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Computer Architecture of Wearable Technology (Draft)

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Executive Summary

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1 Introduction

Wearables as defined by Technopedia are technologies that are worn on the body that contain various sensors that can record health and fitness information, or take movement input data in real-time [1]. The market for this technology has expanded rapidly in recent years, with the wearable market being worth $19 billion in 2015, and expected to expand to $57 billion by 2022 [2]. This growth rate can be attributed to the fact that it is a novel technology just getting past the early adoption phase, but this technology is also improving at an impressive pace each year. The 2010s have seen advances in lower-powered processors with a smaller footprint that allow wearable devices to become much more powerful. With improvments in small, powerful processors, it allows wearbles to have more functionality, and focus less on designing the wearable around the electronics inside [3]. Clearly, this demonstrates the design requirement for low-power and small components to architects of wearable technology.

While there are many types of wearables on the market in present-day 2019, this report will focus on two types of wearable technology: smartwatches; and virtual/augmented reality (VR/AR) headsets and headwear.

2 Smartwatches

The most popular type of wearable in 2019 is the smartwatch [4]. Smartwatches are devices worn on one's wrist, equipped with sensors, and in some cases wireless communication capability for syncing data to a smartphone. Some common examples of smartwatches are the Apple Watch (Figure 1a), Fitbit Charge (Figure 1b), and the Garmin Forerunner (Figure 1c), all shown below in Figure 1. These devices are priced quite differently, carry different levels of functionality, and are targeted towards different segments of the population. Shown below in Table 1 are prices for the watches listed above [5] [6] [7].

(a) Apple Watch Series 5 [5]

(b) Fitbit Charge 3 [6]

(c) Garmin Forerunner 235 [7]

Figure 1: Smartwatches discussed in this report.

Table 1: Smartwatch Prices

Watch	Price
Apple Watch Series 5	529.00
Fitbit Charge 3	199.95
Garmin Foreruner 235	319.99

3 Virtual/Augmented Reality

References

[1] Technopedia, "Wearable device." https://www.techopedia.com/definition/31206/wearable-device.

[2] K. Mamtani, "Wearable technology market by device global opportunity analysis and industry forecast, 2014-2022," April 2017.

[3] L. Avila and M. Bailey, "The wearable revolution," *IEEE Computer Graphics and Applications*, vol. 35, Mar.-Apr. 2015.

[4] J. Peckham, "Best smartwatch 2019: the top wearables you can buy today." https://www.techradar.com/news/wearables/best-smart-watches-what-s-the-best-wearable-tech-for-you-1154074, October 2019.

[5] Apple, "Apple watch series 5." https://www.apple.com/ca/shop/buy-watch/apple-watch.

[6] Fitbit, "Fitbit charge 3." https://www.fitbit.com/en-ca/charge3.

[7] Garmin, "Garmin forerunner 235." https://buy.garmin.com/en-CA/CA/p/529988.