Software Product Line: **Elevator**

Features of the lift system: **Parking, 2/3full, Overloaded, Empty, Executivefloor, weight**

Comment:

1. In original paper we have Parking feature while in Apel version we have not it and have another feature called weight.
2. Feature ID 10 and 11 are ordered feature.

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| Feature Interaction ID | Features Involved in the Interaction |
| 1 | Overloaded-Empty |
| 2 | Parking-Empty |
| 3 | 2/3 full- Empty |
| 4 | Executivefloor-Empty |
| 5 | Parking-Overloaded |
| 6 | 2/3full-Overloaded |
| 7 | Executivefloor-Overloaded |
| 8 | 2/3full-Parking |
| 9 | Executivefloor-Parking |
| 10 | Executivefloor-2/3full |
| 11 | 2/3full-Executivefloor |

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| Feature Interaction ID | Features Involved in the Interaction |
| 1 | Overloaded-Empty |
| 2 | 2/3 full- Empty |
| 3 | Executivefloor-Empty |
| 4 | 2/3full-Overloaded |
| 5 | Executivefloor-Overloaded |
| 6 | Executivefloor-2/3full |

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| *Known Feature Interaction* | Overloaded-Empty | |
| *Possible new features* | 2/3full, executivefloor, weight | |
|  | ***overloaded*** | ***empty*** |
| ***Jaccard Similarity*** | 2/3full | executivefloor |
| *Predicted pair as Interaction* | 2/3full-Empty | Overloaded-executivefloor |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** | 2/3full | 2/3full |
| *Predicted pair as Interaction* | 2/3full-Empty | Overloaded-2/3full |
| *Is Prediction an Interaction?* | yes | yes |

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| *Known Feature Interaction* | 2/3 full- Empty | |
| *Possible new features* | Overloaded, executivefloor, weight | |
|  | 2/3 full | Empty |
| ***Jaccard Similarity*** | executivefloor | executivefloor |
| *Predicted pair as Interaction* | Executivefloor-empty | 2/3full-executivefloor |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** | executivefloor | overloaded |
| *Predicted pair as Interaction* | Executivefloor-empty | 2/3full-overloaded |
| *Is Prediction an Interaction?* | yes | yes |

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| *Known Feature Interaction* | 2/3full-Overloaded | |
| *Possible new features* | Empty, executivefloor, weight | |
|  | 2/3full | Overloaded |
| ***Jaccard Similarity*** | Executivefloor | executivefloor |
| *Predicted pair as Interaction* | Executivefloor-overloaded | 2/3full-executivefloor |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** | Executivefloor | empty |
| *Predicted pair as Interaction* | Executivefloor-overloaded | 2/3full-empty |
| *Is Prediction an Interaction?* | yes | yes |

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| *Known Feature Interaction* | Executivefloor-Empty | |
| *Possible new features* | Overloaded,2/3full, weight | |
|  | Executivefloor | Empty |
| ***Jaccard Similarity*** | 2/3full | (overloaded,2/3full) |
| *Predicted pair as Interaction* | 2/3full-Empty | Executivefloor-(overloaded,2/3full) |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** | 2/3full | overloaded |
| *Predicted pair as Interaction* | 2/3full-Empty | Executivefloor-overloaded |
| *Is Prediction an Interaction?* | yes | yes |

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| *Known Feature Interaction* | Executivefloor-Overloaded | |
| *Possible new features* | Empty, 2/3full, weight | |
|  | Executivefloor | Overloaded |
| ***Jaccard Similarity*** | 2/3full | 2/3full |
| *Predicted pair as Interaction* | 2/3full-overloaded | Executivefloor-2/3full |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** | 2/3full | 2/3full |
| *Predicted pair as Interaction* | 2/3full-overloaded | Executivefloor-2/3full |
| *Is Prediction an Interaction?* | yes | yes |

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| *Known Feature Interaction* | Executivefloor-2/3full | |
| *Possible new features* | Empty, overloaded, weight | |
|  | ***executivefloor*** | 2/3full |
| ***Jaccard Similarity*** | Overloaded | overloaded |
| *Predicted pair as Interaction* | Overloaded-2/3full | Executivefloor-overloaded |
| *Is Prediction an Interaction?* | yes | yes |
| ***Hamming Similarity*** |  |  |
| *Predicted pair as Interaction* |  |  |
| *Is Prediction an Interaction?* |  |  |

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| *Known Feature Interaction* | **Decrypt, Forward (0)** | |
| *Possible new features* | Addressbook, Autoresponder, Encrypt, Sign, Verify | |
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| ***Jaccard Similarity*** | Decrypt-Autoresponder | Forward-Autoresponder |
| *Predicted pair as Interaction* | Autoresponder-Forward | Decrypt, Autoresponder |
| *Is Prediction an Interaction?* | 🗴 | 🗸 |
| ***Hamming Similarity*** | Decrypt- Autoresponder | Forward- Autoresponder |
| *Predicted pair as Interaction* | Autoresponder-Forward | Decrypt, Autoresponder |
| *Is Prediction an Interaction?* | 🗴 | 🗸 |

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| *Known Feature Interaction* | **Addressbook, Encrypt (1)** | |
| *Possible new features* | Autoresponder, Decrypt, Forward, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Addressbook-Sign | Encrypt-Verify |
| *Predicted pair as Interaction* | Sign-Encrypt | Addressbook, Verify |
| *Is Prediction an Interaction?* | 🗴 | 🗴 |
| ***Hamming Similarity*** | Addressbook - Decrypt | Encrypt - Verify |
| *Predicted pair as Interaction* | Decrypt-Encrypt | Addressbook, Verify |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |

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| *Known Feature Interaction* | **Sign, Verify (3)** | |
| *Possible new features* | Addressbook, Autoresponder, Encrypt, Decrypt, Forward | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Sign-Encrypt | Verify-Encrypt |
| *Predicted pair as Interaction* | Encrypt-Verify | Sign-Encrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |
| ***Hamming Similarity*** | Sign- Encrypt | Verify-Decrypt |
| *Predicted pair as Interaction* | Encrypt-Verify | Sign- Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |

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| *Known Feature Interaction* | **Sign, Forward (4)** | |
| *Possible new features* | Addressbook, Autoresponder, Encrypt, Decrypt, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Sign-Encrypt | Forward-Decrypt |
| *Predicted pair as Interaction* | Encrypt-Forward | Sign-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |
| ***Hamming Similarity*** | Sign- Decrypt | Forward-Decrypt |
| *Predicted pair as Interaction* | Decrypt-Forward | Sign-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |

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| *Known Feature Interaction* | **Encrypt, Decrypt (6)** | |
| *Possible new features* | Addressbook, Autoresponder, Forward, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Encrypt-Verify | Decrypt- Autoresponder |
| *Predicted pair as Interaction* | Verify-Decrypt | Encrypt-Autoresponder |
| *Is Prediction an Interaction?* | 🗴 | 🗸 |
| ***Hamming Similarity*** | Encrypt- Verify | Decrypt-Autoresponder(forward) |
| *Predicted pair as Interaction* | Verify-Decrypt | Encrypt-Autoresponder(forward) |
| *Is Prediction an Interaction?* | 🗴 | 🗸(🗸) |

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| *Known Feature Interaction* | **Encrypt, Verify (7)** | |
| *Possible new features* | Addressbook, Autoresponder, Decrypt, Forward, Sign | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Encrypt-Sign | Verify-Decrypt |
| *Predicted pair as Interaction* | Sign-Verify | Decrypt, Encrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗸 |
| ***Hamming Similarity*** | Encrypt-Decrypt | Verify-Decrypt |
| *Predicted pair as Interaction* | Decrypt-Verify | Encrypt-Decrypt |
| *Is Prediction an Interaction?* | 🗴 | 🗸 |

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| *Known Feature Interaction* | **Encrypt, Autoresponder (8)** | |
| *Possible new features* | Addressbook, Decrypt, Forward, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Encrypt-Verify | Autoresponder-Decrypt |
| *Predicted pair as Interaction* | Verify-Autoresponder | Encrypt-Decrypt |
| *Is Prediction an Interaction?* | 🗴 | 🗸 |
| ***Hamming Similarity*** | Encrypt- Decrypt(+Verify) | Autoresponder-Decrypt |
| *Predicted pair as Interaction* | Decrypt(Verify) - Autoresponder | Encrypt-Decrypt |
| *Is Prediction an Interaction?* | 🗸(🗴) | 🗸 |

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| *Known Feature Interaction* | **Encrypt, Forward (9)** | |
| *Possible new features* | Addressbook, Autoresponder, Decrypt, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Encrypt-Verify (Sign) | Forward-Decrypt |
| *Predicted pair as Interaction* | Verify (Sign)-Forward | Encrypt-Decrypt |
| *Is Prediction an Interaction?* | 🗸🗸 | 🗸 |
| ***Hamming Similarity*** | Encrypt- Decrypt (Verify, Sign) | Forward- Decrypt |
| *Predicted pair as Interaction* | Decrypt (Verify, Sign) - Forward | Encrypt-Decrypt |
| *Is Prediction an Interaction?* | 🗸(🗸) | 🗸 |

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| *Known Feature Interaction* | **Decrypt, Autoresponder (11)** | |
| *Possible new features* | Addressbook, Encrypt, Forward, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Decrypt- Forward | Autoresponder-Forward |
| *Predicted pair as Interaction* | Forward -Autoresponder | Decrypt-Forward |
| *Is Prediction an Interaction?* | 🗸 | 🗸 |
| ***Hamming Similarity*** | Decrypt-Forward | Autoresponder- Forward |
| *Predicted pair as Interaction* | Forward -Autoresponder | Decrypt-Forward |
| *Is Prediction an Interaction?* | 🗸 | 🗸 |

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| *Known Feature Interaction* | **Autoresponder- Forward (13)** | |
| *Possible new features* | Addressbook, Encrypt, Decrypt, Sign, Verify | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Autoresponder-Decrypt | Forward- Decrypt |
| *Predicted pair as Interaction* | Decrypt-Forward | Autoresponder-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗸 |
| ***Hamming Similarity*** | Autoresponder- Decrypt | Forward-Decrypt |
| *Predicted pair as Interaction* | Decrypt-Forward | Autoresponder-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗸 |

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| *Known Feature Interaction* | **Verify- Forward (27)** | |
| *Possible new features* | Addressbook, Autoresponder, Encrypt, Decrypt, Sign | |
|  | ***The most similar pairs*** | |
| ***Jaccard Similarity*** | Verify-Encrypt | Forward- Decrypt |
| *Predicted pair as Interaction* | Encrypt-Forward | Verify-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |
| ***Hamming Similarity*** | Verify-Encrypt | Forward-Decrypt |
| *Predicted pair as Interaction* | Encrypt-Forward | Verify-Decrypt |
| *Is Prediction an Interaction?* | 🗸 | 🗴 |

Accuracy (Jaccard)= (14)/(22)= 63%

Accuracy (Hamming)=(15)/(22)=68%

Accuracy (Combined)= (16)/(22)=72%

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| *Known Feature Interaction* | **Encrypt, Autoresponder (8)** | | |
| *Possible new features* | Addressbook, Decrypt, Forward, Sign, Verify | | |
|  | ***Encrypt*** | | ***Autoresponder*** |
| ***Similar features by Jaccard*** | Verify | | Decrypt |
| *Jaccard Detection* | Verify-Autoresponder | | Encrypt-Decrypt |
| *True Detection* | 🗴 | | 🗸 |
| ***Similar feature by Hamming*** | Decrypt Verify | | Decrypt |
| *Hamming Detection* | (Decrypt – Autoresponder) | (Verify– Autoresponder) | Encrypt-Decrypt |
| *True Detection* | 🗸 | 🗴 | 🗸 |

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| *Known Feature Interaction* | **Encrypt, Verify (7)** | |
| *Possible new features* | Addressbook, Autoresponder, Decrypt, Forward, Sign | |
|  | ***Encrypt*** | ***Verify*** |
| ***Similar features by Jaccard*** | Encrypt-Sign | Verify-Decrypt |
| *Jaccard Detection* | Sign-Verify | Decrypt, Encrypt |
| *True Detection* | 🗸 | 🗸 |
| ***Similar feature by Hamming*** | Encrypt-Decrypt | Verify-Decrypt |
| *Hamming Detection* | Decrypt-Verify | Encrypt-Decrypt |
| *True Detection* | 🗴 | 🗸 |

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| **Encrypt, Autoresponder(ID = 8)** | Possible New Features  F= {Addressbook, Decrypt, Forward, Sign, Verify} | | | |
|  | **Jaccard Distance** | | **Hamming Distance** | |
| **Highest Sim (Encrypt, F)** | Verify | | Decrypt | |
| **Highest Sim (Autoresponder, F)** | Decrypt | | Decrypt | |
| **Feature Interaction Prediction** | Verify-Autoresponder | Encrypt-Decrypt | Decrypt-Autoresponder | Encrypt-Decrypt |
| **Actual Result** | **False 🗴** | **True🗸** | **True🗸** | **True🗸** |