**Title** : Tracking through walls

**Description** : This project aims at locating unauthorized stationary or moving people with the help of wireless networks.

**Tool & Technology :** Signal Processing



**Datasets:** A dataset obtained by the experiments performed by University of Utah, this dataset is gathered through radio transmitters with values based on the experimental setup they are placed at.

**Approach**: 28 nodes are placed around an area with a distance of 3m between each. These nodes transmit RSS values depending upon the attenuation caused. Initially a threshold is set as noise threshold to ensure that only desired values are being catered for. The fluctuation between two nodes , demonstrated by lines , shows that an object is detected. This also generates a notification to the user via the android app. Their clustering algorithm is then utilized to eliminate unwanted data. For each point calculated, the average of neighboring points is calculated to determine the clusters. The clusters with a larger number of points will be selected and will be then compared with the maximum number of points to be selected. The average of those points is taken to determine the exact location. The above calculated results are send to the firebase application to display real-time results.

**Applicability in Pakistan:** The major benefit of this project is projected to the use by rescue services. When we talk about catastrophies like earthquake, flood etc, it is quite obvious that the cameras or any similar security measure used will be immediately destroyed, in that case a quick solution is required to get out of the critical situation. Hence, the rescue/security forces can place the transmitters around an area and quickly determine where the burried individuals are in-place.

**Difference from state of the art algorithms**: This project aims to eliminate the use of radio tomographic imaging and generalize the use of a product. It is based on many experiments in order to apply a straight forward algorithm based on the attenuation caused and thus produce results through a regular android application. Considering the work done, this being an emerging field with a vast range of applications, requires the need of a more efficient algorithm to be developed with an improved accuracy, which this project has constructed, giving the following accuracies according to the shown results.

1. Detection of Moving Object : Accuracy 100%
2. Locating a single moving object : Accuracy 92%
3. Locating moving object (>1) : Accuracy 60%

FYP Demonstration Evaluation Form

Project Title : Tracking through walls

Student Names : Muhammad Usman Noor, Ali Raza Chisti, Noor Nawab

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| PLO | S No | Description | Weight | Performance (1 – 5) | Marks(10) |
| PLO-11: Project Management | R1 | Completeness and Accuracy | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 6 |
| PLO-3: Design/ Development of Solution | R2 | Coding Standards | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 7 |
| PLO-10: Communication | R3 | Ways of Demonstration | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 9 |
| PLO-3: Design/ Development of Solution | R4 | Quality | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 7 |
| PLO-8: Ethics | R5 | Originality | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 10 |
| PLO-5: Modern Tool Usage | R6 | Modern Tool Usage | 1 | 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ | 9 |

Evaluator Name: \_Mujtaba Shahid Faizi\_\_

Signature : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date : \_17-05-2018\_\_\_\_\_\_\_\_\_\_

**Comments**

There some hiccups to the solution, like noise that occurs (when objects move in that area) haven’t been given much consideration, and that noise decreases the accuracy fast, especially when the speed of the objects increase.