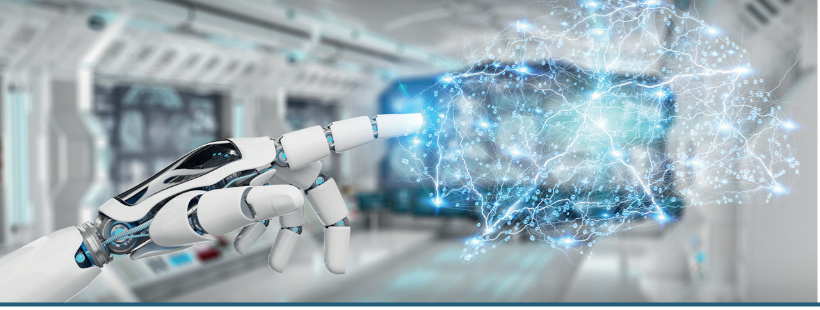

5. BÖLÜM

SAĞLIK HİZMETLERİNDEKİ IoT TEKNOLOJİLERİNİN GÜVENLİK RİSKLERİ VE ALINABİLECEK TEDBİRLER

Uğur CORUH [1]

GİRİŞ

Sağlık sektörü gelişen teknolojiye uyum sağlayarak IoT (Internet-of-Thing) unsurlarıyla birçok izleme, analiz, teşhis ve tedavi uygulamasını hayata geçirmiştir. IoT altında IoH (Internet-of-Health) adında bir alt dal ile birlikte maliyeti düşük, kişiselleştirilmiş ve önleyici sağlık uygulamaları Health 2.0 olarak yaygınlaşarak erken teşhis ve önleyici tedavilerin uygulanmasını kolaylaştırmıştır (1). Bütün bunların getirisi olarak öncesinde birbirine yakın olan hasta ve doktor ilişkisinin uzaktan yönetilmeye başlanması veya hastalar ile ilgili kararların otonom sistemlere emanet edilmesi kurulan sistemlerin belli güvenlik ve kalite gereksinimlerini sağlamalarını zorunlu kılmıştır (2). Akıllı sağlık uygulamaları konseptine uygun bir şekilde ilerleyen bu çalışmalar sağlık ekosisteminin yapısında ciddi değişiklikler yaparak klinik ilaç araştırmalarına da avantaj sağlayacak bir hale getireceği Şekil 1'deki veri zenginleştirme akışında gösterilmiştir (3).

Bu bölümde öncelikle sağlıkta IoT uygulama örnekleri verilmiş, sonrasında 3 ve 4 katmanlı sağlık IoH mimarisi ve arayüzleri tanımlanarak uygulamaların çalıştığı platform tanıtılmıştır. Genel olarak IoT saldırı türleri ve bunların etkilerine değinilmiş ve son olarak bu saldırı türlerine bağlı güvenlik gereksinimleri belirtilmiştir.

[1] Dr. Öğr. Üyesi, Recep Tayyip Erdoğan Üniversitesi Mühendislik ve Mimarlık Fakültesi, Bilgisayar Mühendisliği Bölümü, ugur.coruh@erdogan.edu.tr / ugur.coruh.tr@gmail.com

geliştirme platformlarının güvenliği. Bu noktada verilerin bir noktadan başka bir noktaya taşınması için simetrik ve asimetrik şifreleme yöntemleri kullanılır. Veriler taşınırken veri gizliği ve bütünlüğünü sağlayan şifreleme yöntemleri tercih edilir. Hassas verilerin hem cihazlar hem de sunucu üzerinde güvenli bir şekilde saklanması gerekir. Cihaz üzerinde eğer ki bir şifreleme ve güvenli depolama alanı yoksa whitebox şifreleme çözümleri kullanılır sunucu tarafında ise bu ihtiyaç HSM (hardware security module) cihazları ile giderilir. Veri uygulama içinde kullanılırken şifreleme operasyonlarıyla çözülmüş ve saldırıya açık bir hale gelmiş olabilir bu durumları önlemek için kod içerisindeki çalışma alanının bütünlük kontrolünü yapan mekanizmalar geliştirilmiştir. Uygulamaların fizibilite gereksinimlerine bakıldığında ise IoH donanımları sağlık ve mental sinyalleri alıp işleyebilecek algılayıcılara ve bu sinyalleri dışarıya sızdırmayacak şekilde donanım korumasına sahip olmaları gerekebilir. Kritik sistemler ve normal kullanıcılar belli bir gecikme süresini kabul edebilirler, Son kullanıcıya ve ihtiyaca uygun gerekli performans kriterlerini sağlamaları gerekebilir (50). Sahip olunan cihaz veya ameliyatla yerleştirilen implant kullanım alanına göre belli bir güç yönetimine sahip olması gerekir ki sistemi kullanan kişileri mağdur etmeden alınan hizmetin sürekliliği sağlanmış olsun (52,53). Kablolu ve kablosuz bağlantı arayüzleri analiz ve inceleme için belli bir eşik değerinin üstünde ağ trafiğini desteklemelidirler (54-57). Yine aynı şekilde kullanılan cihazlar belli işlem yükünü kaldıracak işlemci donanımlara sahip olmalıdırlar (51). Son olarak da yeni trend ile birlikte gelen toplanan bütün veriden son kullanıcıların faydalanabileceği tavsiye, öneri, tedavi gibi çıkarımlar yapılabilmeli (49).

SONUÇ

IoH gelişimi ile her şeyin birbirine bağlı olduğu bir ekosistem oluşmuş durumdadır. Bu platformlar ile en başta izleme olmak üzere verilerin işlenmesi ile öneri uygulamaları da hayatımızda yer edinecektir. Bütün bu kişisel veri akışı da belli hizmet kalitesini garanti edecek şekilde bu ekosistemin her noktasında her türlü saldırı için korunacaktır.

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