

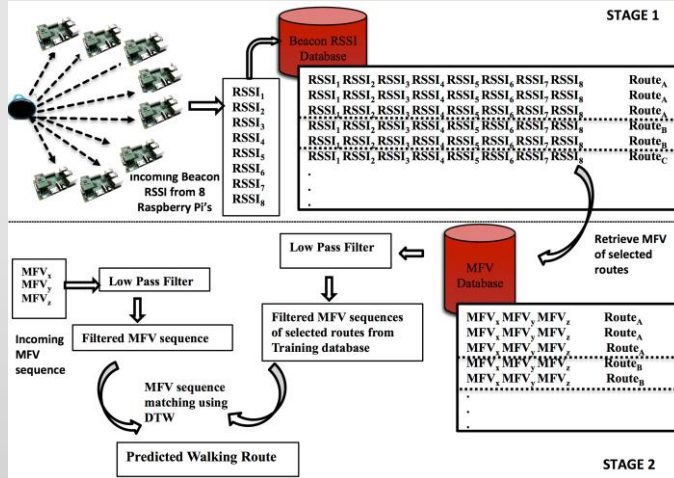
Collaborative location estimation for confined spaces using magnetic field and inverse beacon positioning

Mathangi Sridharan, John Bigham, Chris Phillips, Eliane Bodanese

1. Limitation with Existing Indoor Positioning Systems:

- ❖ Less focus for confined spaces.
- ❖ Not suitable for stationary and trajectory route prediction for activity recognition

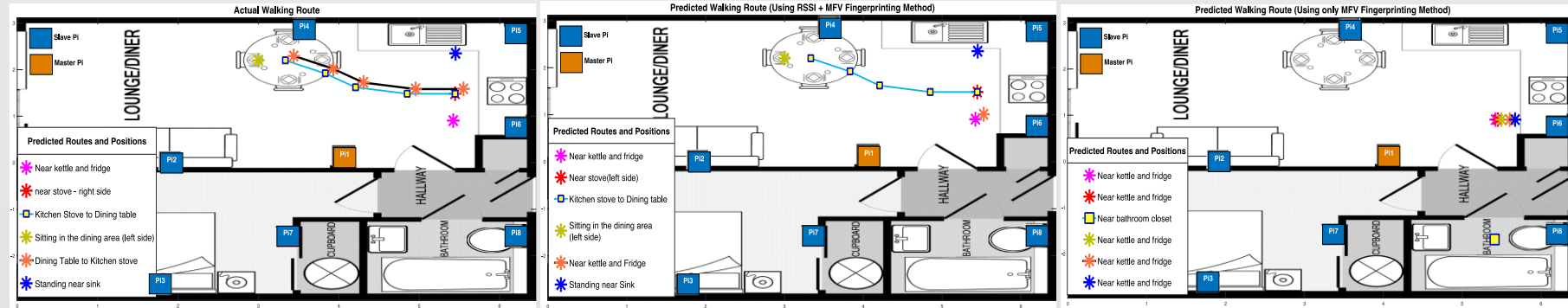
2. Schematic Diagram of Proposed System



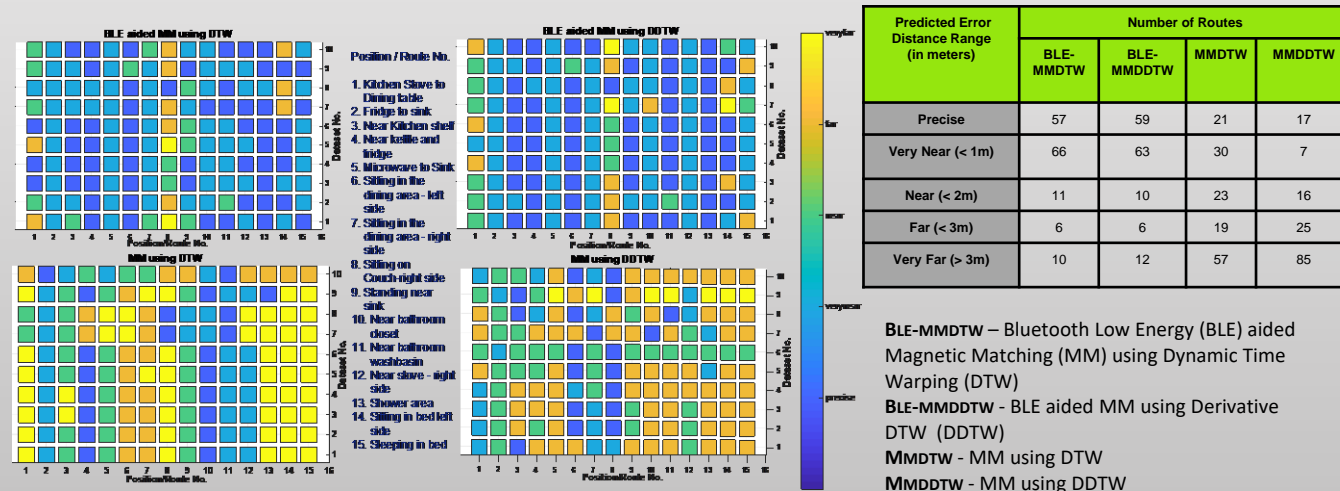
3. Potential Advantages of this Method

- ❖ Aids activity monitoring in a small household.
- ❖ High variability of beacon signal + mismatch issues in magnetic field fingerprinting are overcome.
- ❖ Fine-grained localization in confined spaces
- ❖ Improves Computational Efficiency

4. Case Study Results when user performs the following activities [Uses Fridge - Cooks using Stove - Moves to Dining Table from Stove – Sits in the Dining area - Moves back to the Kitchen Stove - Uses the Sink]



5. Performance Comparison Colour Chart and Predicted Error Distance Range



6. Conclusion

- ❖ MM method as an independent solution gives the lowest performance in confined spaces.
- ❖ Around 123 of the 150 predicted routes were within 1m from the actual location when using proposed method.