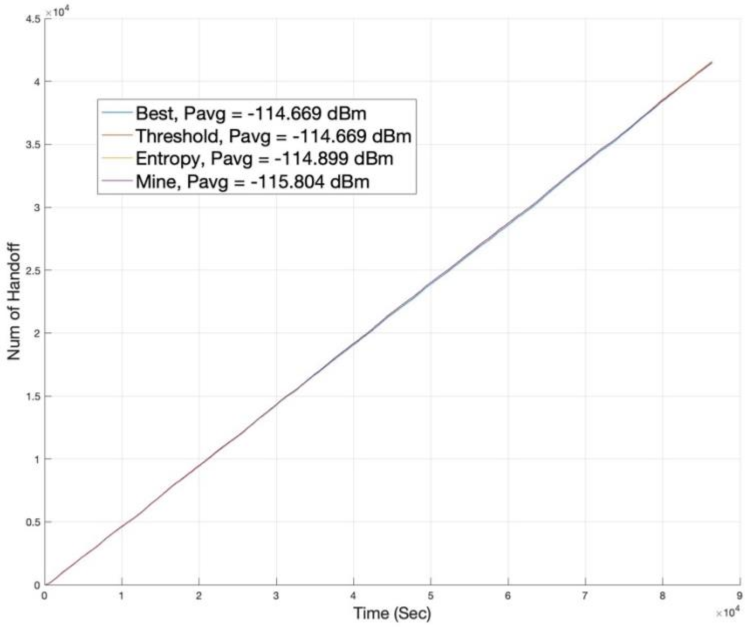
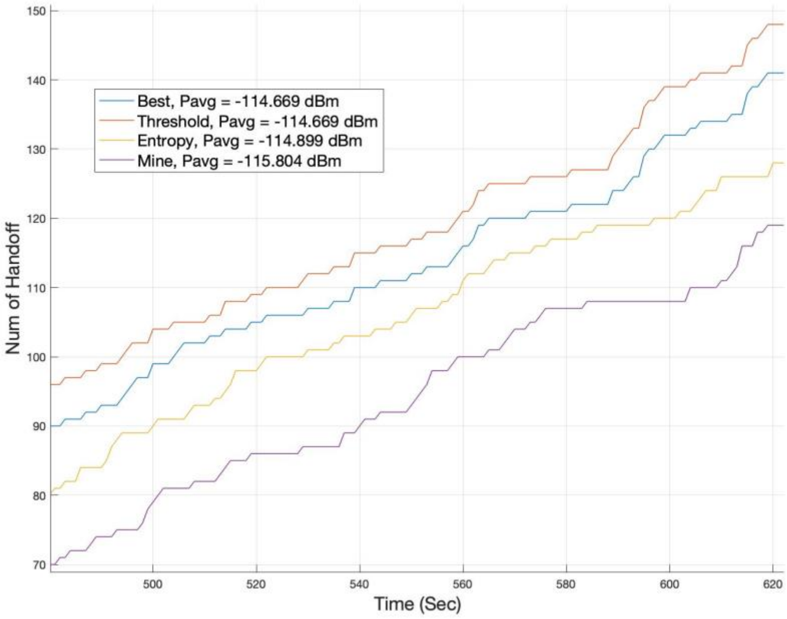
無線通訊網路 Project　F04066028 詹子毅

1. Charts

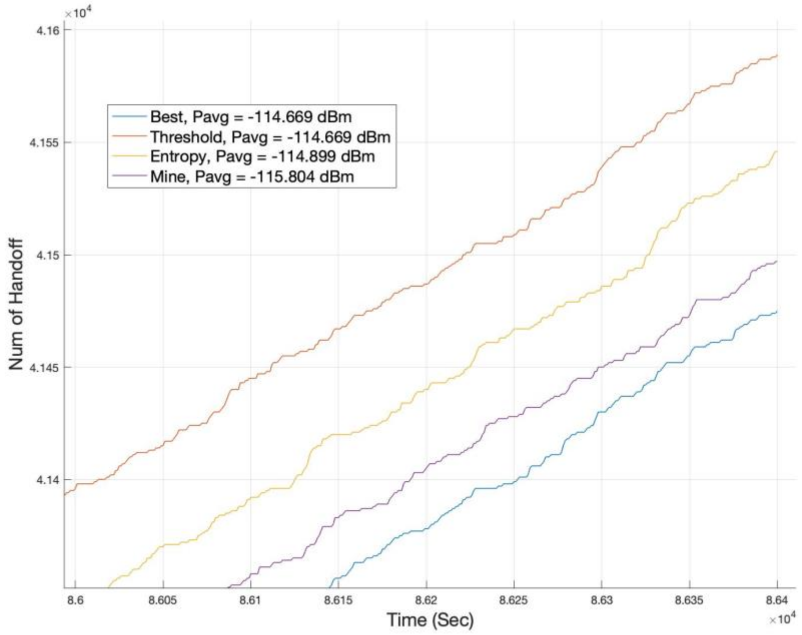
Overview & Pavg



$\mathrm{T} = 500{\sim}600s\ (Early\ Stage)$



$\mathrm{T} = 86000{\sim}86400s\ (Ending\ Stage)$



2. Source Code

Best Signal Method

```
% (1) Best Relative Signal Method
function bestSigMethod(obj)
    SignalPower = sigPower(obj);
    best_signal = max(SignalPower);
    % idx of base stations that have best signal
    BestSigBaseIdx = find(SignalPower == best_signal);
    % change base station
    if numel(BestSigBaseIdx) == 2 && ~ismember(obj.Base(1),
     BestSigBaseIdx)
        obj.Base(1) = randi(BestSigBaseIdx);
        obj.Handoff(1) = obj.Handoff(1) + 1;
    elseif numel(BestSigBaseIdx) == 1 && obj.Base(1) ~=
     BestSigBaseIdx
        obj.Base(1) = BestSigBaseIdx;
        obj.Handoff(1) = obj.Handoff(1) + 1;
    end
    % assign updated signal power to car
    obj.Signal_power(1) = best_signal;
end
```

Pseudo Code

(1) Find best P_r out of the four BSs based on car's current location

(2) Get index of best signal BSs as BestSigBaseIdx

(3) If two BSs give Pnew > Pold, randomly assign car to one of 2 BSs; add handoff

(4) If only one BS gives Pnew > Pold, assign car to BS; add handoff

(5) Update P_r

Threshold Method

```
% (2) Threshold Method
function thresholdMethod(obj)
    % Pold < Threshold
    SignalPower = sigPower(obj);
    if obj.Signal_power(2) < obj.T
        best_signal = max(SignalPower);
        % idx of base stations that have best signal
        BestSigBaseIdx = find(SignalPower == best_signal);
        % change base station
        if numel(BestSigBaseIdx) == 2 && ~ismember(obj.Base(2),
          BestSigBaseIdx)
            obj.Base(2) = randi(BestSigBaseIdx);
            obj.Handoff(2) = obj.Handoff(2) + 1;
        elseif numel(BestSigBaseIdx) == 1 && obj.Base(2) ~=
          BestSigBaseIdx
            obj.Base(2) = BestSigBaseIdx;
            obj.Handoff(2) = obj.Handoff(2) + 1;
        end
        % assign updated signal power to car
        obj.Signal_power(2) = best_signal;
    % Pold > Threshold
    else
        obj.Signal_power(2) = SignalPower(obj.Base(2));
    end
end
```

Pseudo Code

(1) Find corresponding P_rs out of the four BSs based on car's current location

(2) If Pold < Threshold, get index of best signal BSs as BestSigBaseIdx

(3) If two BSs give Pnew > Pold, randomly assign car to one of 2 BSs; add handoff

(4) If only one BS gives Pnew > Pold, assign car to BS; add handoff

(5) If Pold >= Threshold, no handoff

(6) Update P_r

Entropy Method

```
% (3) Entropy Method
function entropyMethod(obj)
    SignalPower = sigPower(obj);
    best_signal = max(SignalPower);
    % Pnew > Pold + E
    if best_signal > obj.Signal_power(3) + obj.E
        % idx of base stations that have best signal
        BestSigBaseIdx = find(SignalPower == best_signal);
        % change base station
        if numel(BestSigBaseIdx) == 2 && ~ismember(obj.Base(3),
          BestSigBaseIdx)
            obj.Base(3) = randi(BestSigBaseIdx);
            obj.Handoff(3) = obj.Handoff(3) + 1;
        elseif numel(BestSigBaseIdx) == 1 && obj.Base(3) ~=
          BestSigBaseIdx
            obj.Base(3) = BestSigBaseIdx;
            obj.Handoff(3) = obj.Handoff(3) + 1;
        end
        % assign updated signal power to car
        obj.Signal_power(3) = best_signal;
    % Pnew <= Pold + E
    else
        obj.Signal_power(3) = SignalPower(obj.Base(3));
    end
end
```

Pseudo Code

(1) Find best P_r out of the four BSs based on car’s current location

(2) If Pnew > Pold + Entropy, get index of best signal BSs as BestSigBaseIdx

(3) If two BSs give Pnew > Pold, randomly assign car to one of 2 BSs; add handoff

(4) If only one BS gives Pnew > Pold, assign car to BS; add handoff

(5) If Pnew <= Pold + Entropy, no handoff

(6) Update P_r

My Method (Distance Method)

```
function myMethod(obj)
    SignalPower = sigPower(obj);
    best_signal = max(SignalPower);
    % handoff when dist to BSold > 1500m
    if norm([obj.x, obj.y] - obj.BS_Coor_Array(obj.Base(4),:)) >
      1500
        % idx of base stations that have best signal
        BestSigBaseIdx = find(SignalPower == best_signal);
        % change base station
        if numel(BestSigBaseIdx) == 2 && ~ismember(obj.Base(4),
          BestSigBaseIdx)
            obj.Base(4) = randi(BestSigBaseIdx);
            obj.Handoff(4) = obj.Handoff(4) + 1;
        elseif numel(BestSigBaseIdx) == 1 && obj.Base(4) ~=
          BestSigBaseIdx
            obj.Base(4) = BestSigBaseIdx;
            obj.Handoff(4) = obj.Handoff(4) + 1;
        end
        % assign updated signal power to car
        obj.Signal_power(4) = best_signal;
    % dist to BSold < 1500
    else
        obj.Signal_power(4) = SignalPower(obj.Base(4));
    end
end
```

Pseudo Code

(1) Find best P_r out of the four BSs based on car’s current location

(2) If distance to original BS > 1500m, get indexes of best signal BSs

(3) If two BSs give Pnew > Pold, randomly assign car to one of 2 BSs; add handoff

(4) If only one BS gives Pnew > Pold, assign car to BS; add handoff

(5) If distance to original BS <= 1500m, no handoff

(6) Update P_r

3. Intro to My Policy

My policy uses the distance between the car and the BS to determine if handoff should happen. This might sound identical to the Threshold Method in the case of free space ideal propagation, but if applied to a realistic scenario, the background influence of the environment would differ the two.

My policy has a lower handoff rate compared to the previous methods because the distance at which handoff occurs is greater than those. However, it also suffers from lower Pavg since on average the distance between transmitter and receiver is also greater.