

# MobiUS: A Together-Viewing Mobile Video Experience

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## Introduction

This demo, MobiUS, shows a specific *together-viewing* mobile video application in which a higher (doubled) resolution video is played back across screens of two mobile devices placed side by side, which is a case study of the envisioned new *better-together* mobile application paradigm where multiple mobile devices are placed in a close proximity.

Our motivation is to not only enable users to enjoy higher quality video, but also make it natural for them to enjoy it together, which utilizes and consolidates the sociality. Since the marketing target is young couples, it is also called “Lover’s Phone”. An independent market survey confirms that Lover’s Phone is warmly welcomed.

Two key technologies together enable the MobiUS demo. While playback a video at two mobile devices, half by half, is easy to be thought of, it is very challenging due to the motion compensated prediction technique that is adopted in almost every video compression standard. To address this challenge, the first technology we developed is a novel, efficient collaborative half-frame decoding scheme, which is further optimized for better energy efficiency to a collaborative guardband-based half-frame decoding scheme. The other key technology is the high accuracy proximity detection technique, which achieves up to few centimeters precision using the microphone and speaker that are available on ordinary mobile devices. We are able to detect not only if the two devices are close or faraway, but also their relative positions, i.e., to the left or the right, which is necessary to determine which device will decode which half of the video. Technical details about this demo are presented in [1].

## Demo Description

It is a rather common observation that people are used to listen to music or watch video clips using their mobile devices while on the go. This demo starts with the experience that a person say Alice watches a pre-downloaded movie trailer on her own PocketPC phone, the HP iPAQ rw6828: she can watch the video but the size is small and the quality is low.

Situation changed when her friend, Bob, arrived. Bob also has a PockPC Phone (happen to be of the same model as Alice’s in our demo, although it is not required). They put together their phones. Now Alice’s phone immediately detected the arrival of Bob’s phone. A proximity detection process is then activated.

If determined they are close enough and also the relative positions of the two phones, i.e., to the left or the right, Alice’s phone automatically and on-the-fly expands the video to both screens of the two phones. One snapshot of the two phones playing video together is shown in Figure 1.



Figure 1: Snapshot of the demo.

When the two devices are apart by a certain distance that causes a significant change in RSSI, the two devices will trigger another round of proximity detection. If the distance is considered too large to be suitable for together-viewing, Alice’s phone will switch back to single display mode and the estimated distance information will be displayed on Bob’s phone.

We then let Bob’s phone approach Alice’s from another side. As expected, Alice’s phone will detect the arrival of Bob’s phone but from another side and automatically expand the correct half of the video to Bob’s phone’s screen.

We used acoustic signal for the proximity detection, therefore, one will hear two short chirps when performing distance and relative position detection.

The video of MobiUS demo is also available from the website <http://research.microsoft.com/wn/mobius.aspx>.

## Demo Settings

MobiUS demo is deployed onto the commercially off-the-shelf PocketPC phones, HP iPAQ rw6828, running Microsoft Windows Mobile Version 5.0 (Phone Edition), with WiFi and Bluetooth radios, a QVGA resolution (320 × 240) display, 64 MB RAM, and an Intel XScale 416 MHz processor.

## REFERENCES

- [1] G. Shen, Y. Li, and Y. Zhang, “Mobius: Enable together-viewing video experience across two mobile devices,” in *The 5th International Conference on Mobile Systems, Applications, and Services*, Puerto Rico, 2007.