

Systems and Architectures Double coding

Mohammed Al Owayyed

2023-11-20

Introduction

This document gives an overview on the inter-reliability analysis for a paper titled “Agent-based Social Skills Training Systems: The ARTES Architecture, Interaction Characteristics, Learning Theories and Future Outlooks”. The document include analysis of:

- Double coding on a comparison between ARTES components and 7 other related architecture.
- Double coding of 41 systems based on ARTES components.

For that, we need two files:

- CodingArchitecture.xlsx: the coding of the first coder and the second coder for all the 7 architectures compared to ARTES
- CodingSystems.xlsx: Coding of the first coder and 5 second coder for categorisations of systems based on ARTES components implementation (41 systems were coded)

Libraries

```
library(pander)      # markdown
library(dplyr)
library(irr) # for calculating kappa coefficient
library(readxl) #to read an excel file
```

Reading Data

```
RelArch <- read_excel("CodingArchitecture.xlsx")
RelSys <- read_excel("CodingSystems.xlsx")
```

Set-up variables

```
#set up a variable for inter-reliability of architectures coding
ratingsArch <- RelArch %>% select(Coder1N, Coder2N)
```

```

#set up a variable for inter-reliability of systems coding for each dimension (i.e., 5 component)
ActD <- RelSys %>% select(Act_dec1, Act_dec2) #For Action decision making
AgMod <- RelSys %>% select(Agent_Model1, Agent_Model2) #for the agent model
Feed <- RelSys %>% select(Feedback1, Feedback2) #for the feedback
Inst <- RelSys %>% select(Inst_Princ1, Inst_Princ2) #for instructional principles
Pedag <- RelSys %>% select(Pedag_Agent1, Pedag_Agent2) #for pedagogical agent

```

Calculate Cohen's kappa for the architectures mapping

```

kappaArch <- kappa2(ratingsArch) #Calculate Cohen's kappa

# Print the kappa coefficient for the architectures mapping
print(kappaArch)

```

```

## Cohen's Kappa for 2 Raters (Weights: unweighted)
##
## Subjects = 88
## Raters = 2
## Kappa = 0.694
##
## z = 35.2
## p-value = 0

```

Calculate Cohen's kappa for the systems based on mapping 5 components

```

#Calculate Cohen's kappa for the 5 components
kappaActD <- kappa2(ActD)
kappaAgMod <- kappa2(AgMod)
kappaFeed <- kappa2(Feed)
kappaInst <- kappa2(Inst)
kappaPedag <- kappa2(Pedag)

# Print the kappa coefficient for the 5 components
print(kappaActD$value)

```

```
## [1] 0.5157139
```

```
print(kappaAgMod$value)
```

```
## [1] 0.492105
```

```
print(kappaFeed$value)
```

```
## [1] 0.6341629
```

```
print(kappaInst$value)
```

```
## [1] 0.5199281
```

```
print(kappaPedag$value)
```

```
## [1] 0.5705882
```

```
#Calculate the mean for the 5 components
```

```
SysMappingMean = (kappaActD$value+kappaAgMod$value+kappaFeed$value+kappaInst$value+kappaPedag$value)/5  
print(SysMappingMean)
```

```
## [1] 0.5464996
```