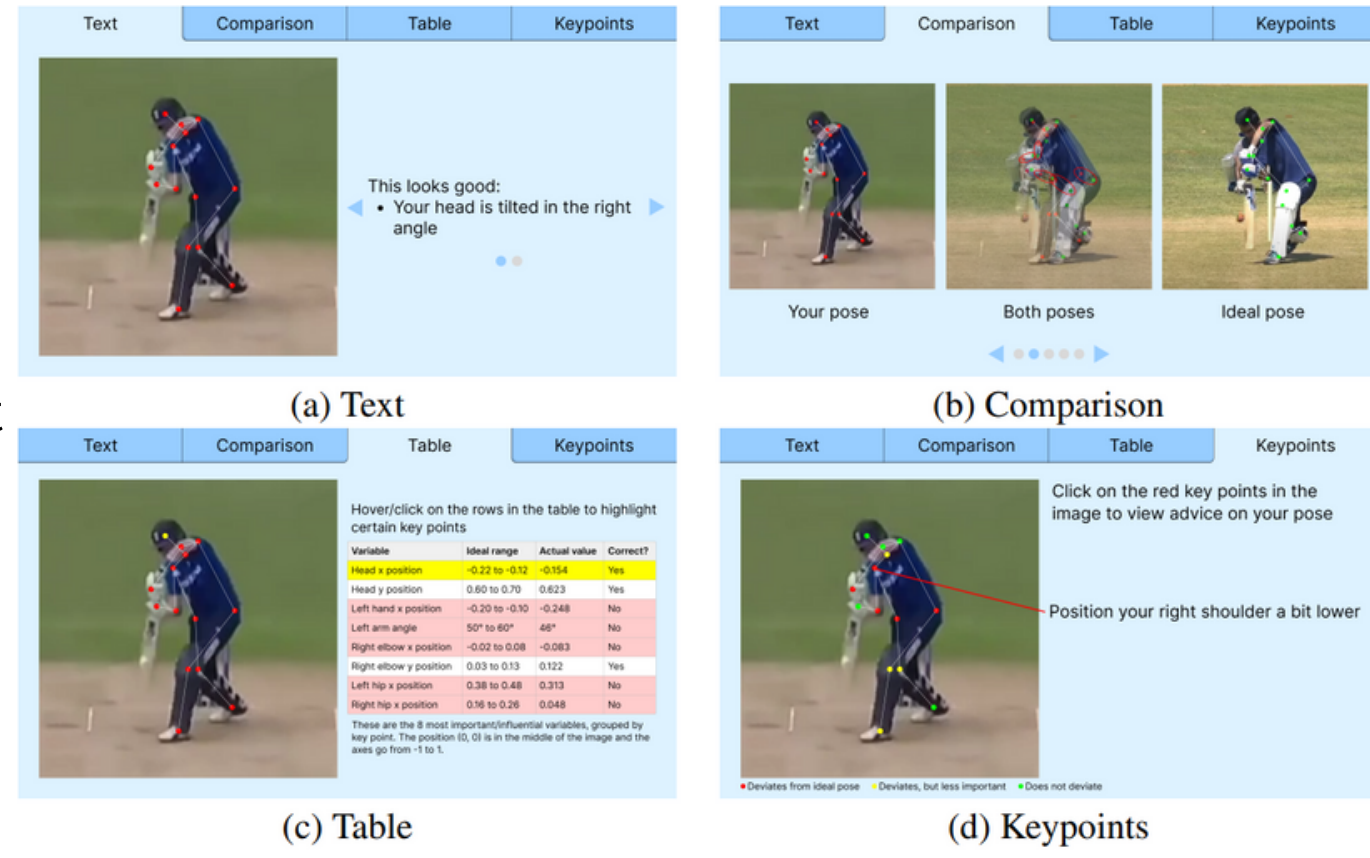


Figure 2: The second, more interactive, prototype

|            | Prototype 1 | Prototype 2 |
|------------|-------------|-------------|
| Text       | 5           | 5           |
| Comparison | 6           | 6           |
| Table      | 0           | 1           |
| Keypoints  | 11          | 11          |

Table 1: Amount of users that would prefer certain explanations in a cricket learning environment

## Methodology (user study)

- Explanation Satisfaction Scale as basis for a satisfaction score [2]
- XAI Trust scale as basis for a trust score [2]
- Additionally, users could indicate their preferred explanations per prototype

## Results

- 12 participants
- One-way ANOVA with TukeyHSD post-hoc test revealed:
  - The Table explanation performed worse in satisfaction
  - A difference in trust in the whole first prototype but no difference in individual comparisons
- Paired t-tests between first and second prototype revealed:
  - Trust increases with interactivity
  - Satisfaction does not

## Conclusion

- Textual and visual (and combinations of them) explanations are more satisfying than rule-based ones
  - This matches with Table 1
- Interactivity improves trust but not satisfaction
  - Possible transparency-usability trade-off

## Future work

- Integrate actual XAI system into the prototypes
- Larger participant group
- Research types of interactive features
- Extend explanations beyond human pose

## References

[1] G. Vilone en L. Longo, 'Classification of Explainable Artificial Intelligence Methods through Their Output Formats', Machine Learning and Knowledge Extraction, vol. 3, nr. 3, Art. nr. 3, sep. 2021, doi: [10.3390/make3030032](https://doi.org/10.3390/make3030032).

[2] R. R. Hoffman, S. T. Mueller, G. Klein, en J. Litman, 'Measures for explainable AI: Explanation goodness, user satisfaction, mental models, curiosity, trust, and human-AI performance', Front. Comput. Sci., vol. 5, feb. 2023, doi: [10.3389/fcomp.2023.1096257](https://doi.org/10.3389/fcomp.2023.1096257).