A4: Indoor Localization Report

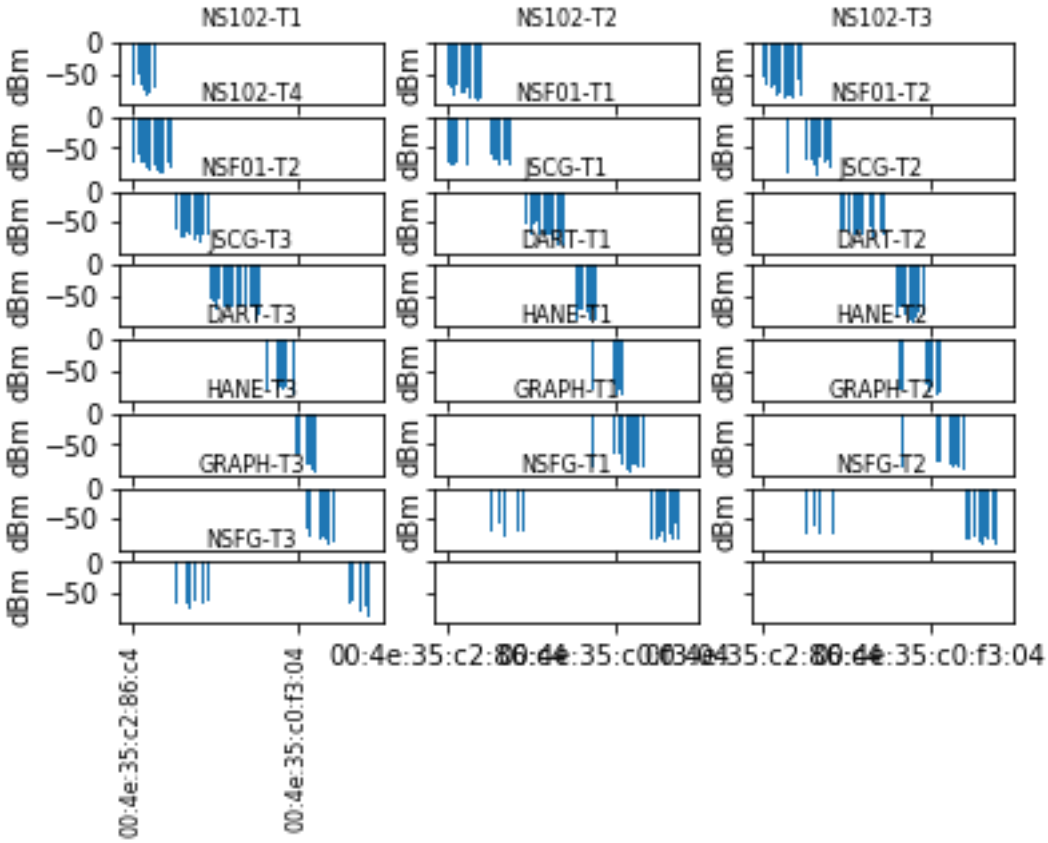

Fig.1 Signal Data

Three readings were taken at each location (four in the first location: electronics lab), at various points around the room/area.

The first reading of the electronics lab is interesting as it is very different from the other three. The available signals and their strengths were much lower than the other readings despite only being a few feet away. This suggests this particular point was outside the coverage areas that the other three readings intersected.

Some of these coverage areas are shared across the same building as can be seen in the readings taken in the same building (locations 1 & 2). The first reading at the second location (NSF01-T1) highlights this well, as it retains many signals shared by the lab on the same floor, whereas the other two readings do not. This is explained by each reading being taken in a slightly further distance from that side of the building.

This effect is seen less in smaller areas (such as HANE-T1/2/3) where each reading was taken in a much smaller area, resulting in less diversity of signals.

The ground floor of the New Science Building is interesting as it shows much more signal on the right, presumably being from its ‘own’ access points, but is still within range of those covered by the electronics lab, resulting in the two groupings of signals visible in the final readings.

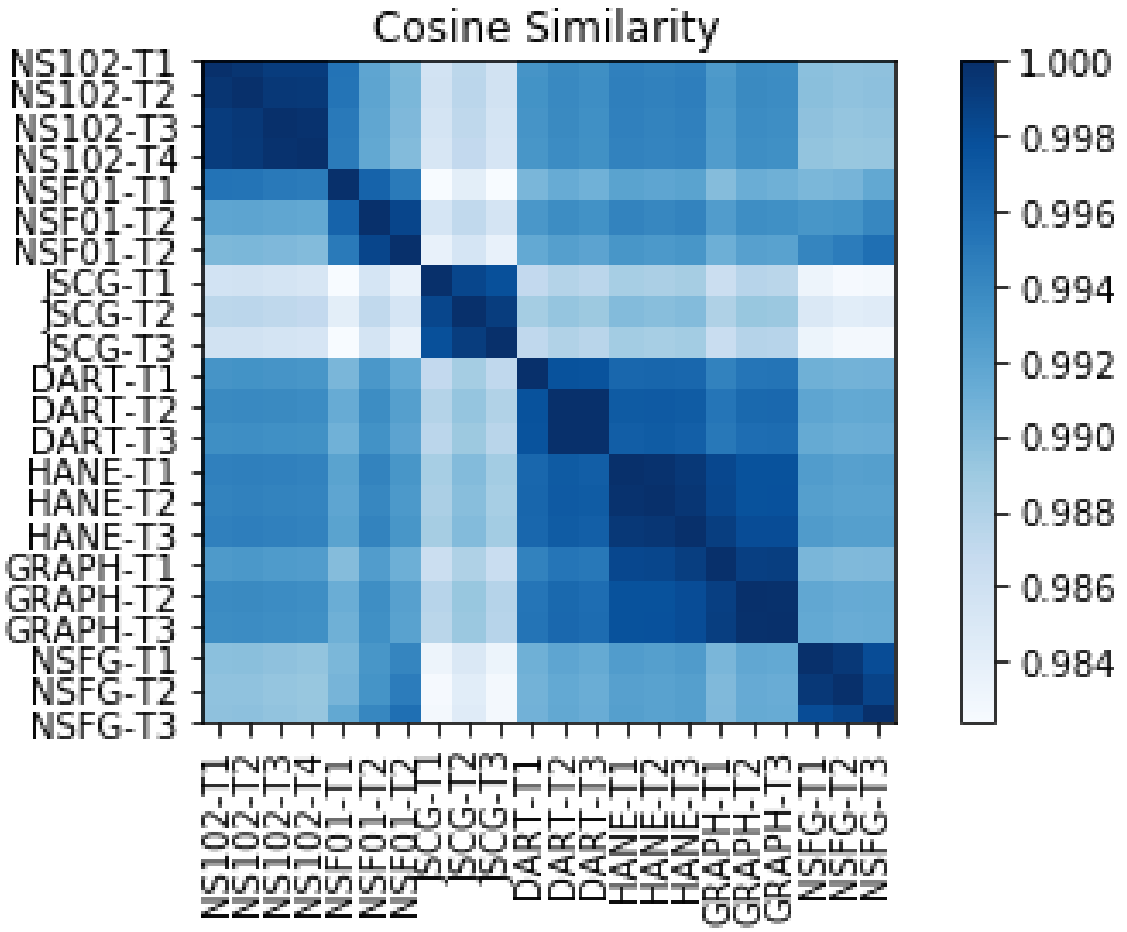

Fig.2 Similarity Data Self

The first observation worth mentioning is the stark contrast of the JSC location to any other. These signals are densely contained within its structure, while seemingly blocking nearly all external signals, even from the neighbouring building. This suggests that the construction material of JSC is acting as an insulator against these frequencies, possibly containing a large amount of metal in its walls.

Secondly I was surprised to note the level of shared signals within the three New Science building, despite being within such close proximity, very little crossover can be observed in this matrix, the same floor sharing a much higher level of similarity but nowhere as much as expected. This is especially apparent in the readings from the ground floor where there is barely any similarities with the readings from the same building.

This is in direct contrast to the similarities shared in the Teaching Wall, where the readings from Darcy Thompson Room, Hanes office and the Graphics Lab, all share a relatively high cohesion in their respective signals (shown in the large darker square in the matrix).

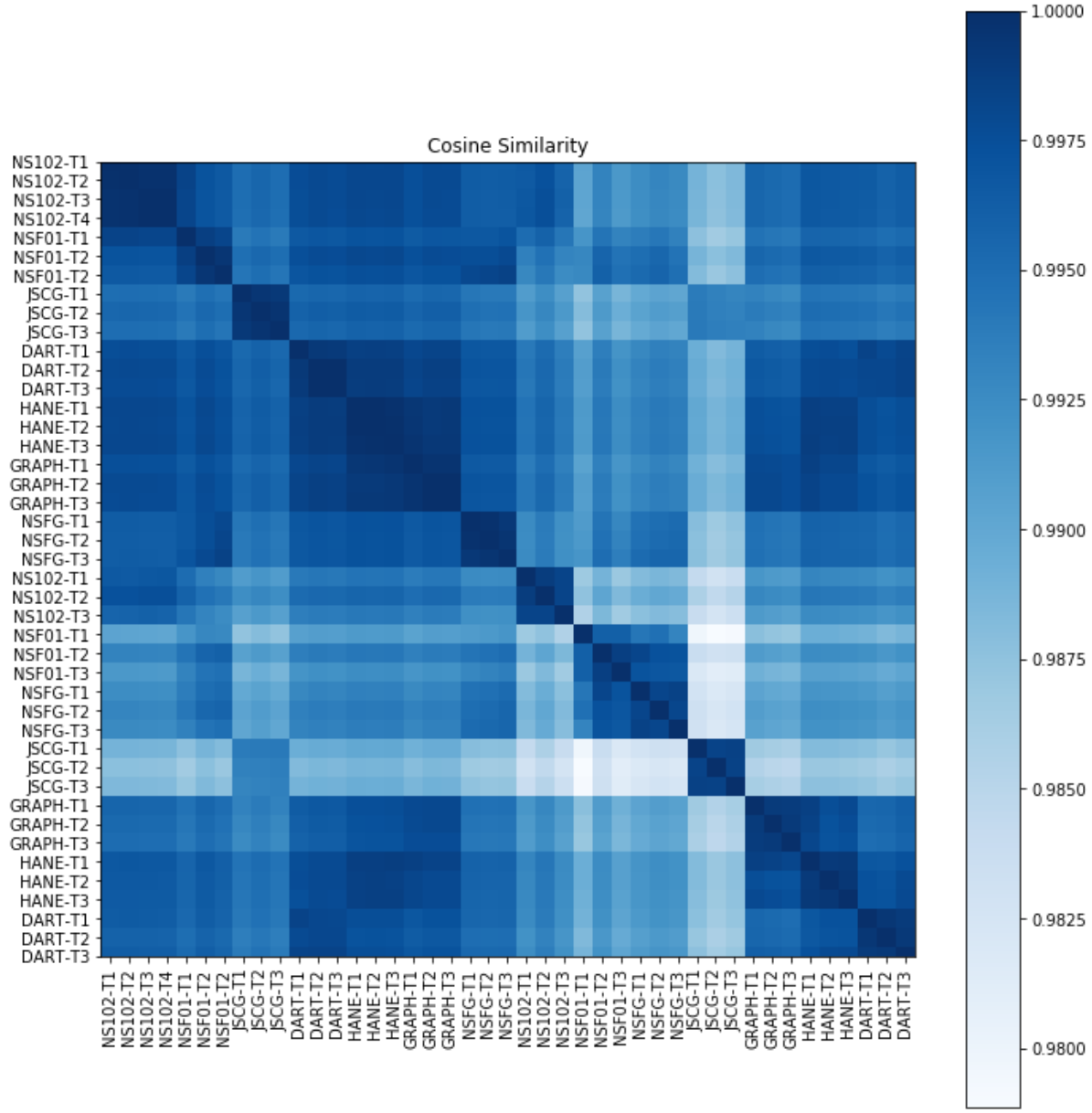

Fig.3 Similarity Data Combined

The diagonally symmetric pattern seen in the combined matrix concurs that both sets of readings shared the same results. With some variation, such as one set of data experiencing a much starker contrast with regard to the JSC signal-isolation anomaly, the relationships between the signals remains consistent.

Despite the differences of levels in their own data (explained by the variance in location during each reading), the relation to the other readings shares the same pattern of repetition.

The same dark squares of overlapping signals in the same building is apparent, even down to the inverse being seen in the *lack* of similarity in the ground floor of the New Science building.

One observation that surprised me was the seemingly strong similarity seen in buildings that are nowhere near each other (such as the Teaching wall and New Science buildings. While their buildings are not only geographically distantly separated, their construction is wildly different, being constructed decades apart. This would presumably result in a differing effect on the signals, such as that so obviously seen in the JSC building (in itself surprising, as the New Sci building is seemingly of similar materials and of a much closer age than the teaching wall), and yet this does not seem to be the case.