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### To localise or to be localised with WiFi in the Hubei museum?

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Abstract. Indoor localisation is in demand for a variety of applications within the built environment. An overall solution based on a single technology has not yet been determined. The aim of this paper is to gain insight on Signal Strength monitoring by a special kind of WiFi Monitors in comparison to the commonly known fingerprinting method for the purpose of a 3D indoor navigation system. Two different WiFi based localisation techniques are tested during the MSc Geomatics DaRen Syntheses Project in the Hubei Provincial Museum, China.

The first method detects the beacon frames send by smartphones, laptops and other WiFi enabled devices in range using Libelium Meshlium Xtreme monitors. Their MAC addresses and the signal strength is measured by the Meshlium Xtreme and stored on an external database. We call this method WiFi monitoring. The second method a Wifi enabled device, like a smartphone, measures the signal strength of multiple Wifi Access Points in range to localise itself based on a previously created radio map. This method is known as WiFi fingerprinting.

Both methods have some advantages and disadvantages. Advantages of the common way of WiFi fingerprinting are that the implementation costs are relatively low, because it is usually possible to use (a part of) the existing WiFi AP infrastructure. WiFi fingerprinting can reach a relatively high accuracy in the order of magnitude of meters. Finally, the location granularity can be adjusted to what is necessary for the purpose of the indoor localisation. This makes it employable for a wide range of purposes.

The question remains how suitable these methods are for a 3D indoor navigation system for the Hubei provincial museum. One important aspect is the localisation-granularity necessary for the application. In a museum it is not necessary to know the exact X,Y position of a user (such high accuracy is unnecessary), more important is to know in which room the user is located so the information on exhibitions can be presented and the starting point of the navigation can be determined.

Both methods can track the user and tell the room he or she is located at. Although WiFi smartphone monitoring may

have a low update frequency it is still suitable for a navigation system for a museum since visitors usually spend more than a couple of minutes within a room.

[Conference Paper](#) (PDF, 245 KB)

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